BIRDS OF THE

"COPYRIGHTED BY THE MASSACHUSETTS AUBUDON SOCIETY."

1. Cedar Bird (**Ampelis Cedrorum**)
2. Chickadee (**Parus Atricapillus**)
3. Song Sparrow (**Melospiza Fasciata**)
4. Cardinal (**Cardinalis Cardinalis**)
5. Wood Pewee (**Horizopus Virens**)
6. Red-Eyed Vireo (**Vireo Olivaceus**)
7. Black-Throated Green Warbler (**Dendroeca Virens**)
8. Chestnut-Sided Warbler (**Dendroeca Pennsilvanica**)
9. Baltimore Oriole (**Icterus Galbula**)
10. Chimney Swift (**Chaetura Pelagica**)
11. Scarlet Tanager (**Piranga Erythromelas**)
12. Cowbird (**Molothrus Ater**)

13. Golden-Crowned Kinglet (**Regulus Satrapa**)
14. Tree Swallow (**Tachycineta Bicolor**)
15. Bluebird (**Sialia Sialis**)
16. Kingbird (**Tryannus Tyrannus**)
17. Wood Thrush (**Turdus Mustelinus**)
18. Rose-Breasted Grosbeak (**Zamelodia Ludoviciana**)
19. Oven-Bird (**Siurus Aurocapillus**)
20. Indigo Bunting (**Passerina Cyanea**)
21. Maryland Yellow-Throat (**Geothlypis Trichas**)
22. Redstart (**Setophaga Ruticilla**)
23. Least Flycatcher (**Empidonax Minimus**)
24. Purple Finch (**Carpodacus Purpureus**)

THE STANDARD AMERICAN ENCYCLOPEDIA

A Dictionary of Universal Knowledge in eight volumes—Fully illustrated

VOLUME V

EDITOR-IN-CHIEF

GEORGE J. HAGAR

Editor of *Harper's Encyclopædia of United States History;* Member of the Editorial Board of *The International Cyclopædia;* Editor of *The Columbian Encyclopædia, etc., etc.*

Partial List of Associate Editors and Special Contributors

SAMUEL WALKER BEYER, Ph.D.
Professor of Geology, Iowa State Coll.

AMOS P. BROWN, Ph.D.
Professor of Geology, University of Pennsylvania

Rev. GEORGE BRYCE, D.D., LL.D.
Authority on Canadian History

Rev. FRANCIS E. CLARK, D.D.
Founder and President of the United Society of Christian Endeavor

CHARLES A. CONANT
Financial Expert and Author

JAMES CARDINAL GIBBONS
Archbishop of Baltimore

Rev. EDW. E. HALE, S.T.D., LL.D.
Late Author, Lecturer and Critic

JOHN H. HAMMOND, A.M.
Consulting Engineer

HALSEY C. IVES, LL.D.
Director of the St. Louis Museum and School of Fine Arts

HOSEA M. KNOWLTON, LL.D.
Late Attorney-General of Massachusetts

JAMES L. LAUGHLIN, A.M., Ph.D.
Professor of Political Economy, University of Chicago

JESSE MACY, LL.D.
Professor of Constitutional History and Political Science, Iowa College

JOHN TROWBRIDGE, S.D.
Professor of Applied Science, Harvard University

WILLIAM H. WELCH, M.D., LL.D
Professor of Pathology, Johns Hopkins University

AND MANY OTHERS

THE WHEELER PUBLISHING COMPANY

NEW YORK — SAN FRANCISCO

AES
1915

COPYRIGHT, 1903
BY
THE AMERICAN MAGAZINE ASSOCIATION

COPYRIGHT, 1909
BY
THE HAMILTON BOOK COMPANY

COPYRIGHT, 1912
BY
THE UNIVERSITY SOCIETY INC.

Cl. A320944

THE STANDARD AMERICAN ENCYCLOPEDIA

IN EIGHT VOLUMES—FULLY ILLUSTRATED

Volume V

LAKSHMI—ORPHISM

Lakshmi (läksh′mē), in Hindu mythology, the name of the consort of the god VISHNU (*q. v.*), and considered also to be his female or creative energy.

Lala, Ramon Reyes, an American author; born in the city of Manila, Philippine Islands, March 1, 1857; was educated at St. Xavier's College, Hong Kong, St. John's College, London, and at Neufchâtel, Switzerland; traveled extensively; returned to Manila and engaged in business with his father. Owing to Spanish oppression he came to the United States, and was the first Filipino ever naturalized here. He became widely known in the United States as a lecturer on the people and land of his birth. He is the author of "The Philippine Islands" (1898) and of many magazine articles on Filipino subjects.

Lalande, Joseph Jérôme Le=Français de (lä-lo*ng*d′), a French astronomer; born in Bourg, Ain, France, July 11, 1732. Sent to Paris to qualify for an advocate, he was attracted to astronomy, which he studied under Delisle and Lemonnier. The latter persuaded the Academy of Paris to send Lalande to Berlin in 1751, to determine the moon's parallax, while Lacaille was sent to the Cape of Good Hope. On his return he was appointed one of the astronomers-royal, and in 1762 succeeded Lemonnier in the professorship of astronomy in the Collége de France, a post which he held during the remainder of his life. In 1795 he was appointed Director of the Paris Observatory. His character was marked by extreme vanity; nevertheless he contributed greatly to the general progress of astronomical science. His principal work is "Treatise on Astronomy" (2 vols. 1764). In 1802 he instituted the Lalande prize for the most notable astronomical book or observation of the year. He died in Paris, France, April 4, 1807.

Lalita=Vistara (lal′i-ta-vis′ta-rä), the name of one of the most celebrated works of Buddhistic literature. It belongs to the N. Buddhists, but is of unknown origin and antiquity, existing only in a debased Sanskrit version. It contains a narrative of the life and doctrine of the Buddha Sakya-muni, and is considered by the Buddhists as one of their nine chief works, treating of "Dharma," or religious law.

Lally=Tollendal (lä-lē-to-lo*ng*-däl′), **Thomas Arthur, Comte de Lally** and **Baron de Tollendal,** a French general; born in Romans, Dauphiné, France, in January, 1702. His father, Sir Gerard Lally, was an Irish Jacobite refugee, and commander of an Irish regiment in the French service. Lally distinguished himself as a soldier in Flanders, especially at the battle of Fontenoy; accompanied Prince Charles Edward to Scotland in 1745; and in 1756 was appointed commander-in-chief in the French East Indian settlements. He commenced vigorous hostilities against the British, took many towns, and besieged Madras itself; but, having sustained a severe defeat, he was compelled to retreat to Pondicherry, which was attacked in March, 1760, by land and sea by a greatly superior British force. Lally, however, held out for 10 months; then, capitulating, Jan. 16, 1761, he was conveyed as a prisoner of war to England. But, hearing that he had been accused of treachery and cowardice in India, he obtained leave to proceed to France for the vindication of his character. There he was thrown into the Bastille, and kept two years before his trial took place. The Parliament of Paris at last condemned him to death for betraying the interests of the king and the Indian Company, and the sentence was executed on May 9, 1766. But his son, supported by the powerful assistance of Voltaire, procured a royal decree, May 21, 1778, declaring the condemnation unjust, and restoring all the forfeited honors.

Lally=Tollendal, Trophimus Gérard, Marquis de, a French politician and author; born in Paris, March 5, 1751. He was one of those nobles who in the States General of 1789 united with the Third Estate; but, alarmed at the democratic tendencies of the National Assembly, he afterward allied himself with the court. He labored to procure for France a constitution with two chambers and a privileged aristocracy; and earnestly sought to protect the king, but was himself obliged to flee to England. After the Revolution of 18th Brumaire he returned to France. Louis XVIII. made him a peer. He wrote a famous "Defense of the French Emigrants" (1794), and a "Life of Wentworth, Earl of Strafford" (2d ed. 1814). He died in Paris, March 11, 1830.

Lamaism (lä′ma-izm), a system partly religious, partly political — the Church and State Establishment of Tibet — standing in the same relation to Buddhism proper as Roman Catholicism stands to primitive Christianity. It has also been defined as a "form of Buddhism, modified by Saivism and Shamanism." Buddhism was introduced into Tibet in A. D. 622 by Srong Tsan Kampo, who founded the present capital, now known as Lhasa. His zeal was now shared by his two queens, one named Bribsoon, a princess from Nepal, the other Wen Ching, a princess from China, who are said to have founded La Branq and Ra Mochay, the most famous religious houses in Tibet. From the death of this king down to about 850 is called the "First Introduction of Religion." More than a century of civil war followed, and in 971 there took place the "Second

Introduction of Religion" into Tibet. For more than 300 years Buddhism grew in power and wealth, and Kublai Khan embraced the doctrine of the Lamas. Under his successors the dignity of abbot at Sakya became hereditary, the abbots breaking the rule of celibacy. In 1390 Tsongkapa, the Tibetan monastic reformer, appeared in Lhasa, and at his death in 1419 he left three immense monasteries with 30,000 monks. The two things on which he insisted were, (1) the observance of celibacy, and (2) simplicity in dress. About the middle of the 15th century the Emperor of China acknowledged the leaders — the Dalai Lama and the Pantshen Lama — as titular overlords of the Church and tributary rulers of Tibet. They were abbots of the monasteries at Gedun Dubpa near Lhasa, and Krashis Lunpo in Further Tibet, and their successors still exercise the same rights. Both are looked upon as incarnations — living in heaven, and appearing on earth in an apparitional body. When one dies he is supposed to become incarnate in some male child born about that time. There is a hierarchy corresponding in a marked degree to that of the Roman Church, and Huc and Gabet describe the principal act of religious worship as wonderfully like a high mass. The political authority of the Dalai Lama is confined to Tibet, but he is head of the Buddhist Church throughout Mongolia and China.

La Mancha. See MANCHA, LA.

Lamar, Joseph Rucker, an American jurist; born in Ruckersville, Ga., Oct. 14, 1857; received a university education; was admitted to the bar in 1879; practiced in Augusta, Ga., in 1879-1903; member of the Legislature in 1886-1889; appointed a commissioner to codify the laws of Georgia in 1895, and an associate justice of the Supreme Court of that State in 1903; and became an Associate Justice of the Supreme Court of the United States in 1910.

Lamar, Lucius Quintus Cincinnatus, an American jurist; born in Jasper co., Ga., Sept. 1, 1825. Admitted to the bar in 1847, he served two terms as congressman from Mississippi (1856–1860). In 1861, after taking part in the secession convention of Mississippi, he entered the Confederate army and achieved distinction. After the downfall of the rebellion he was Professor of Political Economy and Law Professor in the University of Mississippi, and afterward served in both Houses of Congress, manifesting a fraternal feeling toward the North attracting general attention. In 1885 he was appointed Secretary of the Interior and in 1887 became an Associate Justice of the United States Supreme Court, bringing all the brilliant resources of his intellect to the discharge of his official duties. He died in Macon, Ga., Jan. 24, 1893.

Lamar, Mirabeau, 2d president of the republic of Texas; born in Louisville, Ga., Aug. 16, 1798. After some years' experience in mercantile pursuits and farming, he founded a newspaper, devoted to State rights, called the "Columbus Inquirer," and in 1835 removed to Texas, then on the verge of revolution. He at once threw himself into the cause of independence, and highly distinguished himself at the battle of San Jacinto. He afterward became, successively, attorney general and secretary at war to the new republic. In 1836 he was elected vice-president, and in 1838 president, holding the latter office till 1841. On the outbreak of the Mexican war he (with the rank of Major-General) served at the battle of Monterey under General Scott. He was afterward employed in operations against the Comanche Indians, and eventually appointed United States minister to Nicaragua and Costa Rica. He died in Richmond, Tex., Dec. 19, 1859.

La Mara (lä mär'ä), pseudonym of MARIE LIPSIUS, a noted German writer on music; born in Leipsic, Dec. 30, 1837. Her interesting work, "Studies of Musicians' Heads" (5 vols. 1868–1882), had a wide circulation. She was author also of "Musical Thoughts" (1873), a collection of sayings of eminent musicians; "Letters of Musicians" (1886); "Classicism and Romanticism in the World of Music" (1892).

Lamarck (lä-märk'), **Jean Baptiste Pierre Antoine de Monet, Chevalier de,** a French naturalist; born in Bazantin, Picardy, France, Aug. 1, 1744. A soldier in his youth, he had already begun to distinguish himself, when an accident compelled him to relinquish the army. Like many other naturalists, his first study was botany. The first work he published was the "French Flora," which met with great success. Other botanical works soon followed, and for some time Lamarck seemed completely occupied with these and works of a more speculative kind. In 1793 he was appointed to a chair of natural history at the Garden of Plants, and turned his attention to the study of zoölogy. In a few years he had made himself thoroughly master of the subject; and his great and excellent work, the "History of Invertebrate Animals," will ever entitle him to take his place in the very first rank of zoölogists. As a conchologist his name stands preëminent, and the Lamarckian arrangement of shells is still that of the present day. In his latter days he became blind and comparatively poor. He died in Paris, Dec. 18, 1829.

Lamarmora (lä-mär'mō-rä), **Alfonso, Marquis,** an Italian soldier; born in Turin, Nov. 18, 1804. He left the military academy at Turin in 1823, and thenceforward devoted himself to army reform. He was

engaged in checking the revolutionary movements of 1848, and soon after became minister of war. In 1854 he commanded the Sardinian troops in the Crimea. He accompanied Victor Emmanuel to the field in 1859 against Austria, and after the peace became president of the council. He was ambassador to Prussia in 1861, to France in 1867, and was governor of Rome 1870–1871. He died in Florence, Jan. 5, 1878. His elder brother, ALBERTO COUNT LAMARMORA (1789–1863) entered the French army, and was military governor of the Island of Sardinia. He published an important account of the island.

Lamartine (lä-mär-tēn′), **Alphonse Marie Louis Prat de,** a French poet and statesman; born in Macon, France, Oct. 21, 1790. After being educated at the Jesuit

ALPHONSE LAMARTINE.

school at Belley he spent some years in the country and in traveling, without any definite occupation, devoting himself chiefly to poetry. By his first production, "Poetical Musings" (1820), he at once obtained a high place among the poets of the day. In 1820 he was attached to the legation at Naples, and married a rich English lady, Eliza Marianna Birch. "New Poetical Musings" (1823), and "Poetical and Religious Harmonies" (1828), established his poetic fame and obtained for him admission into the French Academy (1830). After the revolution of July he traveled in the East, and on his return published "Journey in the East" (1835). During his absence he had been elected a member of the Chamber of Deputies, and thenceforward his career was as much political as literary. In 1847 he published his "History of the Girondins," in which he manifested strong republican leanings. After the February revolution of 1848 he became a member of the provisional government in the capacity of minister of foreign affairs. For some months he enjoyed unbounded popularity, and his energetic behavior was on more than one occasion the means of averting incalculable evils. After the insurrection of June, 1848, he lost his popularity, and in 1851 withdrew from public life. He was latterly much impoverished, and was voted an annuity in 1867. Among his later works, which did not add to his reputation, were "History of the Restoration," "History of Turkey," "History of Russia," "The Civilizer," "Snakespeare and His Work," "Life of the Tasso," etc. His "Memoirs" appeared in 1871. He died in Paris, March 1, 1869.

Lamb, Charles, an English author; born in London, England, Feb. 10, 1775. He was educated at Christ's Hospital, where the poet Coleridge was his schoolfellow. Debarred from entering the clerical profession owing to an impediment of speech, he obtained an appointment in the South-Sea House, in 1789, which he quitted in 1792, to take a situation in the accountant's office of the East India Company, from which he retired in 1825 on a pension of $2,250 per annum. Lamb's life was even, and comparatively uneventful. A confirmed bachelor, he resided for the great part of his life with an accomplished sister, to whom he was devotedly attached. Their pleasant house at Islington was the first resort of the most brilliant literary coterie of the first half of the 19th century, excepting only, perhaps, the famous Holland House clique. Lamb's genial wit and hospitality drew around his tea table the poets Coleridge, Lloyd, Southey, Wordsworth, Dyer, Barton, Leigh Hunt, Cary (the translator of Dante), Procter, and Hood; Godwin the novelist; Hazlitt the critic; Talfourd the accomplished judge and dramatist; De Quincey the philosopher; Manning the theologian (afterward Archbishop of Westminster); etc. In 1796 and 1797 some short poems by him appeared along with others by Coleridge, and in 1798 he published a volume of poems in conjunction with his friend Charles Lloyd. It met with little success. On the other hand, his tale of "Rosamund Gray" (1798) was well received when it appeared, and is still a favorite with those who have a taste for Lamb's writings. In 1807 he wrote, in conjunction with his sister, a series of "Tales from Shakespeare," "Mrs. Leicester's School," and the "Adventures of Ulysses." All these proved very popular books for children. In 1808 he published "Specimens of English Dramatic Poets contemporary with Shakespeare," with notes in which he draws attention to the simplicity and purity of the diction of the dramatists of that period. Almost all his other productions were contributions to different periodicals of his day. By far the best known, a series of essays, appeared first in the "London Magazine," under the

name of "Elia." They have been frequently republished in a collected form since 1823, latterly along with "Last Essays of Elia," first published in 1833. Here, in a style ever happy and original, and with humor of the rarest and most pungent description, he has carried the short essay to a point of excellence perhaps never before attained. He died in Edmonton, England, Dec. 27, 1834.

Lamb, Isaac Wixan, an American inventor; born in Salem, Mich., Jan. 8, 1840. He is known principally by his invention of a knitting machine which can produce more than 30 kinds of knit goods and make about 4,000 loops a minute at ordinary speed, besides turning out both flat and tubular work. He died in 1906.

Lamb, Martha Joan Reede Nash, an American historian; born in Plainfield, Mass., Aug. 13, 1829; received an excellent education; married Charles A. Lamb in 1852 and settled in Chicago, Ill.; was secretary of the United States Sanitary Commission Fair in 1863; settled in New York city in 1866 and devoted herself to literature, becoming editor of the "Magazine of American History" in 1883. Her publications include "History of the City of New York"; "The Homes of America" "Wall Street in History"; "Memorial of Dr. J. D. Russ"; etc. She died in New York city, Jan. 2, 1893.

Lamballe (lo*ng*-bäl′), **Marie Thérèse Louise of Savoy-Carignan, Princesse de,** a French princess; a daughter of the Prince of Carignan; born in Turin, Sept. 8, 1749. Beautiful and charming, she was made by Marie Antoinette superintendent of the royal household, and her own intimate friend and companion. Princess Lamballe proved her devotion to her royal mistress by returning to France (whence she had escaped to England) after the unsuccessful flight from Versailles, by sharing the queen's imprisonment for a week in the Temple, and finally by refusing to take the oath expressing detestation of the king, queen, and monarchy (Sept. 3, 1792). As she stepped out of the court room on that fatal day she was cut to the ground; her body was given up to the fury of the populace, who paraded her head and heart on pikes in front of the queen's windows.

Lambecius (lam-bē′shus), called PETER LAMBECK, a German scholar; born in Hamburg, April 13, 1628. He was teacher of history in the high school of his native city from 1652 to 1660, when he became its rector. He then became superintendent of the Imperial Library, Vienna. His principal writings are: "Introduction to Literary History" (1659), the first methodical work of the kind; "Notes On the Imperial Library" (8 vols. 1665–1679), a work of great value for early German language and literature. He died in Vienna, April 3, 1680.

Lamber, Juliette. See ADAM, JULIETTE.

Lambert, Daniel, an Englishman noted for his extraordinary size; born in Leicester, England, March 13, 1770. He was exhibited in London and the principal towns of England, and at the time of his death was 5 feet 11 inches in height, weighed 730 pounds, and measured 9 feet 4 inches round the body, and 3 feet 1 inch round the leg. He died in Stamford, England, July 21, 1809.

Lambert, Johann Heinrich (läm′bert), a distinguished German philosopher and scientist; born in Mühlhausen, Alsace, Aug. 26, 1728. He was entirely self-educated. At 16 he calculated the period of the comet of 1744, according to the "Lambertine theorem." He became tutor in the household of a nobleman in 1748, and in 1759 was appointed professor in the Munich Academy. He was called to Berlin (1764) by Frederick the Great. His masterpiece in philosophy is the "New Organon, or Thoughts On the Research of Truth" (2 vols. 1764); in physics he laid the foundations of photometry, pyrometry, and hygrometry; in his "Cosmological Letters" (1761), he sets forth the views still held by astronomers regarding the nature of the fixed stars; not less important are his researches in pure mathematics. He died in Berlin, Sept. 25, 1777.

Lambert, John, an English Parliamentary general during the English Civil War; born in Kirkby Malhamdale, Yorkshire, Sept. 7, 1619. He entered the Parliamentary army under Fairfax, was colonel at Marston Moor, and Major-General in the war in Scotland. He took the lead in the council of officers who gave the protectorate to Cromwell, but he afterward fell into disgrace and was deprived by Cromwell of all his commissions, though a pension of $10,000 was allowed him for past services. He headed the confederacy which deposed Richard Cromwell, and in 1660 set out for the N. to encounter Monk, but was deserted by his troops, seized, and committed to the Tower. At the Restoration he was excepted from the act of indemnity, brought to trial, and condemned to death, but had his sentence commuted to banishment to Guernsey. where he died in 1683.

Lambertini. See BENEDICT XIV.

Lambert Pine, *Pinus lambertiana*, a gigantic tree, discovered by Douglas in New Albion. Trunk, lofty and erect; leaves five, rather stiff, bright green, with no sheaths; cones very large and pendulous; seeds large and used for food.

Lambese (lo*ng*-bāz′), or **Lambessa** (lam-bes′sä), a town of Algeria, depart-

ment of and 62 miles S. W. of the town of Constantine. It is the site of the ancient Lambæsa, and has important Roman remains.

Lambeth, one of the English metropolitan parliamentary boroughs, S. of the Thames, in the county of Surrey, and forming part of the S. W. quarter of London. Lambeth Palace has been the official residence of the archbishops of Canterbury since 1197. It contains a splendid series of portraits of the archbishops, and a valuable library of 30,000 volumes, with many fine MSS. The Lollards' Tower, so named in comparatively modern times from the notion that heretics were here imprisoned, was really a water tower. It dates from 1434, but has been restored and modernized. The nine Lambeth Articles, drawn up in 1595, were strongly Calvinistic. They were never in force. Pop. (1901) 301,873.

Lambeth Conference. See ANGLICAN CHURCH.

Lamboys, in old armor, skirts of steel plates, flexible and overlapping, attached to the front and back pieces of the cuirass, and hanging over the thighs; worn especially in Germany in the earlier part of the 16th century. They were cut away before and behind, to allow the rider to sit on his horse.

Lambrequin. See MANTLING.

Lamb's Lettuce. See CORN SALAD.

Lamech, a descendant of Cain, in the 5th generation, and ancestor of a numerous posterity distinguished for skill in agriculture, music, and several mechanical arts. He is the first polygamist on record. Another Lamech, son of Methuselah, and father of Noah, lived 777 years, and died only five years before the flood (Gen. v: 25–31).

Lamellibranchiata (-brang-ki-ā'tă), a division of the higher mollusca, represented by the oysters, mussels, cockles, etc., which are distinguished by the possession of a bivalve shell, the absence of a distinct head, and the presence of four lamellar or plate-like gills (whence the name).

Lamellicornia (-kor'ni-ă), or **Lamellicornes** (-kor'nēz), a tribe of beetles having short antennæ terminated by a lamellated club — *i. e.*, a club composed of lamellæ or little plates — formed by the expansion on one side of the three apical joints. The mentum is solid and horny; the legs are long, and have spines and tooth-like projections on the fore ones, enabling them to dig with facility. The larvæ are soft and cylindrical, with a large vertical head. There are six small legs attached to the thoracic segments. Some live in the ground, feeding on the roots of plants, and others in decayed animal and vegetable matter, which affords them food. They are all herbivorous. Among them are the most bulky and some of the most splendid beetles existing. More than 7,000 species are known. They are divided into two families: *Scarabeidæ* and *Lucanidæ*.

Lamellirostres (-ros'trēz), a family of swimming birds, distinguished by the flat form of the bill, which is invested by a soft skin, and provided at the edges with a set of transverse plates or lamellæ, through which the mud, in which these birds grope for food, is sifted or strained. The family comprises the ducks, geese, swans, flamingoes, etc.

Lameness, a disability commonly due to some abnormal condition either of the joints or of the muscles and fasciæ of the lower limbs; mere difference in length between the two limbs, even to the extent of an inch or more, is not necessarily incompatible with a natural gait. It is generally one of the earliest symptoms of disease in the joints; and permanent stiffness of any of these, whether the result of disease or of injury, always involves some degree of lameness. The weakness and imperfect development of the muscles which usually follow infantile paralysis is one of the commonest muscular causes. Severe wounds or rupture of any of the important muscles must also be mentioned. Unnaturally shaped or ill-fitting boots, with the corns, bunions, distortion of toes, and other ill effects they produce, are a fertile source of lameness; but conditions thus produced are generally in some degree amenable to treatment. Among the causes most apt to be overlooked are the slighter degrees of flat-foot, of contraction of the calf-muscles, or other muscles whose tendons are inserted into the bones of the foot, and of the plantar fascia. See ARTIFICIAL LIMBS.

Lamennais, Hugues Félicité Robert de (lä-muh-nā').a French writer; born in St. Malo, June 19, 1782. He was ordained priest in 1817. The same year appeared the first volume of his "Essay upon Indifference in the Matter of Religion" (1807–1820), a work of profound learning and of strict orthodoxy. He developed his views further in "Religion Considered in its Relation to the Civil and Political Order" (1825), and "Progress of the Revolution and of the War against the Church" (1829). By degrees he became the critic of Church policy, and

HUGUES F. R. DE LAMENNAIS.

his journal "L'Avenir" (The Future) was condemned by the Pope. Lamennais bowed to Rome's decree; but after a year was published his "Words of a Believer" (1834), in which he repudiates all authority of popes and bishops. The little volume is written in archaic style, imitating the language of the Hebrew sacred books; it had an enormous circulation among the masses of the people in every country of Europe. It was followed by "The Book of the People" (1837), and "The Past and the Future of the People" (1842), in the same tone. He wrote also: "Sketch of a Philosophy" (3 vols. 1841); "Religion"; and translated the Gospels, accompanying the text with notes. He died in Paris, Feb. 27, 1854.

Lamentations, one of the shorter books of the Old Testament. No author's name is attached to it in the Hebrew Bible, where it is simply designated from its first two words, *ekhah* = "O how." The Septuagint translators called it *Threnoi Ieremiou* = "Dirges or Lamentations of Jeremiah." Universal tradition attributes it to him, and the style is that of his acknowledged prophecies. Compare Lam. i: 15, ii: 13 with Jer. xiv: 17; Lam. i: 16, ii: 11, iii: 48-9 with Jer. ix: 1, xiii: 17, xiv: 17; Lam. iv: 21 with Jer. xlix: 12, etc. Each of the five chapters is a distinct elegy. Chapters i, ii. and iv have each 22 verses, and beginning with the 22 Hebrew letters alphabetically arranged. Chapter iii has 66 verses, commencing with the letters of the alphabet, thrice repeated. The fifth chapter is not alphabetically arranged, though it also has 22 verses. The theme is the destruction and desolation of Jerusalem and the slaughter of many of its inhabitants, with the misery of the survivors. It is chanted in part of the Jewish ritual on the 9th of Ab, in our month of July.

Lamero (lam′-), in metallurgy, a walled receiver, where the slimes (mud charged with auriferous or argentiferous particles, or both) are deposited from the arrastra, to part with a portion of their water, and accumulate till sufficient to form a torta, in which the amalgamation is performed.

Lamettrie, Julien Offray de (lä-muh-trē′), a French philosopher; born in St. Malo, France, Dec. 25, 1709. He studied first for the Church, but subsequently went over to medicine and was trained by Boerhaave at Leyden. He entered the French army as surgeon in 1742; but the publication in 1745 of a materialistic work, "Natural History of the Soul," roused such a feeling of odium against him that he was compelled to seek refuge in Leyden (1746). But in Leyden the fear of persecution still dogged his footsteps; he published "Man the Machine" (1748), and was glad to escape a threatened arrest by accepting an invitation from Frederick the Great of Prussia to settle in Berlin. In Germany Lamettrie continued his materialistic studies in "Man the Plant" (1748), "The Art of Enjoying" (1751), "Pleasure," etc. A good deal of the enmity excited against him was occasioned by cynical and satirical books which he published against the medical men, including such great authorities as Boerhaave, Linnæus, Astruc, Winslow, etc. Lamettrie died in Berlin, Nov. 11, 1751.

Lamia (lā′-), a monster said to inhabit the center of Africa, with the face and upper part of the body like a woman, and the extremities like a serpent. The first lamia, according to classic mythology, was the daughter of Neptune, who, having become insane through the jealousy of Juno, caught and devoured all new-born children she came across. The lamias, however, of the ancients, were sometimes represented as a species of monstrous animal, or again as a vampire. This latter character is seized on and carried out by Goethe in his "Bride of Corinth," where a young man is represented as marrying a lamia, who sucks his life-blood at night. A tale, somewhat similar in construction, occurs also in Philostratus's "Life of Apollonius of Tyana"; and in Keats's "Lamia."

Laminaria (-nā′), a genus of algals, the typical one of the family *Laminaridæ*, or the order *Laminariaceæ*. In place of leaves there is a plane ribless expansion. The stem is either naked or fringed. The young stalks of *L. digitata* and *L. saccharina*, called tangles, are eaten. The first of these with *L. bulbosa* are most valued of the genus for kelp manufacture. *L. saccharina* is used as an imperfect hygrometer. It is administered in India in goiter, scrofula, and syphilis. So are *L. bracteata* and the large Australian species, *L. potatorum*.

Laminarian Zone, in zoölogical geography, the second of the great marine zones into which mollusks are distributed, a zone from low water to 15 fathoms in depth. The laminaria and other seaweeds form miniature forests in which are the vegetable-feeding mollusks, *Lacuna*, *Rissoa*, also bivalves, cephalopods, etc. In tropical seas there is often coral instead of seaweeds. The oyster beds of the N. and the pearl fisheries of the S. are in the laminarian zone.

Laminated Pipe, water, sewer, or gas pipe made of thicknesses of veneer or scale board successively wrapped to obtain thickness and strength. Each layer is thoroughly saturated with asphalt, and the grain of alternate layers passes in transverse directions, so as to secure an intimate bond and a line of resistance to disruption in any direction, lengthwise, oblique, or across

the pipe circumference. The veneer is sometimes made to alternate with fabric or an adhesive composition.

Laminating Machine, a gold-beater's rolling-mill for reducing the ingot of gold to such a thickness that a square inch will weigh 6½ grains. The ingot weighs two ounces, and is three-quarters of an inch broad. The rollers are of hard steel, and extend the ingot to a ribbon. The gold is frequently annealed during the process.

Lamination, the arrangement of rocks in thin layers or laminæ, the condition of a large proportion of the earth's strata. Shale deposits exhibit this structure very plainly, being frequently easily separable into the thin laminæ in which they were originally deposited. Shale is the fine sediment that settles down at the bottom of some tranquil or slightly-moving water. The laminæ indicate interruption in the supply of the materials, which may have been occasioned by successive tides, by frequent or periodical floods, or by the carrying medium having access to a supply of different material, passing, *e. g.*, from mud to sand, and back again to mud. The laminæ of the brick-clay deposits are separated, in many places, by the finest sprinkling of sand, which is almost invisible in the vertical sections. The layers are occasionally obvious, from their being of different shades of color, often produced by the bleaching of the layers when they were deposited; but frequently the various laminæ of a bed are so united, and the bed so homogeneous, that except when the face is exposed to weathering, the laminated structure is not visible. This condition seems to have resulted from the shortness of the interruptions in the deposit not permitting the solidification of any of the layers till all were deposited, when the whole set cohered together as a single bed.

Lamington, Alexander Dundas Ross Wishard Baillie Cochrane, Baron, an English author; born in November, 1816. He was the eldest son of Admiral Sir Thomas J. Cochrane, and one of the leaders of the Young-England Party in Parliament. "Exeter Hall or Church Polemics" (1841); "Morea," a poem; "The State of Greece" (1847); "Ernest Vane," a novel; "Florence the Beautiful" (1854); "Francis the First, and Other Historical Studies" (1870); "The Théâtre Français in the Reign of Louis XV." (1879), constitute his chief works. He died in London, Feb. 15, 1890.

Lammas, a name given to the first day of August, though the origin of the term is involved in obscurity. It is the day of the feast of St. Peter ad Vincula, or St. Peter in Bonds, which was instituted in 317, and, according to some authorities, received its title from the Divine commission to Peter, "Feed my lambs." Others state that it is a corruption of the Saxon *Loaf-mass*, because an annual feast was then celebrated to return thanks for the first-fruits of corn. Lammas day is one of the four cross quarter-days of the year, Whitsuntide being the first, Lammas the second, Martinmas the third, and Candlemas the fourth.

Lämmergeier (lem-mer-gī'er) (*Gypaëtos barbatus*), a large bird of prey, also called the bearded vulture or bearded griffin. The full-grown bird is of a shining brownish-black color on the upper parts, with a white stripe along the shaft of each feather; the head is whitish, with black stripes at the eyes; the neck and underpart of the body are rusty yellow. It is the largest bird of prey in the Old World, measuring almost 4 feet high when sitting, nearly 5 feet in length, and from 9 to 10 feet in expanse of wing. Though by no means brave, it is bold and rapacious, swooping down on hares, lambs, young goats, chamois, etc., and sometimes, it is said, on infants. But as the feet and claws are comparatively weak, only young and light animals are lifted, and it is very difficult to believe the circumstantial tales of their carrying children. The usual food consists of animals newly killed, but carrion and even offal are not despised. Once common in the Alps, it is now very rare, but occurs not infrequently in Sardinia, the Pyrenees, North African mountains, and the Himalayas, where it often soars high above the loftiest peaks. The lämmergeier is said by some to be the original of the fabulous "roc."

Lammermoor, or **Lammermuir** (-mūr') **Hills,** a range of Scotch hills stretching in a generally E. direction from S. E. Midlothian to the German Ocean at St. Abb's Head, and forming part of the boundary between Berwick and Haddington shires. Highest summit Lammer Law, 1,733 feet.

Lamon, Ward Hill, an American biographer; was a law partner of Abraham Lincoln, and after the latter's election as President became his private secretary and was appointed by him marshal of the District of Columbia. His works are: "Life of Abraham Lincoln, from His Birth to His Inauguration as President" (1872); "Recollections of Abraham Lincoln." He died in Martinsburg, W. Va., May 7, 1893.

Lamont, Daniel Scott, an American executive officer; born in Cortlandville, N. Y., Feb. 9, 1851; was educated at Union College and engaged in journalism; private secretary to President Cleveland in 1885–

1889 and Secretary of War in 1893-1897; then vice-president of the Northern Pacific Railway Company. He died July 23, 1905.

Lamoricière, Christophe Léon Louis Juchault de (lä-mō-rē-syār′), a French general; born in Nantes, France, Feb. 6, 1806. He entered the army as an engineer in 1826, and saw active service in Algeria, taking part in nearly all the military events which occurred in that country 1833–1847. It was through his energy chiefly that the war against Abd-el-Kader was brought to a successful end by the capture of that chief in 1847. In June, 1848, Lamoricière commanded the attack on the barricades in Paris, and quelled the anarchic tumults of the Socialists. He was war minister during the government of Cavaignac; but was arrested on the occasion of the coup d'état of Dec. 2, 1851, and banished from France. When the Italian war of independence threatened the safety of the Pope, Lamoricière proceeded to Rome in 1860, and was appointed by Pius IX. commander of the papal troops. He was, however, defeated at Castelfidardo by the Sardinian general, Cialdini, Sept. 18, and on the 29th capitulated at Ancona. He died near Amiens, Sept. 10, 1865.

La Motte, Jeanne de Valois, Comtesse de, a French adventuress; a descendant of the family of Valois by an illegitimate child of Henry II., and notorious for the part she played in the "diamond necklace" fraud; born in Champagne, July 22, 1756. She married the Comte de la Motte, a penniless adventurer, and settled in Paris about 1780. In the years 1783–1784 the Prince-Cardinal de Rohan, who had fallen into disgrace, was persuaded by her that the Queen Marie Antoinette regarded him with much favor, which would be increased if he would assist her in purchasing a valuable diamond necklace which Louis XV. had ordered for Madame du Barry, but which was still in the jeweler's hands. The cardinal fell into the snare, he agreed to stand surety for the payment, and the necklace was delivered to him. There is here yet somewhat of mystery. Cagliostro (*q. v.*), and probably the queen also, was in the plot; the necklace disappeared, was broken up and sold, probably by the La Mottes. The jeweler, after waiting a long time for his money, applied direct to the court, and the plot was discovered. Cagliostro, the cardinal, and others were thrown into the Bastille, but at the trial only the La Mottes were convicted. They escaped to England, where the comtesse wrote "Memoirs" implicating the queen in the fraud. She was killed in London by falling out of a window, Aug. 23, 1791. Her husband lived a miserable wandering life till his death in 1831.

La Motte-Fouqué (-fö-kā′), **Friedrich, Baron de,** a German author; born in Brandenburg, Feb. 12, 1777. Entering the army, he served in the campaign of the Rhine, and had a share in the numerous engagements that were fought with the French for the liberty of Germany in the beginning of the 19th century. His first works appeared under the name of "Pellegrin"; and the numerous productions of his pen contributed not a little to fan the flame of patriotic ardor which led his countrymen to final victory. On quitting the army, he retired to Nennhausen, the property of his second wife, Caroline, and on her death, in 1831, he removed to Halle, where he delivered lectures on poetry and history. His beautiful fairy tale, "Undine," gained him a world-wide reputation. Among his other works are "Sintram," a fairy tale; "Aslauga's Knight"; and the poems, "Sigurd," "Corona," "Bertrand du Guesclin," etc. He died in Berlin, Jan. 23, 1843.

Lamp, a vessel used for the combustion of liquid inflammable bodies, for the purpose of producing artificial light. The invention of the lamp is ascribed to the Egyptians. In treating of the construction of modern lamps it is necessary to take into consideration the nature of the flame. In order to insure a constant and steady flame, it is necessary that the supply of combustible matter be steady and uniform. It must, therefore, be either in a liquid or gaseous state, so that it may approach the flame in an uninterrupted current. The combustible substance may either be made to approach the flame by capillary attraction through wicks, or by mechanical pressure. A good lamp must have the following properties: It must be supplied with carbonaceous matter and with oxygen; it must convert the former into a gaseous state; and it must bring the gas so produced into contact with oxygen at such a temperature that the carbon will combine with oxygen in the highest degree without producing smoke. The simplest way in which a lamp can be formed is that practised in making night-lights to burn in sick chambers. A small quantity of water is poured into a glass tumbler, or other vessel, and above that a quantity of oil; a piece of cork is then pierced so as to admit a few threads of cotton to pass through it, and the cork being placed on the oil, will float; the cotton threads will draw up the oil by capillary attraction, and a feeble, but clear light will be given. Till 1789 all lamps continued to be dim, smoky, ill-made articles, soiling everything they came near, and filling the air with anything but an agreeable odor. The invention and introduction of the Argand Lamp (*q. v.*) at that time made a revolution in illumination. Among the inventions which appear

Lamp

to indicate important progress in the history of lamp illumination, may be enumerated the following:

The Worms Lamp.— This lamp is used and well known in the countries bordering on the Rhine. It is characterized by the shape of the wick. The fibers of the wick, instead of being collected into a round bundle, are placed in small bundles side by side, forming together a flat ribbon. The effect produced by this arrangement is that the edges of the flame are at no point so distant that a nucleus can form in the center, which, from want of air, will burn incompletely and smoke. Another advantage possessed by this and other lamps to be described, is the movability of the wick. This is effected by means of screws. The wick is raised or lowered according as the screws are turned, and a large or smaller quantity of air is employed in the combustion. When the wick is high, a large quantity of oil is decomposed, and when low, a small quantity.

The Study Lamp.— In the common study lamp the oil-vessel is more flat, and, instead of being situated below, is behind and at the side of the flame, so that its shadow falls much beyond the immediate vicinity of the flame, and in no way interferes with the person in front of the lamp. The greater part, too, of the light passing upward, is collected by a conical shade and reflected downward.

The Astral Lamp.— This lamp was constructed by Bardier-Marcet, with the idea of making the sinking of the level of the oil as imperceptible as possible, and, at the same time, the diminution of the flame by means of a very flat oil-vessel, in which, therefore, a larger quantity of oil only occupies a very insignificant height. The principle of the astral lamp was applied to the Argand.

The Sinumbra Lamp.—In the sinumbra lamp (*sine umbra*, without shadow) the shadow is greatly reduced by making the circular oil-vessel in such a way that its three surfaces meet in the form of a flat wedge, the sharp edge being directed toward the flame. The position of the flame in relation to the oil-vessel is such that two tangents drawn from the base to the apex of the flame to the latter meet a few inches behind it. Beyond this point the lamp can cast no shadow; but even in this small space it is almost entirely destroyed by a ground-glass shade, which, resting on the oil-vessel, surrounds the chimney and scatters the light in all directions around.

In all these lamps one common evil is to be noticed; namely, that of having the oil-vessel at all events within a few lines of the level of the burner, in a position which, consequently, throws the most objectionable shadow. A large number of contrivances have been invented in order to remove the cistern, either to a considerable distance above the flame — when its shadow would fall on the ceiling — or to a position much below the flame, when it would fall at the foot of the lamp. In the former of these cases, from the peculiar arrangement of the oil-cistern, the height of the oil in the burner cannot be quite constant, but will alternately sink and immediately rise again to its former height; while in those lamps described previously, the suction of the wick is always rendered more difficult by the sinking of the oil. When the oil-cistern is transposed to the foot of the lamp, all shadow is avoided; but the advantage of the free flow of oil is lost; in all lamps of this sort, therefore, the oil must be raised. They are, therefore, interesting on account of their ingenious, but at the same time complicated, apparatus, which partly depends on hydrodynamic, partly on hydrostatic laws, and is partly also a mere mechanical arrangement.

Girard's Lamp.— In Girard's lamp the oil is raised by the compression of air somewhat after the manner of water in a fire engine, or as in Hero's fountain, where the pressure exerted in one vessel is transferred to another distant vessel by means of the compressed air.

The Hydrostatic Lamp.— The principle on which this lamp is constructed is as follows: When two different fluids are brought into tubes connected at the bottom, they will balance each other at different heights in the respective tubes, according to their densities.

Keir's Lamp.— In this lamp the oil is raised and supported by a column of salt and water sufficiently dense to support a column of oil four-thirds of its own height. Instead of the salt and water, other heavy liquids, such as syrup, honey, mercury, or a solution of sulphate of zinc, may be used. The zinc solution is 1.57 times denser than oil; hence a column 10 inches high will support a column of oil 15.7 inches in height.

Carcel's Mechanical Lamp.— In Carcel's mechanical lamp was first carried out the idea of pumping up the oil from the foot of the lamp to the wick by simple machinery, like that of clocks, and in such proportions as to exceed the quantity consumed during the whole period of burning. Carcel brought out his invention about 1800, and carried it to such perfection that only unimportant points connected with the works and the pump were left for the improvements of his successors, Gagneau, Nicod, Careau, and others. The complex arrangement of the machinery in Carcel's lamp, and other similar instruments, soon caused them to fall into disuse. All the difficulties which encompassed these arrangements seem, however, to have been surmounted in

Meyer's elliptic, and in the French moderator lamp.

The Elliptic Lamp.— In the elliptic lamp, a spiral spring acting on a piston is the motive power, and the constant flow of oil to the wick is regulated in an ingenious manner by means of a tube of narrow bore. A lamp of this kind will yield a good light for 8 or 10 hours, and will allow of the combustion of crude vegetable oils.

The Moderator Lamp.— But the greatest improvement ever effected in oil lamps was in the so-called French moderator, which combines the greatest amount of illuminating power with elegance of form, easy management, and general economy. It is a lamp for burning oil, paraffin, etc., in which the oil is forced through a tube up to the wick by a piston pressing on its surface, to which a downward impulse is communicated by a spiral spring situated between it and the top of the barrel or body of the lamp. The flow of the oil is moderated, or made uniform, by an arrangement inside the tube.

The Vesta Lamp.— Young's Vesta lamp, introduced in 1834, employed camphine, a volatile hydrocarbon spirit distilled from turpentine, as an illuminant, this lamp being constructed on the round wick, or Argand, principle, with a button or constrictor over the central air tube and a constricted chimney.

Of recent years the introduction of mineral oils as illuminants has caused a great variation in the construction of lamps, and a host of patents have been taken out for paraffin or kerosene lamps, some of which equal gas in illuminating power. In these the flat wick is widely used, its advantage being greater ease in trimming and a better supply of oxygen to all parts of the flame than is attainable in the case of round wicks. These lamps are now extensively used for heating and cooking, a double or triple flat wick being employed. In many parts of the United States and Europe vapor lamps are employed. In these, which consume the volatile hydrocarbon obtained from the products of the distillation of bituminous coal, the liquid is converted into vapor before it reaches the burner, and burned without the need of a wick. These are therefore distinguished as vapor or self-generating gas lamps. In 1868 a light-house lamp for burning mineral oils was introduced, and has been adopted in all parts of the world. These lamps have two or more concentric wicks, and yield a very powerful light. For the safety lamp, invented in 1815, and used everywhere by miners, see DAVY SAFETY LAMP.

Lampblack, the soot or amorphous carbon obtained by burning bodies rich in that element, such as resin, petroleum, and tar, or some of the cheap oily products obtained from it. The supply of air is limited or controlled so as to produce a smoky flame, and the smoke passes into a chamber with some arrangement for receiving the abundant deposit of soot. For some of the finer qualities of lampblack this soot or carbon is purified by heating it in closed vessels. A large quantity of lampblack has been made in the United States by the imperfect combustion of natural gas. Lampblack is a useful pigment for artists both in oil and water color, a coarser kind being employed by house-painters. It is the chief ingredient in Indian ink, and along with boiled linseed oil forms printing ink. Of it is formed the pigment for the carbon paper used in AUTOTYPOGRAPHY (*q. v.*). Lampblack is also employed in the preparation of some kinds of leather, and for other purposes.

Lamp Chimney. See GLASS BLOWING.

Lampeters, an association formed among his fellow students by Rev. Henry James Prince, who entered Lampeter College in March, 1836. In June, 1842, at a meeting in Swansea, he is said to have put forth pretensions to be an incarnation of the Holy Ghost, which, being repudiated by the majority of his brethren, led him to leave the college and secede from the Church of England and found an institution called the AGAPEMONE (*q. v.*). Called also Lampeter Brethren.

Lampetians (-pē′shanz), a sect, probably of the 4th or 5th century, said to derive their name from their founder Lampetius, of whom nothing is known. St. John Damascene describes them as teaching that no Christian should do anything unwillingly or by constraint, and says that their freedom degenerated into license. They have, at various times, been identified with the Massalians, Adelphians, and Marcionists, but were probably a branch of the Euchites.

Lampic Acid, $C_4H_4O_3$ aldehydic acid, acetylous acid, or etheric acid, an acid discovered by Davy and Faraday, and called by Professor Daniell lampic acid. If a spiral of platinum wire be kept at a red heat in the wick of a spirit lamp, and the volatile products of combustion condensed, an acid liquid is obtained, the vapor of which has the odor of aldehyde and strongly affects the eyes. This is called lampic acid, but by many chemists it is considered to be a mixture of aldehyde, acetic and formic acids. It is a transparent, colorless liquid; sp. gr., 1.015, possessing a sour, harsh taste, and disagreeable, pungent odor. It has a powerfully reducing action, and if heated with the oxides of silver or gold, converts them into the metallic state, a liquid remaining which is found to contain acetic acid.

Lampman, Archibald, a Canadian poet; born in Morpeth, County Kent, Ontario, Nov. 17, 1861. He was a graduate of Trinity College, Toronto (1882), and after 1883 held an appointment in the Postoffice Department at Ottawa. A constant contributor of verse to the literary papers and magazines of the Dominion and the United States, he published two collections of poems, "Among the Millet" (1888), and "Lyrics of Earth" (1895), which reveal a deep love of nature and outdoor life. He died in Ottawa, Feb. 10, 1899.

Lamprey, the genus *Petromyzon*. There are two dorsal fins, both far back on the body. The sea, or spotted lamprey, *P. marinus*, is an eel-like fish, nearly three feet long, greenish-brown, marbled with darker brown and green on the back and sides. It attaches itself to rocks, boats, and to other fishes, by the mouth, exhausting the air. It is found in the United States, in England, and Africa. The fringe-lipped lamprey (*P. branchialis*) is called also the SANDPIPER (*q. v.*), the river lamprey, and the lampern. Lampreys, the family *Petromyzontidæ*. It consists of eel-like fishes, with a naked skin and undergoing a metamorphosis. Their larval form was taken for a distinct fish, and was called ammocætes. In this form the head is very small, the mouth toothless and surrounded by fringed barbels, and the eye small and hidden in a groove. In the third or fourth year maturity is reached.

Lampshells, the familiar designation of certain brachiopodous mollusks, especially those of the genus *Terebratula*, the bivalve shells of which when closed bear a close resemblance to the shape of the old Roman or classical lamp.

Lamsacus (läm'sä-kös), or **Lamsaki** (läm'sä-kē) (ancient Lampsacus), a maritime village of Asia Minor, on the Hellespont, nearly opposite Gallipoli. It was in ancient times given by Xerxes to Themistocles.

Lamu (lä'mö), an island and town on the coast of East Africa; lat. 2° 20′ S., the administration of which was granted in 1889 to the Imperial British East Africa Company. Pop. 10,000.

Lana, a kind of close-grained, tough wood, obtained from the *Genipa americana*, a tree of the *Cinchona* family, and a native of British Guiana. The fruit, called genipap, yields a pigment called lana dye, used by the natives to stain their skins.

Lanark, the county town of Lanarkshire, Scotland; on a slope near the Clyde; 33 miles S. W. of Edinburgh; has an interesting ruined church, a large Catholic chapel (1859), the county buildings (1836), a good racecourse, memories of Wallace, and some weaving and other industries; pop. (1901) 6,440. NEW LANARK, 1½ miles S. by W., is a small manufacturing village, founded in 1783 by David Dale, and for 28 years the scene of the social experiments of his son-in-law, Robert Owen.

La Navidad (lä nä-vē-*thäth'*), the name of a fort built by Columbus in 1493 on the N. E. coast of Haiti, and which was the first Spanish settlement in the New World. Here he left a company of between 30 and 40 men, but on his return in November of the same year found they had all been killed by the Indians and the fort destroyed. A new fort was subsequently built at Isabella.

Lancaster, a city and county-seat of Fairfield co., O.; on the Hocking river and canal, and the Toledo, the Cincinnati and Muskingum Valley, and other railroads; 32 miles S. E. of Columbus. It is the farming trade center for the county; and is engaged in the manufacture of agricultural implements, foundry products, flour, shoes, and glass. It is the seat of the State Industrial School for Boys, Crawfis Institute, and the Columbia commercial school; contains a fine court house, high school; National bank; and many churches; and has electric light and street railroad plants; a good water supply; daily, weekly, and monthly periodicals; and an assessed property valuation of nearly $2,000,000. Pop. (1890), 7,555; (1900) 8,991; (1910) 13,093.

Lancaster, a city and county-seat of Lancaster co., Pa., on the Pennsylvania, the Philadelphia and Reading, and other railroads; 68 miles W. of Philadelphia. It is the manufacturing trade center for the county; is an important tobacco market; and is engaged in tobacco growing, cigar-making, cattle-raising, and the manufacture of cotton goods, iron and steel goods, shoes, and combs. It is the seat of Franklin and Marshall College; contains the Lancaster, St. Joseph's, and the County Hospitals, Children's Home, Mechanics' and Y. M. C. A. libraries, and Conestoga Park, and has gas and electric light plants, electric street railroads, National and State banks, about 50 churches, and an assessed property valuation of over $16,000,000. Lancaster was settled in 1729; was the State capital in 1799–1812; and received its city charter in 1818. Pop. (1900) 41,459; (1910) 47,227.

Lancaster, the name of a royal English house which flourished in two lines. The first commences with EDMUND, son of Henry III. and Eleonora of Provence, and brother of Edward I., employed by the latter as ambassador to Philip of France, and afterward as commander in the expedition for the recovery of Guienne. Born in London, 1245; died in Bayonne in 1296. THOMAS, his son and successor in the earldom, cousin-german to Edward II., headed the confed-

eracy of barons against Piers Gaveston, and finally shared the responsibility of his death with Hereford and Arundel. He was at length taken in arms against the sovereign, and beheaded at Pomfret in 1322. HENRY (previously Earl of Leicester), brother and heir of Thomas, joined the conspiracy of Isabella and Mortimer against Edward II., and received the king into his custody at Kenilworth. He was freed from this charge on account of his too great humanity; and, when fortune changed, was appointed guardian and protector of the person of his son, Edward III. He died in 1345. HENRY, his son (previously Earl of Derby), after vainly endeavoring to make peace with John, King of France, under the mediation of the Pope at Avignon, was sent with an army into Normandy, and took part in the victory of Poitiers and the subsequent French wars. About this time his title was changed to Duke of Lancaster, this degree of nobility being then newly introduced into England. He died in 1362. The next Duke of Lancaster commences a new lineage, that of the princes opposed to the house of York. The first in the line was JOHN OF GAUNT, or GHENT, third son of Edward III.; born in 1339. He was married successively to the daughter of Henry, the last duke, who died without male issue, and to the daughter of Peter, King of Castile. His name is one of the most celebrated in English history and in the chivalry of the Middle Ages. He died in 1399. HENRY OF HEREFORD, the successor of John of Gaunt in the dukedom, was son to him by his first wife. He claimed the crown by descent, by the mother's side, from Edmund the first earl, who was popularly supposed to be the elder brother of Edward I., and to have been deprived of the succession by his father for personal reasons. He became king by deposing Richard II., 1399, and was a prince of great ability and valor. He reigned as Henry IV. till his death in 1422, and was succeeded by his son, HENRY V. The son of the latter also inherited the crown as HENRY VI., and in his reign the feuds of York and Lancaster broke out, which ended in the union of the two houses in the person of HENRY VII.

Lancaster, Duchy of, a territorial hereditament of the British sovereign, and to all intents his private appanage. It is in Lancashire, mostly, and one of the titles of the King of Great Britain and Ireland is Duke of Lancaster.

Lancaster, Sir James, an English navigator. He commanded the first fleet of the East India Company that visited the East Indies in 1600–1603, and on his return home was knighted. He had previously been a soldier and a merchant in Portugal, had visited the East Indies on his own account in 1591–1594, and in 1594 had captured Pernambuco in Brazil. He was one of the original board of directors, and afterward did much to promote the voyages of Waymouth, Hudson. and Baffin in search of the Northwest Passage to India. The strait leading W. from the N. of Baffin Bay was in 1616 named Lancaster Sound by Baffin. Lancaster died June 9, 1618. See LANCASTER SOUND.

Lancaster, Joseph, an English educator; born in London, Nov. 25, 1771. He was a member of the Society of Friends, and in 1789, while yet a boy, opened a school for poor children at Southwark, whom he taught almost gratuitously. So great was the success attending his system that numerous schools founded on it sprang up throughout the country. A rival, however, in the person of Dr. Bell, who claimed to have been the original introducer of Lancaster's system, appeared, and succeeded in throwing Lancaster into disrepute, who thereupon departed for the United States. There and in Canada he was well received and assisted, but becoming involved in pecuniary embarrassments his friends purchased for him an annuity and he retired to New York, where he died, Oct. 24, 1838. He was the author of a work on "Improvement in Education" (Lon. 1805), and of various elementary school-books. His system forms the basis of popular education in many parts of England.

Lancaster, William Joseph Cosens, an English civil engineer and author; born in Weymouth, May 23, 1851; entered the British navy as a midshipman, but on account of defective eyesight resigned and became a civil engineer, in that capacity visiting different parts of the world. Under the pseudonym of "Harry Collingwood," he is known to juvenile readers in England and the United States as the author of the popular nautical romances: "The Secret of the Sands" (1878); "Under the Meteor Flag" (1884); "The Pirate Island" (1884); "The Congo Rovers" (1885), a story of the Slave Squadron; "The Missing Merchantman" (1888); "The Cruise of the Esmeralda" (1894); "Jack Beresford's Yarn" (1896); "An Ocean Chase" (1898); "The Castaways" (1899); etc.

Lancaster Gun, a cannon with a twisting, slightly oval bore and conoidal projectile. Mr. Lancaster's plan was adopted in 1854, and several Lancaster guns were employed at the siege of Sebastopol.

Lancaster Rifle, a rifle with an elliptic rifling, the bore being slightly oval in section. The twist is one turn in 32 inches, which is the length of the barrel; bore, .498 inch; eccentricity, .01 in half an inch. The lateral expansion of the bullet causes it to fill the bore. Length of bullet, 2½ diame-

ters with a windage of .004, and has a paper patch; the first of its kind.

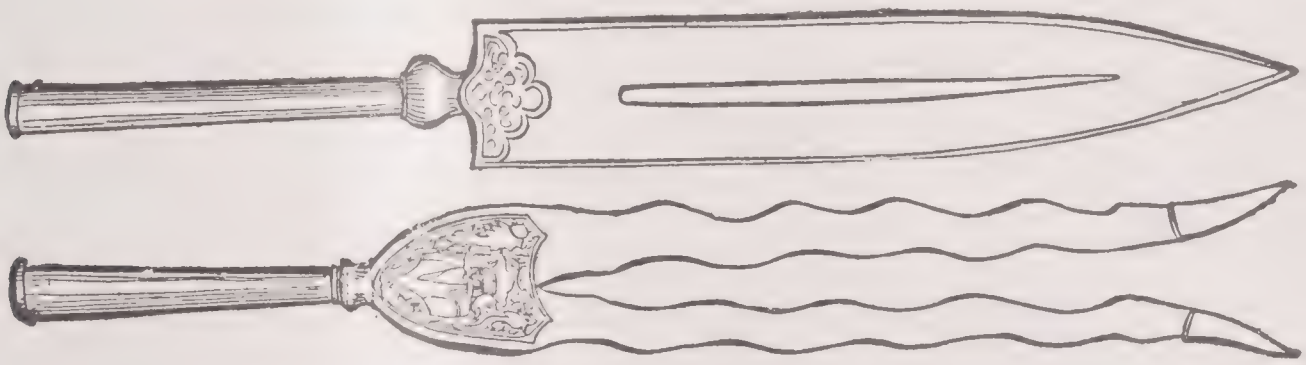
Lancaster Sound, a W. outlet of Baffin Bay, in lat. 74° 20′ N., connected with Boothia Gulf on the S. by means of Prince Regent Inlet. Though this opening into the Arctic Ocean was discovered by Baffin in 1616, it was first navigated by Parry in 1891. See LANCASTER, SIR JAMES.

Lance, a weapon consisting of a long shaft with a sharp point, much used, particularly before the invention of firearms. It is a thrusting weapon used on foot, but chiefly on horseback. In the Middle Ages the lance was held in the highest repute by knights and men-at-arms who formed the main strength of European armies; it was gradually superseded by the invention of gunpowder. The lance used by knights of the Middle Ages was of a peculiar form. Near the lower end the lance was very thick, with a deep opening in which the arm was placed when the lance was put in rest preparatory to a charge. Immediately in front of the opening the shaft was, in tilting-lances, from 1 foot to 1½ feet in diameter, and sloped off toward the upper end, which was from ½ inch to ¾ inch in diameter. The lances now in use among the European cavalry have a shaft of ash or beech-wood from 8 to 16 feet long, with a steel point 8 or 10 inches long, and, to prevent this from being cut off by a saber stroke, the shaft is guarded by a strip of iron on each side from 1½ feet to 2 feet long. The other end has an iron cap to prevent splitting. The point has a small pennon, intended to frighten the enemy's horses. When not in use, the lance is carried in a leathern shoe by the right stirrup, dependent by a leathern thong on the right arm. In use it is carried under the right arm.

Free lance: Formerly a mercenary soldier, owing allegiance to no one permanently; hence a person who is free to assail any party or principle and is not pledged to any one more than temporarily.

Stink-fire lance: A fuse which, when ignited, emits a suffocating odor, and is used in military mining operations to dislodge counter-miners.

LANCELET.



BENIN LANCE HEADS.

In carpentry, a pointed blade, usually employed to sever the grain on each side of the intended path of a chipping-bit or router. It is used in crozes, planes, and gauges of certain kinds. In the Greek ritual, a small knife used in the early part of the present Greek liturgy to divide the Host from the holy loaf. The action commemorates the piercing of our Lord's side. The priest makes four cuts in the loaf, and stabs it more than once, accompanying each action with appropriate texts of Scripture. In pyrotechnics, lances are small paper cases, filled with composition, and attached to light frames of wood, to mark the outlines of the figures in pyrotechnical devices. Various chemicals give the desired color to the flame.

Lancelet, *Amphioxus lanceolatus,* a transparent and iridescent fish about three inches long, with a fin extending nearly from the snout to the hinder extremity. The skeleton is imperfectly developed, the blood colorless; no proper skull or brain. It has affinities to the Ascidian. Its movements are active. It is found in temperate and tropical seas.

Lancer, a cavalry soldier armed with a lance. Lancers were introduced into Euro-

pean armies by Napoleon I., after the pattern of those in the Polish service. After the campaign of 1815, four regiments of English lancers were formed from the 9th, 12th, 16th, and 23d Light Dragoons. These are now represented by the 5th. 9th, 12th, 16th, and 17th Cavalry regiments, and are classed as the Medium Cavalry. They are armed with lance, sword, and pistol, but it is proposed to add a carbine. They are not good for reconnoitering purposes, as they are more easily seen than the Light Hussars, and are also very unsuitable to wooded country; but they are valuable in open country against infantry in disorder. The Uhlans in the German service are armed and used as in England, and are "medium cavalry." In dancing, the "lancers" are a certain set of quadrilles.

Lancelot of the Lake. the hero of a celebrated Middle-Age romance which was originally written in Latin by an unknown author, and afterward translated into the Romance tongue by Chevalier Gautier Mapp. He was one of the Knights of the Round Table, and was inspired with a lively passion for the beautiful Guinevere, wife of King Arthur. Tennyson, in his "Idylls of the King," has interwoven the adventures of this knight with those of Arthur, his kingly hero, and beautifully depicts the grief of Elaine, the maid of Astolat, who dies of unrequited love for Sir Lancelot.

Lancet Window, a high, narrow window terminating in a very pointed arch. It is characteristic of that division of Gothic architecture known as Early English. Lancet windows are frequently found two, three, or even five together.

Lancewood, a wood valuable for its great strength and elasticity. It is produced by the small tree *Guatteria virgata* (natural order *Anonaceæ*). Another species, *G. laurifolia,* yields the wood called white lancewood, which, however, is not much used. Lancewood is of great value to coachbuilders, by whom it is used for shafts and carriage poles, for which it is especially fitted. The part used is the main trunk of the tree, which is very straight, and rarely more than 9 inches in diameter with the bark on. It comes in small quantities from the West Indies, chiefly from Jamaica.

Lanciani, Rodolfo Amedeo (län-chä'-nē), an Italian archæologist; born in Rome, Jan. 1, 1847. He attained celebrity by investigating the ruins of classical Rome. Among his works are: "Ancient Rome in the Light of Recent Discoveries" (Boston: 1888); "Pagan and Christian Rome" (Boston: 1892); and "The Ruins and Excavations of Ancient Rome" (Boston, 1897).

Land, Property in. Questions connected with the theory of property in land form at all times one of the most important subjects of investigation in political economy. At the present time they have acquired an added, though perhaps somewhat adventitious, interest from the speculations of economists of an advanced school. Such speculations always tend, especially when supported by names of weight, to affect through public opinion the legislative constitution of society. It is strongly held by some economists of great reputation that the question of property in land is intimately connected with the most vital economical problem of the day, that of the position of the industrial classes and the remuneration of labor. It is held that a wider distribution of land would materially affect the condition of the classes dependent on labor; that it is, in fact, the only solution of certain difficulties in their position, and that the existing distribution of property is a monopoly brought about by means inconsistent with the mutual obligations of society, and which it is expedient and necessary to revise with a view to its gradual but complete alteration. If we seek from history a solution of the theory of property in land, we will find in the first instance only a chaos of facts in which almost every kind and variety of tenure will be found represented in some way, and without any fixed and invariable order of succession. It is the prerogative of political economy, as a science equally related to fact and speculation, to unravel this confusion, to write history hypothetically, not as it has actually happened, but as it may be supposed it might have happened, with the elimination of accidents foreign to the immediate object of speculation. This prerogative is always liable to abuse, and in no subject has it been more abused than in regard to property in land; but no amount of abuse can dispense with the legitimate exercise of speculation, and all that can be required of those who are compelled to follow the advocates of doubtful speculative dogmas is to conduct their speculations with greater circumspection. To deduce from history the fundamental doctrines involved in the appropriation of natural agents is not, after all, a matter of insuperable difficulty if only we can avoid coming to the subject with rooted prejudices and unalterable prepossessions.

The existing position of the question is this: The actual tenure of property recognizes the right of individual ownership in a manner much more absolute and exclusive than a large and increasing class of economists believes to be right or expedient. Among the opponents of existing rights, if so strong a term can be applied to some of the more cautious advocates of innovation, there are all diversities of shades of opinion, but one leading dogma may be said to characterize all who seriously object to the existing disposition of property, namely, that the right of property in land

Land

belongs by an inherent and inalienable title to the society and not to the individual. In its extreme form this principle amounts in regard to the tenure of land to communism. When it is held along with the expediency of permitting individual property in land it is of the greatest possible elasticity, and admits of any modification of tenure which it may be the will of society to impose or the pleasure of the speculator to suggest. There is, of course, one drawback to this elasticity of tenure. It is liable to awaken doubt and uncertainty in the mind of the holders of land and to diminish the advantages, if any, of proprietorship. The actual tenure of land does not afford any decisive dictum in favor of either of the rival theories which it is incumbent on us to examine. If the society is represented by the sovereign the theory of British, and especially of English law, is that all land is held of the sovereign, but in practice this theory has long been little more than a dead letter. The abolition of feudal tenures in the reign of Charles II. is a proof that it was already virtually extinct and it cannot be said to have since acquired any fresh vitality. The feudal law of Europe, in which English territorial rights originated, had for its fundamental principle the right of conquest; and if we examine the land tenures of Asia we shall find that they have mostly, if not altogether, sprung from the same source.

Authentic history, in fact, does not lead us back far enough to enable us to discover the origin of property, and in as far as it is important to our subject, we must be indebted for our views of it chiefly to speculation. Thus much we may know that even among nomadic peoples there is a distinct perception and recognition of the fundamental principle of property in relation to land. The hunting grounds or pastures which are alternately occupied by these migratory tribes are held by them as appropriated to their use; and disputes and wars arise when during their temporary abandonment they are occupied by others. Thus even the most roving tribes among the nomadic races of Asia, Europe, and America, have always had their wanderings circumscribed by the claims of other nations of similar habits, whence wars have originated among them just as from territorial disputes among more settled nations. If from the uncertain light of history we turn to the principles of justice and expediency, the claims advanced for various tenures of property are both numerous and complicated. On the ground of abstract justice it is asserted that all men have an equal right to the soil. This right might be questioned on various grounds, but what effectually disposes of it in its naked form is its utter impracticability. It would be difficult to establish the right even of a community to the territory on which it is settled if the territorial rights of each individual of the human race were insisted on; but taking the community, and supposing it to have a settled disposition of property on any conceivable basis, how are the rights of the new members added to it by birth or immigration to be adjusted? It but disguises these difficulties to vest the inalienable right in the community and not in the individual. Obviously all individuals cannot be treated alike, and whether the monopolist be an individual or a collective one, the effects of the monopoly will be equally disadvantageous to those who are excluded from it. M. De Lavellaye, a recent advocate of this principle, has shown that it still exists in some of the Swiss communes with precisely this effect — families not included in the original distribution being more effectually excluded from the possession of property than in countries where the land is held by individual tenure, and consequently transferable by sale. Such considerations have compelled all sober speculators to admit the expediency of at least a modified individual tenure of property; but it is still held that this tenure exists only for the convenience of the community at large, and may be withdrawn when it fails to answer, much more when it thwarts the end for which it was granted.

A distinction is generally drawn by those who take up this position between property in land and other species of property, and this distinction is frequently founded on a theory of the origin of proprietary rights, which is supposed to afford a solution of the difficulties of this question, and to place these rights on a basis of natural justice. John Stuart Mill, though not the originator, was one of the most able and cautious exponents of this theory. No man, it is assumed, has a right to appropriate natural agents to his exclusive use; but the modification of these agents by labor gives a valid claim to their possession. Thus labor is held to be the true foundation of property, and while the soil, the common storehouse of natural agents, is held to be an inalienable common possession, an absolute right of property is supposed to be established in products taken from the soil by labor, and even a modified right is created in the soil itself by labor bestowed on its improvement. Even if this theory could be held good it would only substitute for the previously existing difficulties the equally formidable difficulty of distinguishing between natural and acquired rights; but the distinction on which the entire theory is founded is wholly illusory. If the soil is in any sense common and inalienable property, those who take anything from it take from it what belongs to all. Their labor

Land

can give them no possible claim to appropriate what is thus abstracted from the common store, for the value of labor depends entirely on the possession of appropriate agents on which to exercise it; and there are many others who with equal right would have been glad to have bestowed similar appropriating labor on the natural agents which have been monopolized by this appropriation. He who appropriates money or other portable property abstracted from the soil, moreover appropriates to his own use the means of procuring subsistence just as much as he who appropriates the soil itself.

Labor without natural agents cannot possibly afford a foundation for property, and as the appropriation of natural agents has commonly labor for its end, it is no solution of the question to say that labor justifies appropriation. The only source to which the appropriation of property can be referred is the universal instinct of appropriation in the human mind. The fact of appropriation needs no justification. Man finds natural agents suited to his purposes. He finds no rivals but his own fellows capable of disputing them with him, and no difficulty arises till disputes arise among men about their respective appropriations. Even then it may be observed that there is a natural principle of justice which inclines men mutually to respect each other's appropriations; and it is only when these press severely on those affected by them, as when all the available means of procuring subsistence are already appropriated, that serious questions arise. Whether the original appropriations were individual or collective seems a matter of no consequence. Whatever uncertainty may surround the original forms of appropriation, all history attests a uniform course of development in its issue, and the end to which it invariably gravitates is exclusive individual possession. When the feudal system was superimposed on a simpler form of tenure the insecurity of possession in which it originated gave the division of proprietary rights so wide an acceptance as to afford it the fairest chance of permanence. The feudal system was admirably welded, and its spread over the greater part of Europe, together with its independent administration in innumerable manorial estates, made its progress equivalent to a large series of independent experiments. The result in every case was the same. As soon as security returned the individual rights of each proprietor became extinguished or defined. Whether we watch the history of a manor or of a kingdom the result is the same.

When the superior, from his personal vigilance or the limited extent of his domain, proved stronger than his vassals, he became an absolute proprietor; when from the extent of his nominal rights he was unable to enforce them, they were gradually wrested from him, leaving only empty forms, which, when they proved irksome, were gradually discontinued. When the forces were more equally balanced services were commuted into rents, and a fixed proprietary determined on one side or the other. In all these charges, however diversified in appearance, one universal principle is to be discovered, that the individual interest constantly represented by possession, in the end proves stronger than all mere customary or abstract rights. Possession, of course, must be understood not in the literal sense of material possession, but of the active exercise of possessorial rights. This natural impulse is sufficient to account for all the proprietary rights existing in the world, and, in point of fact, it does account for all whose origin can be traced. Of necessity all original appropriations of land must have been mere arbitrary appropriations of unclaimed possessions, but when the actual proprietorship of any territory can be traced to its source, it is not found to have descended in an unbroken line from the first appropriator. It always begins with a "conquest," in which the weakness or negligence of a previous proprietor has been taken advantage of. One thing which this origin of property renders clear, is that proprietary rights are not derived from the State. The confusion which exists in many minds in regard to the relation of the State to property arises from a want of due care in separating fact from theory. The legal fictions or theoretical claims of the State over property are supposed to represent the abstract right of society, but in point of fact they originate in a very different way. They are, as already pointed out, relics of the right of conquest. The functions of government, like the rights of property, have been much more frequently usurped than legitimately derived, and the actual proprietary claims of government are to be explained not on any abstract principle, but from the simple fact that governments being human, and, moreover, frequently representing individual interests, have, like individuals, had and exercised the instinct of appropriation. But though the right of holding property does not originate with government there is another way in which it comes legitimately within the control of government. It can only be permanently retained and profitably exercised through the protection which government affords. Proprietary rights then require the sanction of government, and if government, as the general representative of society, is asked to protect these rights, it may reasonably make conditions with the holders as to the terms on which it shall do so.

The question, What ought a government to do? is certainly a right one; but the

Land

question, What can it do? is not the less a necessary one. If a government, from a theory of abstract right, tries to set aside the principle of appropriation, it will as surely find that principle too strong for it as those governments have done which have attempted to overrule it from mere interested motives. But because the security of property and the facility of lawfully acquiring it are necessary to the peace and highly advantageous to the prosperity of society, and the continuance of violence and fraud highly disadvantageous to both, it ought to take means to render property secure and easily transferable. It has already been noticed that, along with the desire of appropriation, there exists among men a counterbalancing disposition to respect the appropriations of others when these do not interfere too violently with their own convenience. This disposition is evidently a just counterpoise to the other, and as it perfectly accords with the whole interests of society, it is by strengthening it into a principle and rendering it inviolable that a foundation is laid for the security of property. In establishing this principle a government must implicitly recognize the principle of appropriation, whether founded on priority of possession or any other title.

Of the various advocates of common rights, or rather the claims of those who are excluded from holding property, some touch the fundamental principles of proprietary right much more closely than others; some indeed seem almost to respect it altogether; but as all of the class of writers to whom we refer, who are received as authorities, seem to agree on two points, they can hardly be classified apart. The two points of agreement are that they regard the subdivision of property as superior to any theory of tenure, and that they all profess to regard some form of compensation as necessary to the commutation of existing rights. To restore to the people an interest in the soil, to establish peasant properties, is the great object of the suggestions whether practical or theoretical, of the school of economists we are considering. There are two difficulties, however, in regard to this resolution of the industrial question to which the attention of these economists does not seem to have been turned. Admitting that cultivation under peasant properties is more productive than under large tenure and that this tenure tends to check the growth of population among the proprietors, which is all that its most thorough advocates can ask for it, unless we are to abandon combination in labor and return to a more primitive civilization in which the agriculturist supplies his own collateral wants, the non-agricultural population will bear about as large a proportion to the agricultural under the new arrangement as under the old. But assuming even a return to the earlier civilization and that the whole paradise pictured by our economists should be realized, what is to be the guarantee for its permanence? Either society in redistributing property must retain the right of future redistribution — and then the stimulus to exertion and to abstinence from over-increase of numbers will be gone; or it must give absolute right of property, and then the differences of individual capacity and other accidents will rapidly lead to inequality of distribution.

It is by no means settled whether large or small properties are on the whole the most productive. It is perfectly clear that in the case of a given amount of labor, combination, which can only be exercised to the full extent on properties of considerable size, has an immense advantage. The advocates of peasant properties seem, however, to have made out that through an abnormal development of avarice the holders of these properties are induced to bestow on them an excessive amount of individual toil and care, which renders the comparison of total results doubtful. Whether in a social point of view this is a state of things which it is desirable to generalize is perhaps doubtful, but it is not a little remarkable to find those who object to an absolute alienation of what they hold to be a common right, insist so strongly on the individual desire of accumulation when prompted by the hopes inspired by ownership over real property as the spring of the prosperity to be expected from their own arrangements. It is no new doctrine to economists whose communistic sympathies have not led them to look another way, that the desire of accumulation is the mainspring of industry. It is this which reconciles economists to any original disposition of property which gives security to industry, seeing that whatever the primary distribution of property may be, there is in a state of liberty a constant gravitation to a distribution regulated by industry alone; and it is a confirmation of this view to find that the principle of individual tenure of property cannot be attacked on the ground of economy without invoking it in a new form. But what these economists entirely overlook is that the object of all the toil they so commend is to defeat their own end and secure that very accumulation of territorial wealth which it is their design to frustrate. Men cannot like bees be robbed of their honey and set to work again. But without disturbing the tenure of property, there are various laws regulating its transference and succession by the amendment of which its divisibility might be promoted. With regard to the mere simplification of the transference of property, and of all contracts in regard to its occupancy, there can be but one opinion among economists as to the

great value and importance of every reform tending in this direction, and there is here yet much room for reform.

The laws of succession involve questions of greater difficulty. By merely abolishing primogeniture, and rendering the division of property among descendants or collateral heirs of equal degree obligatory, the principle of accumulation might be overmatched and a division minute enough to satisfy even the advocates of peasant properties secured. This is accordingly what is advocated by Professor Fawcett, but only in the case of properties of which the owners die intestate. Professor Fawcett vehemently contends that primogeniture is unnatural, but this is precisely the doubtful point. If by what is natural we are to understand what happens when men are not guided by preconceived theories we should be disposed to come to the opposite conclusion. History, it is true, offers examples not only of both kinds of inheritance, but also of almost every other conceivable kind of it; but the balance of evidence, we think, is in favor of primogeniture. If again we are to understand by natural what is promotive of the greatest advantage, we are still unable to agree with Professor Fawcett. We believe that both in a social and a political point of view the maintenance of a body of considerable landed proprietors is of indispensable utility to the State. Without such a body the leisure and means necessary for the maintenance of a class to represent the higher education of the country and many other important social organizations would have to be supplied entirely by the fluctuating population of the towns. Politically the value of primogeniture is still more conspicuous. It was to a great extent the nonadoption of this principle that so weakened Germany as for several successive ages to make France the leading power of Europe. France, since her great Revolution, has adopted an enforced division of property among descendants. To the want from this cause of a governing class of large proprietors, and the abandonment of the control of government to the *doctrinaires* of town populations, may possibly be due her failure after so many revolutions to reach a position of security and repose.

It seems, moreover, an undue stretching of the functions of government to make an intestacy law run contrary to instead of in conformity with the general custom of the country; but as the tendency to accumulation of real property is from various causes excessive, a modification of Professor Fawcett's proposal to the effect of reserving a certain proportion of intestate property as an appanage for younger children would probably be beneficial both in its own operation and in its effect on the habits of testators. Entail is merely an exaggerated form of primogeniture, and its existence is a strong proof of the natural force of that principle. It is not always in the power of a government to overrule such expressions of individual interest. But though in regard to the direct desire of accumulation the interest of the individual is stronger than any supposed interest of the community of an adverse kind, this cannot be held to be the case in regard to so artificial a development of the desire to found a family as entail. In this matter the power and the vigilance of the community may fairly be held equal to the strongest individual tendencies, so that any disposition of the law of entail that may be considered advantageous to the community may be held to be fairly within the competency of government to enforce. See SINGLE TAX.

Land, Jan Pieter Nicolaas (länt), a Dutch Orientalist; born in Delft, April 23, 1834. Among his works are: "John, Bishop of Ephesus, the First Syrian Church Historian" (1856); "Syriac Anecdotes" (4 vols. 1862); "In Memory of Spinoza" (1877); "Javanese Music" (1891); "Arnold Geulinecx and his Philosophy" (1895); etc.

Landau (län'dou), a town of the Bavarian Palatinate, 11 miles W. of the Rhine and 17 S. W. of Spires. Founded and made an imperial city in the 13th century, it has some interesting old churches and played a prominent part in history as a fortress. During the Thirty Years' War it was taken eight times; in 1688 it was fortified by Vauban for Louis XIV., but surrendered four times during the war of the Austrian Succession. In 1816 Bavaria became mistress of it; and in 1870–1871 its fortifications were levelled to the ground. Pop. (1900) 15,824.

Lande (French), a heathy and sandy plain unsuited for bearing grain. From the vast extent of landes (about four-fifths of the total area) which it contains, the third department of France, in point of size, derives its name. The landes lie to the N. of the Adour, while the country to the S. of that river is fertile. The N. portion consists of heath, with occasional clumps of trees and brushwood, or of morasses, lagoons, and shifting sands. Of the whole area (about 2,250,000 acres), nearly one-half is waste, a third under wood, and little more than a sixth arable. Buffaloes abound in the reedy swamps, and herds of wild horses roam over the heaths. In the more secluded and desolate tracts the inhabitants have peculiarities both of dress and living, which give them a strong resemblance to half-savage and nomadic tribes. The landes are very thinly populated, the inhabitants gaining a miserable subsistence by fishing, by such agriculture as is possible, and by keeping cows and sheep. The shepherds

make use of stilts, that their increased height may give them a greater range of vision, and, when fatigued, sit on a pole with a head somewhat like that of a crutch, and while away the time in knitting.

Lander, Frederick West, an American military officer; born in Salem, Mass., Dec. 17, 1821; became a civil engineer; made surveys across the continent for the United States government for the purpose of finding a suitable route for a transcontinental railroad; served in the Army of the Potomac in the early part of the Civil War; won distinction by checking a large Confederate force at Hancock, Va.; and participated in other important actions. He died in Paw Paw, Va., March 2, 1862.

Lander, Jean Margaret, an American actress; born in Wolverhampton, England, May 3, 1829; followed her profession in the United States in 1838–1842; played as Julia in "The Hunchback" in England and Holland during 1842–1848; settled in the United States in 1849, and married Gen. Frederick West Lander, Oct. 12, 1860. During the Civil War she was active in the National Hospital service; a few years after the war she retired from the stage. She died Aug. 3, 1903.

Lander, Richard, an English African explorer and discoverer of the mouth of the Niger; born in Truro, Cornwall, Feb. 8, 1804. In 1825 he accompanied Clapperton as his servant to Sokoto. There Clapperton died, and Lander, returning to England, published an account of the expedition. The British government then intrusted to him and his brother John (1807–1839), the prosecution of further researches along the lower course of the Niger. In 1830 they proved that the Quorra, or Niger, falls by many mouths into the Bight of Benin. They published a "Journal of an Expedition to Explore the Niger" (3 vols. 1832). In the course of a third expedition in the same quarter, Richard Lander was wounded by the Niger natives, and died in consequence in Fernando Po, Feb. 16, 1834.

Landesmann, Heinrich. See LORM, HIERONYMUS.

Landfall, the first landing of a discoverer or explorer in any region; as, the landfall of Columbus in Guanahani, in the New World, or the landfall of Captain Cook in New Caledonia.

Land Grant, a grant made by Congress to assist railroad companies to secure funds, by the sale of bonds secured by lands so granted, to construct lines of railway through parts of the United States where the local traffic would not pay the running expenses. About 215,000,000 acres of land were given to the various railroads of the country by the government. The Illinois Central received a strip of land 12 miles wide, running the whole length of Illinois; the Northern Pacific received 47,000,000 acres; the Atlantic and Pacific, 42,000,000; the Union Pacific, 13,000,000, and other roads in proportion. Congress has also made many grants of land to the several States and Territories to promote public education. See DOMAIN, PUBLIC.

Landgrave (Landgraf), a German title adopted in the 12th century to distinguish a governor of a district or province from the inferior counts under his jurisdiction. Also the title of each of three princes of the German empire, whose territories were called landgraviates.

Land League, an association projected by Charles S. Parnell, which came into being at a meeting held in Dublin, Nov. 18, 1879. Nominally the programme was the "three F's"—fixity of tenure, fair rent, and free sale (of the tenant's interest); but many speakers at Land League meetings, held Sunday after Sunday in different parts of the country, went so far as to demand that the soil should belong to the cultivator. Opposition by direct violence was deprecated, and recourse was had to boycotting. This state of things continued till the end of 1880, when 14 members of the Land League, of whom the most important were Parnell, Dillon, Biggar, T. D. Sullivan, and T. Sexton, were indicted. The chief counts were "conspiring to prevent payment of rents, to defeat the legal process for the enforcement of payment of rents, and to prevent the letting of evicted farms." The trial, which took place early in 1881, was a fiasco, but it drew from Justice Fitzgerald the declaration that the Land League was an illegal body. A Ladies' Land League, under the presidency of Miss Anna Parnell, was then formed. It was denounced by Archbishop McCabe, and warmly defended by Dr. Croke, Archbishop of Cashel, and T. D. Sullivan. The agitation increased, and the "No Rent" cry became more frequent. On Oct. 7 Gladstone denounced Parnell, and soon afterward Parnell, Dillon, Sexton, O'Kelly, and the chief officials of the League, were arrested and imprisoned in Kilmainham. They issued a manifesto calling on the Irish tenants to pay no rent during their imprisonment. The government replied by declaring the Land League an illegal body, and suppressed its branches throughout the country. The Ladies' Land League lingered on till the end of the year, when it was dissolved by the leaders of the Irish party.

Land of Bondage, a Scripture name for Egypt, in allusion to the harsh treatment received by the Israelites during the latter part of their sojourn in that country.

Land o' Cakes, Scotland; so called because oatmeal cakes are a common article of food among all classes.

Land of Fetish, a name applied to Africa. Among its natives many hideous and repulsive or foolish objects are made the subject of superstitious worship.

Land of Goshen. See GOSHEN.

Land, Public. See DOMAIN, PUBLIC.

Land of Health, a designation by the Moors of the ancient province of Badajos in Spain.

Land of Kings and Prophets, a name given to Palestine.

Land of Myrrh, Azab, or Saba.

Land of Steady Habits, a phrase applied to Connecticut. The term contains an allusion to the gravity of its people and the uniformity of its customs.

Land of the Bee, Utah; in allusion to the busy industry of its population.

Land of the Boar, Germany; so named in classic days.

Land of the Chaldees, Babylonia.

Land o' the Leal, Scotland. The Scotch have always been famed for a loving devotion to the land of their birth. Also heaven, the home of the faithful. In Lady Nairn's beautiful song, "The Land o' the Leal," heaven is clearly meant, but the term also signifies a species of Scotch Utopia, where all the men are brave and honorable and all the women beautiful and virtuous.

Land of the Leek, Wales.

Land of the Midnight Sun, Scandinavia — Norway, Lapland, Sweden, Iceland, etc.— so called by Du Chaillu, who published a book bearing the title.

Land of the Morning Calm, a poetical name given by the Koreans to their country.

Land of the Rose, England, because the rose is the national emblem.

Land of the Shamrock, Ireland, because the shamrock was chosen by St. Patrick to convey to the Irish the idea of the Trinity.

Land of the Stars and Stripes, the United States — in allusion to the National ensign.

Land of the Sun, the peninsula of Hindustan.

Land of the Thistle, Scotland, because the thistle is the national emblem.

Land of the Veda, India. "Veda" (from a Sanskrit word meaning "to know," literally signifying "knowledge") is the name commonly applied to "those Sankrit writings on which the Hindu religion was based."

Land of Wisdom, Normandy, a district of France, so named in allusion to its sensible social and civil customs.

Landois, Hermann (länd-wä′), a German zoölogist; born in Münster, April 19, 1835. He was author of "Sound and Voice Apparatus of Insects" (1867); "Text-Book of Zoölogy" (1870); "Text-Book of Botany" (1872); "Voices of Animals" (1875); "Text-Book of Instruction in the Description of Nature"; and other works of a like character, which have been frequently republished.

Landon, Charles Paul (län-dôn*g*′), a French painter and author; born in Monant, in 1760. His more notable writings are: "Annals of the Musée and of the Modern School of Fine Arts" (29 vols. 1801–1817); "Landscapes and Genre Paintings in the Musée Napoléon" (4 vols. 1805–1808); "The Salons of 1808–1824" (13 vols.); "Selections of Paintings and Statues in the most Celebrated Foreign Museums and Cabinets" (12 vols. 1821 sq.). He died in Paris, March 5, 1826.

Landon, Letitia Elizabeth (Mrs. Maclean), an English poet and novelist; born in Chelsea, London, Aug. 14, 1802. She was a poet of genuine feeling and descriptive power, was at one time connected with the London "Literary Gazette," and published under the pseudonym of "L. E. L.": "The Improvisatrice, and Other Poems" (1824); "The Golden Violet, etc.," all collected in 1841; and several novels. In June, 1838, she married Mr. George Maclean, governor of Cape Coast Castle. She died in Cape Coast Castle, Africa, Oct. 15, 1838.

Landon, Melville de Lancey (pseudonym ELI PERKINS), an American humorist; born in Eaton, N. Y., Sept. 7, 1839. Among his works are: "The Franco-Prussian War in a Nutshell" (1871); "Saratoga in 1901" (1872); "Eli Perkins's Wit, Humor, and Pathos" (1883); "Fun and Fact"; etc. He died Dec. 16, 1910.

Landor, Walter Savage, an English poet; born in Warwick, England, Jan. 30, 1775. He was educated at Rugby and Oxford, and after graduating at the latter university, published a volume of poems, being then in his 20th year. Shortly after succeeding to his patrimonial estates, he sold them, to relieve himself from the cares of a landed proprietor. During the Peninsular War, raising a troop of cavalry at his own cost, he fought for the Spanish cause till the restoration of Ferdinand VII. After his marriage, in 1811, he took up his abode in Florence,

WALTER SAVAGE LANDOR.

where he resided for several years, and where many of his works were written. He afterward returned to England and remained there for some years absorbed in literary occupations, but, his eccentric temper constantly involving him in difficulties and litigation, he went back to Italy. His principal poetical works are "Gebir, Count Julian and other Poems"; "Hellenics"; "Poems and Inscriptions"; "Dry Sticks"; and "Last Fruit of an Old Tree" (1853). His most important prose work is the "Imaginary Conversations of Literary Men and Statesmen," which appeared in five volumes between 1824 and 1829. Landor neither sought nor won popularity. Haughty and of a savage independence, he probably despised his contemporaries and was neglected by them. But the masculine intellect, lofty wisdom, and manly tenderness which reveal themselves in his works, most of them of exquisite finish, can hardly fail to secure to them a high place in the esteem of future generations. He died in Florence, Italy, Sept. 17, 1864.

Landrail. See CORNCRAKE.

Landscape, a term applied to a portion of land or territory which the eye can comprehend in a single view, and to a painting of such.

Landscape-gardening, an art which deals with the disposition of ground, water, buildings, trees and other plants which go to the composition of verdant landscape. Such in a broad sense is the definition of the art; for it may be employed to create a beautiful and harmonious scene where only nature in barren wildness reigned before, or to merely improve and adapt existing natural beauties and resources to the requirements of taste and convenience. Landscape-gardening has been practised from the earliest dawn of civilization, but little of a reliable kind is known of the style or features of the gardens of the Jews, the Phœnicians, Assyrians, or even those of the ancient Greeks. All that we learn from Greek writers respecting the character of their gardens is that they afforded shade, coolness, repose, freshness, and fragrance. The Greeks cultivated the sister art of architecture so well as somewhat to neglect gardening: hence Lord Bacon's remark in his "Essay on Gardens," that "when ages grow to civility and elegance, men come to build stately sooner than to garden finely," as if gardening were the greater perfection. The Romans introduced landscape-gardening into Britain; but the art was lost when the country was abandoned by them to the Saxons. As, however, it had meantime been fostered in France, it was probably reintroduced by the Normans. Henry I., according to Henry of Huntingdon, had a park (*habitationem ferarum*) at Woodstock, and it is conjectured that this park may have surrounded a magnificent Roman villa, the ruins of which — covering about six acres in extent — were discovered on the Blenheim estates early in the 19th century. If the conjecture is well founded, Blenheim may be regarded as the most ancient site as well as the grandest example of landscape-gardening in Great Britain — according to many it is the grandest in Europe. William Kent (1684–1748) and Lancelot Brown (1715–1783), better known as "Capability Brown," may be considered as the founders of modern English landscape-gardening. The most distinguished landscape-gardeners the United States has produced have been A. J. Downing and F. L. Olmstead.

Landseer, Sir Edwin, an English painter; born in London, England, March 7, 1802. He began to draw animals when a mere child; at 13 he exhibited at the Academy, and the year following became a student. Henceforward he exhibited regularly at the Academy and the British Institution. In 1826 he was elected A. R. A.; in 1830, R. A.; in 1850 he was knighted, and in 1865 he declined the presidency of the Academy. He took the very highest rank among animal painters; and though he was blamed for introducing too human a sentiment and expression into some of his animals, the humor and pathos of animal nature has had no finer exponent. Among his best-known works are: "The Cat's Paw" (1824); "The Return from Deer-stalking" (1827); "High Life and Low Life" (1831); "A Jack in Office" (1833); "Highland Drover Departing for the South" (1835); "Bolton Abbey in the Olden Time" (1837); "The Return from Hawking" (1837); "The Shepherd's Chief Mourner" (1837); "A Distinguished Member of the Humane Society" (1838); "There's Life in the Old Dog Yet" (1838); "Laying Down the Law" (1840); "Defeat of Comus" (1842); "Shoeing" (1844); "The Stag at Bay" (1846); "A Dialogue at Waterloo" (1850); "Monarch of the Glen" (1851); "Titania and Bottom" (1851); "Swannery invaded by Sea-eagles" (1869); the celebrated work of sculpture, the Lions at the base of Nelson's Monument, Trafalgar Square, London. He died in London, Oct. 1, 1873. CHARLES LANDSEER (1799–1879), brother of the above, had a good reputation as a painter of subjects from English history and poetry. He was chosen Academician in 1845, and keeper of the Academy in 1851. THOMAS LANDSEER (1795–1880), brother; was celebrated as an engraver, and made many reproductions of his brother's works. JOHN LANDSEER (1769–1852), engraver, father of the above. He was elected associate engraver of the

Academy, 1807; lectured on, and published several treatises on art.

Land's End, the extreme W. point of England (forming part of the county of Cornwall. It is a rocky promontory washed by the waters of the Atlantic.

Landshut (länds'höt), a picturesque town of Upper Bavaria, on the Isar, 44 miles by rail N. E. of Munich; has breweries, manufactories of tobacco, wagons, hats, etc., and an active trade in corn. Of its 11 churches, St. Martin's (1477) has a steeple 436 feet high. The castle of Trausnitz (1232) was partially restored in 1872–1874. The Dominican monastery (1271) was the seat of the university, removed hither from Ingolstadt in 1800, and transferred to Munich in 1826. During the Thirty Years' War and the war of the Austrian succession Landshut was several times captured; and here, April 16, 1809, the Austrians drove back the Bavarians, but were in turn defeated by Napoleon five days later. Pop. (1905) 24,217.

Landskrona (länds'krō-nä), a seaport of Sweden; on the Sound, 16 miles N. N. E. from Copenhagen; it has a good harbor, carries on sugar-refining, shipbuilding, and the manufacture of tobacco and leather, exports considerable corn and butter, and imports raw sugar, coal, and grain. The town was a fortress down to 1870. Opposite Landskrona in the Sound lies the island of Hvem, on which Tycho Brahé built his observatory of Oranienborg. Pop. (1905) 15,420.

Landslide, or **Landslip,** the sliding or settling down of a considerable portion of earth from a higher to a lower level; the earth which so slips or slides. Landslides are produced by earthquake disturbances, or by the action of water undermining the beds which fall. In 1760 a landslide, bringing down soil from an area of 1¼ miles from N. to S., and 600 yards from E. to W., occurred in the Isle of Portland. Sometimes they overwhelm and bury villages, as in the case of the Rossberg, in Switzerland, in 1806, etc. Later notable landslides have occurred in the Rocky Mountains, and a more recent instance, owing to earthquake action, occurred in the province of Granada in 1884.

Landsturm (länd'störm), a local militia of Germany, consisting of those of the reserve who are too old to serve in the LANDWEHR (*q. v.*). The landsturm is never called on to serve out of its own district except in case of invasion.

Land Tax, a tax levied on land. What is known as the land tax in England was imposed in the reign of William III. as a substitute for escuage, talliage, fifteenths, and other contributions. It was imposed annually from 1693 to 1798 at a varying rate, oftenest 4s. per pound. In the latter year it produced about $10,000,000, when it was replaced by a perpetual rent charge on land, with power of redemption, and a tax annually imposed on personal property, the latter tax abolished in 1833. The land tax now produces rather more than $5,000,000 annually. For a statement of the principles of Henry George favoring the raising of all public revenues by a single tax on land values, see SINGLE TAX.

Landwehr (länd'vāhr), a kind of German militia composed entirely of men who have served in the regular army, and who in time of peace follow their usual trades or callings, except during the time when they are called out for their annual training.

Lane, Edward William, an English Orientalist; born in Hereford, England, Sept. 17, 1801. He published "Manners and Customs of the Modern Egyptians" (1836), and made one of the most famous translations of the "Arabian Nights" (1838–1840). This work was the first translation of consequence into English which was made directly from the Arabic, all previous translations having been made through the French. The world is indebted to him for many valuable works on Egypt, and especially for his "Arabic-English Lexicon" (1863–1874), which cost him 20 years of unremitting labor. The succeeding parts came out from 1877 to 1882 under the editorship of S. Lane-Poole, the whole forming a dictionary indispensable to the student of Arabic. He died in Worthing, England, Aug. 10, 1876. See ARABIAN NIGHTS' ENTERTAINMENTS.

Lane, Joseph, an American military officer and politician; born in Buncombe co., N. C., Dec. 14, 1801. In 1821 he settled on a farm in Indiana, and the next year was returned to the Legislature. His representative career thenceforward extended over 25 years. In 1846, on war breaking out with Mexico, he resigned his senatorial seat and volunteered as a private soldier. He was almost immediately appointed colonel, and then directly afterward received from President Polk a Brigadier-General's commission. At the Battle of Buena Vista (where he was wounded), he commanded the left wing of the Americans. On Oct. 9, 1847, at the head of 3,000 men, he defeated General Santa Ana at Huamantla; on the 19th he took Atlixco, losing only one man while the enemy lost 500; on Nov. 22, took the strongly-fortified town of Matamoras, with a large quantity of military munitions; afterward took Orizaba; on the 24th defeated General Jarauta at Tehualtapan. At the conclusion of the war he was brevetted a Major-General, and in August, 1848, was appointed governor of Oregon Territory, from which office he was removed

by President Taylor. In 1859, on the admission of Oregon into the Union as a State, represented it as United States Senator, and in 1860 was nominated on the unsuccessful Breckinridge ticket for the vice-presidency of the United States. He died in Oregon, April 19, 1881.

Lane, Richard James, an English engraver and lithographer; born in 1800. At the age of 27 he became an A. R. A., partly on the strength of a fine engraving after Lawrence. Lithography, however, was just then coming in, and Lane abandoned engraving in its favor. His pencil was so delicate that his lithographs have often been mistaken at the first glance for line engravings. As a draughtsman in pencil or chalk he was very successful. In 1829 he executed an excellent profile of the Princess Victoria, then 10 years of age, and he afterward made portraits of most of the members of the royal family, and was appointed lithographer to the Queen and Prince Consort. His best lithographs (which number more than 1,000) include Lawrence's cycle of George IV., his own grand-uncle Gainsborough's sketches, and many works of Leslie, Landseer, and G. Richmond. He was also an accomplished sculptor, and attracted Chantrey's hearty admiration by such modelling as his life-size figure of his brother Edward. In his last years he directed the etching class at the South Kensington Art Schools. He died Nov. 21, 1872.

Lane-Poole, Stanley, an English archæologist; nephew of Edward W. Lane; born in London, England, Dec. 18, 1854. He was employed in the coin department of the British Museum (1874–1892); sent by the English government on archæological missions to Egypt (1883) and Russia (1886); employed by the Egyptian government in archæological research in Cairo (1895–1897); became Professor of Arabic in Trinity College, Dublin (1898). Among his works are: "Arabian Society in the Middle Ages" (1883); "Social Life in Egypt" (1883); "The Moors in Spain" (1886); "History of Saracenic Egypt" (1900); etc., besides which he edited many works.

Lanfranc, 1st archbishop of Canterbury after the Norman Conquest; born in Pavia, Italy, about 1005. He was educated at Pavia for the law; about 1039 left Italy, and founded a school of law at Avranches, which soon became one of the most popular in France; three years later took the monastic vows at the Benedictine monastery of Bec, and in 1046 was chosen its prior. He figured prominently in the Berengarian controversy as to the real presence, ranging himself against Berengarius (see BERENGARIUS OF TOURS). About 1053 he came into close contact with William of Normandy. Though he at first condemned this prince's marriage with his cousin, he afterward (1059) went personally to Rome to procure the papal dispensation for it. As a reward for this service William made him prior of his new foundation, the abbey of St. Stephen at Caen (1062), and in 1070 promoted him to the primacy of England by making him Archbishop of Canterbury in place of the deposed Stigand. Lanfranc still continued to be William's trusty adviser, helping him both to fill the English sees with Normans and to make the royal power supreme above that of the Church. He died in May, 1089, leaving commentaries, sermons, letters, and a work against Berengar.

Lanfrey, Pierre (lo*ng*-frā′), a French historian; born in Chambéry, France, Oct. 26, 1828. His life was entirely literary till the outbreak of the Franco-German War, when he joined the *garde mobile*. He was elected a member of the Assembly in 1871, was ambassador to Switzerland in 1873, and made life-senator in 1875. His chief work is his "History of Napoleon I.," in which he endeavors with unsparing pen to paint the man as he really was. He died in Paris, Nov. 15, 1877.

Lang, Andrew, an English author; born in Selkirk, March 31, 1844. He was educated at Edinburgh Academy, St. Andrew's University, and Balliol College, Oxford, where he took a distinguished position. A versatile writer, he published several volumes of ballads and other light verse; "Ballads and Lyrics of Old France" (1872); "Ballades in Blue China" (1880); "Custom and Myth" (1884); "Books and Bookmen" (1886); "Letters to Dead Authors" (1886); "Letters on Literature" (1889); "Old Friends" (1890); "Life of Sir Stafford Northcote" (1890); "Essays in Little" (1891); "The Making of Religion" (1898); "The Red Book of Animals" (1899); etc. He edited several collections of stories, fairy tales, and poetry for children, among them being "The Blue Fairy Book" (1889); "The Red Fairy Book" (1890); "The Blue Poetry Book" (1891); "The Green Fairy Book" (1893); "My Own Fairy Book" (1895); "The Yellow Fairy Book" (1894); "The Red True Story Book" (1895); "The Animal Story Book" (1896); "The Pink Fairy Book" (1897), and "The Red Book of Animal Stories" (1899); and he wrote good original fairy tales, including "The Gold of Fairnilee" (1888); "Prince Prigio" (1889), and "Prince Ricardo of Pantouflia" (1893). He was a frequent contributor to the daily press and to periodical literature, and edited "Longman's Magazine."

Lang, John Dunmore, a Scotch clergyman; born in Greenock, Scotland, Aug. 25,

1799. He emigrated to Australia in 1822, was ordained to the Scots Church, in Sydney (1823), and contributed much to the advancement of the colony by his advocacy of immigration, the introduction of a school system, and other public measures. He was a prolific writer, among his important works being: "A History of New South Wales" (1834); "Origin and Migration of the Polynesian Natives" (1834); "New Zealand in 1839"; "Cook's Land, Australia" (1847); numerous pamphlets; and a series of poems, "Aurora Australis" (1826). He died in Sydney, N. S. W., Aug. 8, 1878.

Lang, Karl Heinrich Ritter von (läng), a German historian; born in Balgheim, July 7, 1764. His principal works are: "Historic Development of the German Tax System" (1793); "Modern History of the Principality of Bayreuth" (3 vols. 1798–1811); "History of the Jesuits in Bavaria" (1819). His posthumous "Memoirs of the Ritter von Lang" (2 vols. 1841) made a great noise when first published; but they are to be used with discretion. He died near Ansbach, March 26, 1835.

Lang, Wilhelm, a German journalist; born in Tuttlingen, July 16, 1832. Among his works are: "Michelangelo Buonarotti as a Poet" (1861); "David Friedrich Strauss" (1874); "Wanderings in Peloponnesus" (1878); "From Suabia: History, Biography, Literature" (in seven parts, 1885–1890), a collection of delightful essays.

Langbein, August Friedrich Ernst (läng'bīn), a German poet; born near Dresden, Sept. 6, 1757. His "Poems" (1788); "Drolleries" (1792); and "Later Poems" (1812, 1823), circulated everywhere; they were inspired by the Muse of broad comedy, and at times showed little regard for the proprieties. He wrote also several humorous stories which were received with great popular favor, among them "Master Zimpfel's Wedding Tour" and "Thomas Kellerwurm." He died in Berlin, Jan. 2, 1835.

Langdon, John, an American statesman; born in Portsmouth, N. H., June 25, 1741. He aided the Revolution with money contributions and led a company at Saratoga and Bennington. He was a member of the Continental Congress and of the convention which framed the Constitution of the United States. He was governor of New Hampshire in 1788, from 1805 to 1809 and from 1810 to 1812, and United States Senator from 1789 to 1801. He died in Portsmouth, N. H., Sept. 18, 1819.

Lange, Ernst Philipp Karl. See GALEN, PHILIPPO.

Lange, Friedrich Albert (läng'uh), a German political economist; born near Solingen, Sept. 28, 1828. He wrote a valuable "History of Materialism and Critique of Its Importance for the Present Time" (1866; supplementary volume, 1867). His principal writings on political economy are: "The Labor Question Now and in the Future" (1865; 5th ed. 1894); "J. S. Mill's Views of the Social Question" (1866). He died in Marburg, Nov. 21, 1875.

Lange, Johann Peter, a German theologian; born in Sonnborn, near Elberfeld, April 10, 1802. He studied at Bonn, and after holding several pastoral charges became Professor of Theology at Zurich in 1841, and in 1854 at Bonn. He wrote many works, of which the best known are a "Life of Jesus Christ" (1839), treatises on dogmatics (1849–1852), Christian ethics (1878), hermeneutics, theological psychology, and his great "Commentary" on the Gospels, and, with other scholars, on the whole Old and New Testaments. He died in Bonn, July 9, 1884.

Lange, Julius Henrik, a Danish art critic; born in Vordingborg, June 19, 1838. After leaving the University of Copenhagen he traveled in Italy, and thereafter devoted himself to study of the history of art. Among his works are: "On Art Values" (1876); "Danish and Foreign Art" (1879); "Gods and Men in Homer" (1881); "Art and Politics" (1885); "Thorwaldsen's Representation of the Human Figure" (1893).

Lange, Samuel Gotthold, a German poet; born in Halle in 1711. He wrote a series of "Horatian Odes" (1747) in praise of Frederick the Great, and a metrical translation of "The Odes of Horace" (1752), which found a severe critic in Lessing; and published a "Collection of Letters from Scholars and Friends" (2 vols. 1769–1770), which is of considerable value for the literary history of the time. He died in Laublingen, June 25, 1781.

Langendijk, Pieter (läng'en-dīk), a Dutch playwright; born in Haarlem, July 25, 1683. Left to the care of an extravagant mother by the early death of his father, he was obliged to abandon his course of education, and support himself as a designer in a damask factory. His comedies, which are the redeeming features of a barren period of Dutch literature, include: "Don Quixote" (1711); "The Braggart"; "The Mutual Marriage Deception"; "Xantippe"; "Papirius"; "A Mirror of Our Merchants," the last three being comedies of manners. He died in Haarlem, July 18, 1756.

Langensalza (läng'en-zält-sä), a town of the Prussian province of Saxony, 13 miles N. by W. of Gotha; has woolen and cloth manufactures. Here occurred, June 27, 1866, an encounter between 19,000

Hanoverians and 8,200 Prussians; the latter were at first defeated, but being reinforced compelled the former to capitulate two days later. Not far from the town is a sulphur spring that attracts many visitors annually. Pop. (1895) 11,466.

Langevin, Sir Hector Louis, a Canadian statesman; born in Quebec, Aug. 26, 1826. He was called to the bar in 1850; appointed Queen's Counsel in 1864; having been elected to the Canada Assembly, became a member of the executive council, and at the union of the provinces in 1867 was appointed Secretary of State for Canada; he was afterward Minister of Public Works (1869–1873); Postmaster-General (1878); and Minister of Public Works (1879). He was created K. C. M. G. in 1881. He died June 11, 1906.

Langford, John Alfred, an English author; born in Birmingham, England, Sept. 12, 1823. He was a prominent educator and publicist in his native city. Among his works are: "Religious Skepticism and Infidelity" (1850); "English Democracy" (1855); "Poems of the Fields and Town" (1859); and "Heroes and Martyrs, and Other Poems" (1890).

Langholm, a market-town of Dumfriesshire, Scotland, at the junction of Ewes and Wauchope Waters with the Esk 23 miles S. S. W. of Hawick; has manufactured shepherd's plaid and tweeds since 1832. Near the town hall is a marble statue of Admiral Sir Pulteney Malcolm (1768–1838); and on White Hill an obelisk to his brother, Gen. Sir John Malcolm (1769–1833). In 1890 Thomas Hope, a New York merchant and native of Langholm, left $400,000 to found a hospital here. On the site of the town the Douglases were defeated in the battle of Arkinholm (1455).

Langley, Samuel Pierpont, an American physicist and astronomer; born in Boston, Mass., Aug. 22, 1834; was graduated at the Boston High School; was Professor of Mathematics for a time in the United States Naval Academy. He designed the system of railway-time service from observations which later came into general use; discovered an unknown extension of the invisible solar spectrum; and made numerous experiments to perfect an aërial machine which could support itself in mid-air and move freely without the aid of a balloon. He became secretary of the Smithsonian Institution in 1887; and was a member of many learned societies in the United States and Europe. His publications include "The New Astronomy"; "Researches on Solar Heat"; "Experiments in Aerodynamics"; "Internal Work of the Wind"; etc. He died Feb. 27, 1906.

Langley, Walter, an English painter; born in Birmingham, England, in 1852. He was educated at the National school, Birmingham; served apprenticeship as lithographer, studying art in local school of art in evenings; obtained National scholarship and studied at South Kensington two years; finally took up painting as a profession; settled in Newlyn, Cornwall, 1882; obtained gold medal for painting at Paris and Chicago; painted an autograph portrait, by invitation of the Directorate, for the gallery of the Uffizi, Florence. He exhibited (in water colors): "Among the Missing"; "Departure of the Fleet"; "Disaster"; "After the Storm"; etc.; (in oils): "Never Morning Wore to Evening but Some Heart Did Break"; "Motherless"; "Bread-winners"; etc.

Langres (lo*ngr*), a town in the French department of Haute-Marne; at an elevation of 1,530 feet above sea-level; 184 miles E. S. E. of Paris; a place of military importance as key of the communication between the Seine and the Rhone, it has been strongly fortified since 1868, and has a cathedral of the 12th and 13th century; pop. (1891), commune, 10,719. Langres (ancient Andomatunum) in Cæsar's time was the capital of the Lingones, a name corrupted into Langres.

Langside, a S. suburb of Glasgow. Here, after her escape from Loch Leven, Queen Mary's forces were totally defeated by the Regent Moray, May 13, 1568. A monument (1887) commemorates the battle. Pop. about 6,000.

Lang=Son, a town in Tongking; N. E. of Ha-noi; near the frontier of the Chinese province of Kwang-si. It was a center of operations in the Franco-Chinese war of 1884–1885.

Langton, Stephen, an English statesman; born about 1150. He received his education in the University of Paris, where he was the fellow-student and friend of the future Pope Innocent III.; he rose to the office of chancellor of the university. Innocent, after his elevation, gave Langton a post in his household, and afterward made him a cardinal (1206). On the occasion of the disputed election to the see of Canterbury in 1205–1207 Langton was recommended by the Pope to those electors who had come to Rome on the appeal, and, having been elected, was consecrated by Innocent at Viterbo, June 27, 1207. His appointment was resisted by King John; and for six years Langton was kept out of the see, only being admitted when John made terms with Innocent in 1213. In the conflict of John with his barons Langton was a warm partisan of the latter, and his name is the first of the subscribing witnesses of Magna Charta. And, though the Pope excommunicated the barons, Langton refused to publish the excommunication, and was in

consequence suspended from his functions by the Pope in 1215. But after the accession of Henry III. he was reinstated (1218) in his see, and from that time chiefly occupied himself with Church reforms till his death, which took place July 9, 1228.

Langtry, Lily (Le Breton), an English actress; daughter of the Rev. W. C. Le Breton, Dean of Jersey; born in St. Helier's, Jersey, in 1852. In 1874 she was married to Mr. Langtry, a native of Belfast, and about 1881, after having been for some years extremely well known in London society, made her first appearance on the stage Dec. 15, 1881, at the Haymarket Theater, in "An Unequal Match." She paid several professional visits to the United States. In 1899 she was married a second time to Hugo de Bathe.

Language, human speech; the aggregate of those articulate sounds, called words, used to express perception and thought, accepted by and current among any community; the expression of thought by articulate sounds or words; the body of uttered and audible sounds by which, in human society, thought is expressed. Language must either have been revealed originally from heaven, or it is the fruit of human invention. The latter opinion is embraced by Horace, Lucretius, Cicero, and most of the Greek and Roman writers; the former by the Jews and Christians, and many modern philosophers. Some suppose Hebrew to have been the language spoken by Adam; others say that Hebrew, Chaldee, and Arabic are only dialects of the original tongue. "And the whole earth was of one language and of one speech" (Gen. xi. 1).

"Language may be briefly and comprehensively defined as the means of expression of human thought. Language, then, signifies rather certain instrumentalities whereby men consciously and with intention represent their thought, to the end, chiefly, of making it known to other men: it is expression for the sake of communication. The instrumentalities capable of being used for this purpose, and actually more or less used, are various; gesture and grimace, pictorial or written signs, and uttered or spoken 'signs.'" — Whitney, "Life and Growth of Language," ch. i.

Also a particular set or aggregate of articulate sounds or words peculiar to a particular race, nation, tribe, or community; as, the English language, the French language, etc.; each of these often presents local varieties, to which the name of dialects has been given. Languages are divided according to two principles: First, morphologically, according to the structure of the language and the manner in which the sounds are formed or combined; and secondly, genealogically, according to their connection and relationship with respect to origin. The first class consists of three subdivisions of language, denominated isolating, agglutinating, and inflectional. Isolating languages, of which Chinese is an example, consist entirely of monosyllabic, unchanging roots. The Scythian is the type of what is called an agglutinative structure, in which the root maintains itself unaltered in the whole group of derivatives and inflections, and each suffix has an unchanged form and office. The Basque and Armenian languages are also agglutinative, with this difference, that the roots which are joined together have been abbreviated, as in the Basque *ilhun* = twilight, from *hill* = dead + *egun* = day. To these languages it has been proposed to give the distinctive name of incorporating or polysynthetic languages. In inflectional languages, which are the most highly developed, the roots are capable of being modified by prefixes or suffixes, which were once independent words.

Languages, when classified genealogically, are divided into families or groups connected by a community of origin. Thus the Indo-European (called also Aryan, or Indo-Germanic) is composed of seven great branches: The Indian, the Iranian or Persian, the Greek, the Italic, the Celtic, the Slavonic or Slavo-Celtic, and the Germanic or Teutonic. Each of these may again be subdivided. Thus the Germanic branch includes Mæso-Gothic, or the dialect of the Goths of Mæsia (see GOTHIC); the Low German languages, still spoken in the N. of Germany, and including two important cultivated tongues, the Netherlandish and English; the High-German body of dialects, represented now by only a single literary language, the so-called German; and the Scandinavian division, written in the forms of Danish, Swedish, Norwegian and Icelandic. The Semitic family of languages is the next in importance. It includes Arabic, Syrian, or Aramaic, the Canaanitish dialects, chief among which are Hebrew and Phœnician and the Assyrian and Babylonian dialects.

In music, in an organ an open metal flue pipe consists of foot, and language, and body. The language is a flat piece of metal fastened by its edge to the top of the foot, and which, by its shape, only permits the air to leave the foot in one direction.

Langue-de-bœuf (lo*ng*-duh-buhf'), a military implement, consisting of a broad-pointed blade, which was affixed to a staff, and received its name from its resemblance to an ox's tongue.

Languedoc (lo*ng*-guh-dok'), a former province of France; bounded on the E. by the Rhone, on the S. by the Mediterranean and the counties of Foix and Roussillon, and on the W. by Gascony and Guienne; (now embraced in the departments of Lozère, Gard, Ardèche, Aude, Hérault, Upper Loire, Tarn, and Upper Garonne); name derived from *langue d'oc.* During the period

of the Roman empire this part of Gaul was prosperous and wealthy, a home of enlightenment. In 412 the Visigoths founded the kingdom of Toulouse (one of the chief cities of Languedoc, Montpellier being the other), and were only overthrown in 759 by Pepin the Frank. Two centuries later this part of France was immediately subject to the Count of Toulouse, one of the great feudatories of the kingdom. For the story of the religious wars of the 12th and 13th centuries see ALBIGENSES.

Langue d'oc (*long* dok), the Southern French dialect, or PROVENÇAL (*q. v.*), so called because the people use *oc* instead of *oui* for "yes," as in the N. provinces.

Langue d'oil (dō-ēl'), or **Langue d'oui** (dwē), the Romance dialect spoken in the Middle Ages in the N. of France and so called from its word for yes being *oil*, *ouil*, or *oui*. It was the language of the Trouvères and the progenitor of modern French.

Lanier, Sidney (-nēr'), an American poet; born in Macon, Ga., Feb. 3, 1842. He served in the Confederate army as a pri-

SIDNEY LANIER.

vate soldier; after the war studied law, and for a while practised it at Macon; but abandoned that profession and devoted himself to music and poetry. From 1879 till his death he was lecturer on English literature in Johns Hopkins University. The poem "Corn," one of his earliest pieces (1874), and "Clover," "The Bee," "The Dove," etc., show insight into nature. His poetic works were collected and published (1884) after his death. He wrote also several works in prose, mostly pertaining to literary criticism and to mediæval history: among the former are "The Science of English Verse" (1880); "The English Novel and the Principles of its Development" (1883). He edited or compiled "The Boy's Froissart" (1878); "The Boy's King Arthur" (1880); "The Boy's Percy" (1882). He died in Lynn, N. C., Sept. 7, 1881.

Laniidæ (-nī'i-dē), or **Laniadæ** (-nī'a-dē), a family of thrush-like perching birds. The bill, which is long, has a deep notch or prominent tooth near the tip of the upper mandible, which is hooked. Its base is furnished with bristles; the wings are of moderate size, the tail long and rounded, the claws long, curved, and acute. They somewhat approach the raptorial birds, but have not, like them, retractile claws. Swainson divided the *Laniidæ* into five sub-families: *Lamianæ* (tree shrikes), *Thamnophilinæ* (bush shrikes), *Dicrurinæ* (drongo shrikes), *Ceblepyrinæ* (caterpillar catchers), and *Tyranninæ* (tyrant shrikes). Others divide them into the first two of these sub-families.

Lanigan, George Thomas, an American journalist and poet; born in Canada, Dec. 10, 1845. In Montreal, with Robert Graham, he founded the "Free Lance," a journal of satire and humor; afterward published under the name "Evening Star." In the United States he was connected with various journals. His writings include: "Canadian Ballads" (1864); "Fables Out of the World" (1878), by "George Washington Æsop." "The Amateur Orlando" and "A Threnody" (for the Ahkoond of Swat) are among his most successful humorous poems. He died in Philadelphia, Pa., Feb. 5, 1886.

Lanka (lang'kä), the ancient Sanskrit name of the island of CEYLON (*q. v.*).

Lankavatara, one of the chief religious works of the Buddhists, which treats of their religious law and of some of their most abstruse philosophical problems.

Lankester, Edwin Ray, an English scientist; born in London, England, May 15, 1847. A graduate of Christ Church, Oxford, he was Linacre Professor of Human and Comparative Anatomy at that university, and curator of the museum; and among the first authorities of his time in biology and physiology. He was active and effective in his field of science from 1865; was made Professor of Zoölogy in London University in 1874; was LL. D. and F. R. S.; served as secretary of the British Association, and president of its biological section; was founder and president of the Marine Biological University at Plymouth; director of the natural history departments of the British Museum (1898—). He was editor of the "Quarterly Journal of Microscopical Science," and a frequent contributor to "Nature" and other periodicals. Among his books are: "On Fossil Fishes of the Red Sandstone of Great Britain" (1870); "Comparative Longevity" (1871); "On Earth-Worms"; "Degeneration, a Chapter in Darwinism" (1880); "The Advancement of Science" (1890); "Zoölogical Papers,"

a collection of his articles in the "Encyclopædia Britannica" (1891).

Lanman, Charles, an American author; born in Monroe, Mich., June 14, 1819; was private secretary to Daniel Webster in 1850 and secretary of the Japanese legation in Washington in 1871-1882. He was among the first to explore the mountains in North Carolina, and was author of "A Tour to the River Saguenay" (1848); "Private Life of Daniel Webster" (1852); "The Japanese in America" (1872); "Haphazard Personalities" (1886); etc. He died in Washington, D. C., March 4, 1895.

Lanman, Charles Rockwell, an American educator; born in Norwich, Conn., July 8, 1850; was graduated at Yale College in 1871; at Johns Hopkins University in 1876–1880, and then became Professor of Sanskrit at Harvard College; is identified with numerous learned societies. His publications include "Noun-Inflection in the Veda" (1880); "Sanskrit Reader with Vocabulary and Notes" (1884); "The Beginnings of Hindu Pantheism" (1890); etc.

Lanner, the *Falco laniarius,* a species of hawk, especially the female of the species, the male being called a lanneret. It is a native of Southern Europe, North Africa, and Southwest Asia, and was much valued in falconry.

Lansdell, Henry, an English traveler; born in Tenterden, Kent, England, Jan. 10, 1841. As secretary to the Irish Church Mission he was prominent in philanthropic movements, traveling extensively about the world. In Siberia he investigated the prisons, publishing the results of his observations in "Through Siberia" (1882); "Russian Central Asia" (1885). "Chinese Central Asia" appeared in 1893.

Lansdowne, Henry Charles Keith Fitz-Maurice, Marquis of, an English statesman; born Jan. 14, 1845; became a lord of the Treasury in 1869, under Secretary for War in 1872, and for India in 1880, Governor-general of Canada in 1883, Viceroy of India in 1888, Secretary for War in 1895, Foreign Secretary in 1900. WILLIAM PETTY (1737-1805), 1st marquis, better known as Earl of Shelburne, began political life in 1763; became prime minister in 1782, but was driven from power by the Fox and North coalition. In 1784 he was made Marquis of Lansdowne. His second son, LORD HENRY PETTY (1780-1863), succeeded his brother as Marquis of Lansdowne in 1809; was a successful debater in Parliament, generally acting with the Whig party. In 1827 he was home secretary; from 1831 to 1841 president of the council. He was leader of the opposition in the House of Lords from 1841 to 1846, when he entered the cabinet of Lord John Russell as president of the council. In 1852 he declined the premiership.

Lansing, a city, capital of the State of Michigan, and county-seat of Ingham Co., on the Grand River and on the Chicago and Grand Trunk and several other railroads, 85 miles N. W. of Detroit. It is the farming trade center for the surrounding region, and is engaged in the manufacture of agricultural implements, flour, stoves, machinery, carriages, wagons, trunks, wheelbarrows, artificial stone and knit goods. It contains the State Capitol; State Hospital; State Library; United States government buildings; State School for the Blind; and the State Industrial School; and has electric light and street railroad plants; waterworks supplied from wells; abundant water power from the river; which is spanned by several bridges; National and State banks; about 20 churches; daily, weekly, and monthly periodicals; and an assessed property valuation of over $6,000,000. Pop. (1900) 16,485; (1910) 31,229.

Lansquenet (lans'ke-), a German common soldier, originally one belonging to the infantry, raised by the Emperor Maximilian toward the end of the 15th century; afterward, a soldier of fortune; a soldier who gave his services to any one who paid highest. The name became corrupted into lanceknight. Also the name of a game at cards.

Lantern, or **Lanthorn** (lan'turn), a common contrivance used for carrying a lamp or candle in, consisting of a case or vessel made of tin, with sashes of some transparent substance, such as horn or glass. Lanterns are first spoken of by Theopompus, a Greek comic poet, and Empedocles of Agrigentum. Lanterns were used by the ancients in augury. They were also carried before troops on the march by night, being then borne on the top of pikes, and so constructed as to throw lights only behind them. The only representation of an Egyptian lantern that has come down to us probably did not differ sensibly from those spoken of in St. John xviii: 3, where the party of men which went out of Jerusalem to apprehend Jesus in the garden of Gethsemane is described as being provided "with lanterns and torches." Dark lanterns are provided with only a single opening, which can be closed up when the light is required to be hidden, or opened when there is occasion for its assistance to discover some object.

In architecture, a small structure on the top of a dome, or in other similar situations, for the purpose of admitting light, promoting ventilation, or for ornament, of which that on the top of the capitol at Washington may be referred to as an example. In Gothic architecture the term is sometimes applied to *louvres* on the roofs of halls, etc.,

but it usually signifies a tower which has the whole height, or a considerable portion of the interior, open to view from the ground, and is lighted by an upper tier of windows; lantern towers of this kind are common over the center of cross churches, as at York, England.

Lantern Flies, insects allied to the cicadas, but forming a family by themselves, the *Fulgoridæ.* They are remarkable for the prolongation of their forehead into an empty vesicular expansion. The lantern fly proper (*Fulgora lanternaria*) is a native of South America. It is more than three inches in length, and five across the wings. It has been asserted that it emits a strong light from the inflated expansion of the forehead, but the evidence of this luminosity is more than doubtful. They are in fact reported to fly only during sunlight and not to appear abroad during dark. A Chinese species has, on equally equivocal testimony, been called *F. candelaria.*

Lantern Wheel, allied to the cog-wheel, the bars or spindles which connect the parallel heads being so spaced and proportioned as to engage with the cogs of the spur-wheel. It is a cheap form of wheel, and is seldom used where facilities are at hand for making better. It bears the relation of a pinion to the spur-wheel. It is sometimes called a wallower or trundle wheel, from the trundles or rundles of which it is made.

Lanterns, Feast of, a celebrated feast held in China on the 15th day of the first month of the year. It derives its name from the vast number of lanterns which are hung out of the houses and in the streets, the number of which has been stated to have exceeded even 200,000,000. The lanterns used are often of great value, being richly ornamented with gilding, painting, japanning, sculpture, etc. Some of them are of great size, reaching nearly 30 feet in diameter, and are so constructed as to resemble halls or chambers; hence, two or three together would make an elegant house. In this way the Chinese may be said to live, to receive visits, dance, and act plays in a lantern. When lighted up with torches, these lanterns have a beautiful effect at a distance. Besides the large lanterns, there are also a vast number of smaller ones, which usually consist of six faces or lights, each about 4 feet high and 1½ feet broad, framed in wood, finely gilded and adorned. Over these they stretch a fine transparent silk, painted with flowers, trees, and other objects; the colors are very vivid, and when the lanterns are lighted up the effect is lively and picturesque.

Lanthanium, or **Lanthanum,** a rare metal associated with didymium in the oxide of cerium, and so named from its properties being concealed, as it were, by those of cerium; symbol La″; at. wt. 90.18. Lanthanum forms only one series of compounds, such as the oxide, chloride, and sulphide.

Lantum, a name of uncertain derivation given to a modern musical instrument, in form not unlike the hurdy-gurdy, but larger, and having metallic reeds or tongues similar to those of the concertina. The air is supplied by a rotatory bellows, the handle of which is at the bottom of the instruments, and the series of small square buttons or keys which are in front are played upon by the fingers.

Lanza, Marchioness Clara, an American novelist; daughter of the late Surgeon-General Hammond. Among her works are: "Tit for Tat" (1880); "Mr. Perkins's Daughter" (1881); "A Righteous Apostate" (1883); "A Modern Marriage"; "A Golden Pilgrimage"; "Scarabæus"; etc.

Laocoön (lā-ok′ō-on), according to classic legend, a priest of Apollo, afterward of Poseidon, in Troy, who married against the will of the former god, and who warned his countrymen against admitting the wooden horse into Troy. For one or both of these reasons he was destroyed along with his two sons by two enormous serpents which came up out of the sea. The subject is represented in one of the most famous works of ancient sculpture still in existence, a group discovered in 1506 at Rome, on the side of the Esquiline Hill, and purchased by Pope Julius II. for the Vatican. It was carried by Bonaparte to Paris in 1796, but recovered in 1814. The whole treatment of the subject, the anatomical accuracy of the figures, and the representation both of bodily pain and of passion, have always commanded the highest admiration. According to Pliny, it was the work of the Rhodian artists, Agesander, Polydorus, and Athenodorus; various dates have been assigned to it, from 200 B. C. till A. D. 200; but the best authorities place its date at a little before 100 B. C.

Laodamia (lā-od-a-mī′ä), in Greek heroic history, the daughter of Acastus and wife of Protesilaus. Her husband was the first of all the Greeks who fell by a Trojan hand, being killed as he leaped on shore from his ship. Laodamia prayed of the gods to give him back to her for but three hours. Her prayer was granted; Hermes led him back to the upper world; and, when the fatal moment to return had come, Laodamia died with him. This noble story has been treated by Wordsworth in verse worthy of the theme.

Laodicea (-sē′ä), in ancient geography, the name of several towns of Asia, the most important of which was a city of ancient Phrygia, near the river Lycos, so called after Laodice, Queen of Antiochus Theos, its founder, built on the site of an older town named Diospolis. It was destroyed by an earthquake during the reign of Tiberius,

but rebuilt by the inhabitants, who were very wealthy. Its luxury in the early times of Christianity is attested by the severe rebuke addressed to its inhabitants in the Apocalypse. It fell into the hands of the Turks in 1255, was again destroyed in 1402, and is now a heap of uninteresting ruins, known by the name of Eski-Hissar. Art and science flourished among the ancient Laodiceans, and it was the seat of a famous medical school. The number of Jews who were settled here at the rise of Christianity will account for its importance in the primitive history of the Church. An important ecclesiastical council, the First Council of Laodicea, was held here in 363, which adopted resolutions concerning the canon of the Old and New Testaments, and referring to ecclesiastical discipline. A second council, 476, condemned the Eutychians.

Laodicea ad Mare. See LATAKIA.

Laodocus (-od′ō-kus), the son of Antenor the Trojan, whose form Pallas assumed when she wanted Pandarus to break the truce agreed on between the Greeks and Trojans, by throwing a dart at Menelaus.

Laomedon (-om′uh-don), son of Ilius King of Troy, and father to Priam and Hesione. He built the walls of Troy, assisted by Apollo and Neptune. When the walls were finished, Laomedon refused to reward the labors of the gods, and, soon after, his territories were laid waste by the sea, and his subjects visited by a pestilence. Sacrifices were offered to the offended divinities, but nothing could appease the gods, according to the oracle, save annually to expose to a sea-monster a Trojan virgin. This victim was decided by lot, and when the calamity had continued for five or six years, the lot fell on Hesione, Laomedon's daughter; but Hercules came and offered to deliver the Trojans from this calamity, if Laomedon would reward him with a number of fine horses. The king consented; but when the monster was destroyed he refused to give them. Hercules was obliged to besiege Troy and take it by force of arms. Laomedon was put to death after a reign of 29 years, and his son Priam placed on the throne.

Laon (l*ong*), the chief town of the French department of Aisne; 87 miles N. E. of Paris. Occupying a naturally strong position, it has been a fortress since the 5th century; its citadel is surrounded with ruinous walls. From 515 to 1790 it was the seat of a bishop. The cathedral, a Gothic edifice of the 12th century with a handsome façade, and the bishop's palace, now used as a law-court, still remain. The inhabitants are noted market-gardeners, producing excellent artichokes and asparagus. In the 10th century the city was the place of residence of the Carlovingian kings, and capital of Francia. At Laon, March 9 and 10, 1814, Napoleon I. was repulsed by the allies under Blücher and Bülow; and it surrendered to a German force, Sept. 9, 1870, when the explosion of the powder magazine by a French soldier cost about 500 lives. Pop. (1901) 15,434.

Laos (lä′ōs), a territory in the Indo-China peninsula, surrounded by the Shan States Annam, Tonking, and the Chinese province of Yunman; area, estimated, 91,000 square miles; pop. est. 1,500,000; the soil is fertile, producing rice, cotton, tobacco, and fruits, and bearing teak forests; gold, tin, lead, and precious stones are found; concessions have been granted to several French mining companies; for commercial purposes the country is almost inaccessible; has been under French protectorate since 1893; cost of administration borne by Cochin-China, Tonking and Annam, and Cambodia.

Lao=tsze (lä-o-tsä′), a celebrated philosopher of China; generally reputed to have been the founder of Tâoism; which at the present day shares the allegiance of the Chinese with Confucianism and Buddhism under the appellation of San Chiào, "the three doctrines" or "teachings"; born probably in 604 B. C., 54 years before the birth of Confucius. He was curator of the royal library in the capital city of Loh, not far from the present city of Loh-yang in Honan. The designation Lâo-tsze means the "old philosopher." Confucius and Lâo seem to have met several times. Nothing certain can be said of the length of Lâo's life. Sze-ma-Ch'ien, the historian of ancient China, tells us that he cultivated "the Tâo and its characteristics," his chief aim being to keep himself unknown; that he resided long at the capital, and then seeing the decay of the dynasty of Châu went away to the gate which led out of the royal domain toward the regions of the N. W.; that there he was recognized by Yin Hsî, the keeper of the gate, the place of which is shown in the present Shan Châu of Ho-nan, and was prevailed on to write out for him the treatise called the "Tâo Teh King," which has come down to us as the only record of his teaching. Ch'ien adds that after giving this writing to the keeper "he went away, and it is not known where he died." Such is the substance of all of importance which the great historian, writing in the 2d century B. C., could tell of Lâo-tsze. He says nothing of the preëxistences attributed to him, nor of his subsequent travels in the West, where he became acquainted with the wisdom of India and even Judea. These and other marvels are later and fabulous additions to Ch'ien's brief account, and arose in imitation of the legends of Buddhism and through misconceptions of the meaning of the "Tâo Teh King."

Some doctrine of the Tâo had come down from the most ancient times, and a father, or at least a most important teacher, of it is claimed in Hwang Tî, the mythical sovereign of the 27th century B. C. It served especially as a discipline adapted to promote longevity and to preserve life. Lâo-tsze entered into this, and the doctrine assumed in his hands a more subtle character. It is not easy, however, to say what he meant by his Tâo. "It was the originator of heaven and earth: it is the mother of all things." At the same time it is not a personal being. "It might appear," he says, "to have been before God." "It gave," says Chwang-tsze, the ablest of all Lâo's followers, "their mysterious existence to spirits and to God (or to gods)." The character Tâo properly means "path," "course," or "way"; and it is in this sense that Lâo uses it. His "great way" is but a metaphorical expression for the way in which things came at first into being out of the primal nothingness, and how the phenomena of nature continue to go on, in stillness and quietness, without striving or crying. Of the same kind should be the influence of the Tâo in the conduct of individuals and of government. That things may come to the right and successful issue they must be carried on without effort or purpose. The secret of good government is to let men alone. The appeal to arms is hateful. All learning is injurious. The wisdom of men defeats its own ends. Tâo works by contraries, and the secret of its strength is its weakness. In many of these teachings Lâo-tsze may seem to be only a visionary dreamer, but he enunciates many lessons of a very high morality. Its fundamental quality is humility, which he compares again and again to water, soft and weak in itself, yet able to attack and overthrow the strongest and firmest things. With humility he associates gentleness and economy, and calls them his "three precious possessions." He even rises to the greatest of all moral principles, the returning of good for evil, and enunciates "recompensing injury with kindness." He nowhere speaks clearly of the state of man after death; but Chwang-tsze teaches that life and death follow each other in endless succession, or like the sequence of the four seasons. There is nothing about religion or religious worship in the "Tâo Teh King." The origin of Tâoism as a religion cannot be placed earlier than our 1st century.

La Paz, a department of Bolivia, bordering on Peru; area 171,130 square miles; pop. (1906) 579,300 (excluding aboriginal Indians). The La Paz cordillera contains the loftiest peaks of the Bolivian Andes, and much of the surface of the department is a dry plateau; but in the E. the great mountains sink to the plain, and the country is richly watered. Capital, La Paz, at the foot of a steep valley 11,952 feet above the sea, 42 miles S. E. of Lake Titicaca; has a handsome but unfinished cathedral, and a college, seminary, and medical school; the houses are mostly of mud, and owing to the extremely uneven site present a very irregular appearance; the inhabitants, mostly Indians and half-breeds, carry on an active trade in copper, alpaca wool, cinchona, etc.; pop. about 62,000.

La Pérouse (lä pā-röz'), **Jean François de Galaup, Comte de,** a French navigator; born near Albi, Languedoc, France, Aug. 22, 1741. He distinguished himself in the naval war against England (1778–1783), especially by destroying the forts of the Hudson Bay Company. Two years after the conclusion of peace he was chosen to command an expedition of discovery sent out by the French government. He sailed in August, 1785, with two ships, visited the N. W. coast of America, explored the N. E. coasts of Asia, where by sailing through La Pérouse Strait between Saghalien and Yezo, he discovered that each of these was a separate island. In February, 1788, he sailed from Botany Bay; and after that all trace of him was lost. In 1826 it was fully ascertained by the English Captain Dillon that both of La Pérouse's ships had been wrecked in a storm on a coral reef off Vanikoro, an island lying N. of the New Hebrides. The account of the early portions of La Pérouse's voyage, prepared from journals sent home by him, was published under the title of "Journey round the World."

Lapis Lazuli (lā pis laz'ū-lī), a mineral of beautiful ultramarine or azure color, consisting chiefly of silica and alumina, with a little sulphuric acid, soda, and lime. The color varies much in its degree of intensity. Lapis lazuli is often marked by white spots and bands. It is generally found massive, and is translucent at the edges, with uneven, finely granular fracture, but sometimes appears crystallized in rhombic dodecahedrons, its primitive form. It is found associated with crystalline limestone among schistose rocks and in granite, in Siberia, China, Tibet, Chile, etc. The finest specimens are brought from Bokhara. It seems to have been the only stone of any intrinsic value known to the Egyptians under the Pharaohs. The ancients used it much for engraving, for vases, etc. It is extensively employed in ornamental and mosaic work, and for sumptuous altars and shrines. It is easily wrought and takes a good polish. The valuable pigment called ULTRAMARINE (*q. v.*) is made from it. It is one of the minerals sometimes called azure stone.

Lapithæ (lap'i-thē), a mythical race inhabiting the mountains of Thessaly. They were ruled by Pirithous, a son of Ixion and

Laplace

half-brother of the Centaurs. At the marriage of Pirithous to Hippodamia, the Centaurs, intoxicated with wine, insolently attempted to carry off the bride and the other women, but were overpowered after a bloody struggle by the Lapithæ.

Laplace, Pierre Simon, Marquis de, a celebrated French mathematician and astronomer; born in Beaumont-en-Auge, Calvados, France, March 28, 1749. The circumstances of his parents were extremely humble, and he was indebted for the means of acquiring his early instruction to the generosity of some rich individuals to whom his uncommon talents and astonishing aptitude for mathematical studies had accidentally become known. The expectations which had been formed of him were quickly realized by the great rapidity of his progress, which was such that at a very early age he was appointed a professor of mathematics in the military school of his native town. This field, however, soon appeared too confined for his aspiring views, and he abandoned it in a short time in order to prosecute his studies with greater advantages, and seek his fortune in Paris. In the capital the brilliant talents of the young geometer soon procured him protectors; among others d'Alembert, who admitted him to his friendship and in some measure directed his first steps in his career of the sciences. Laplace profited so well by the counsels and lessons of this illustrious master that in a short time he signalized himself by the capital discovery of the invariability of the mean distances of the planets from the sun, and by the establishment of some theories of great importance in analysis. His first essays were made under the auspices of the President Saron, to whom he dedicated his works and who defrayed the expense of their publication. Through this patronage he was appointed to succeed Bezout in the post of examiner of the royal corps of artillery; an office which left him sufficient leisure to prosecute the studies which he had commenced with such distinguished success.

At the age of 24 he was admitted into the Academy of Sciences, and from this time devoted himself with ardor to the composition of a series of memoirs on the most important questions of physical astronomy and to the development in all their details of the consequences that result from the general laws which regulate the system of the universe. Besides these and other researches connected with the improvement and extension of mathematical science, his attention was turned successfully to the investigation of the principles of, and to experimental researches in, chemistry; and, associated with Lavoisier, he was the first to repeat in France the experiments of Cavendish to effect the decomposition of water. During the Revolution Laplace was several times in danger of meeting a premature fate.

He was not one of those retiring unobtrusive sons of genius who gladly relinquish the objects of political ambition for the calm pursuits of philosophy; on the contrary, he entered into all the frenzies of that distracted period with the same enthusiasm which he displayed in his other occupations; and the extravagant and even ridiculous excess to which he carried his professions in favor of liberty, equality, and republicanism, especially when contrasted with the suppleness and subserviency of his subsequent political conduct, greatly diminished the respect which would have been willingly yielded to his profound genius and distinguished services in the cause of science. At the establishment of the Polytechnic School he was appointed one of its professors. In 1796 he did homage to the Council of Five Hundred by presenting to them his "Exposition of the System of the Universe," a work which was received by the scientific world in general with unbounded admiration. In 1799 he was nominated by the consuls to the ministry of the interior. His success as a minister of State was by no means commensurate with his high reputation as a mathematician and after six weeks he was superseded. Bonaparte, who himself aspired to the renown of science and who always manifested the most friendly disposition toward Laplace, said of him, in reference to the inaptitude which he displayed in the management of practical matters, that he never seized any question in its true point of view, that he sought for subtleties in everything, that his ideas were problematical, and that, in short, he carried into the administration the spirit of the infinitesimal calculus. The same year he was called to a place in the Senate, of which body he was subsequently vice-chancellor and president.

In 1806 Laplace was raised to the dignity of count of the empire. But though he was indebted for all these offices and honors to the personal favor of Bonaparte, yet, on the emperor's reverse of fortune in 1814, he was one of the first to push matters to extremity against his former benefactor, and to vote for the overthrow of the imperial power and the establishment of a provisional government. On the reëstablishment of the Bourbons the facility with which he had deserted his former master and his zeal in the service of the restored dynasty were rewarded with the title of marquis and a seat in the Chamber of Peers. In 1816 Laplace was named a member of the French Academy, an honor to which he was eminently entitled by the admirable clearness, and purity, and elegance of his style. He died in Paris March 5, 1827. It is difficult for

a student who has perused the writings of Laplace to know how much merit belongs to this great astronomer for original research, in consequence of his almost total neglect to acknowledge his indebtedness to his predecessors or contemporaries. The name of his illustrious friend Lagrange is rarely mentioned, and one of the latter's finest analytical discoveries is referred to merely as formula No. xxi. of the second book of the "Celestial Mechanism" (Laplace's own work). In like manner he gravely informs his readers, "We will now give several general theorems, which will be useful as we proceed," these general theorems being known over the whole scientific world by the names of Maclaurin, Taylor, etc. On the other hand, we find him referring to himself in almost every page. The student is then apt to fancy that after more extensive reading he shall find himself obliged to restore more and more to the right owner, till nothing is left to justify such a reputation as that of Laplace. After all due restoration has been made, however, almost any one of his original researches, contained in his great work the "Celestial Mechanism," and the general method of the "Theory of Probabilities" for the approximation to the values of definite integrals, are alone sufficient to stamp him as one of the greatest of mathematicians. His discovery of the cause of the discrepancy between the theoretical and the observed velocity of sound, his rules for barometrical measurement, his theories regarding capillary attraction, tides, atmospheric refraction, the static properties of electricity, etc., prove that in some of the most important departments of physics his mind was not less profitably and actively engaged than in mathematical analysis. Astronomy owes to his labors the discovery of the invariability of the major axes of the planetary orbits, and of the great inequality in the motions of Jupiter and Saturn; the solution of the problem of the acceleration of the mean motion of the moon, the theory of Jupiter's satellites, and other important laws, and it was he who first propounded the nebular hypothesis. The most important of his works besides those mentioned are "Analytical Theory of Probabilities" (1812), and "Philosophical Essay on Probabilities" (1814). His contributions to the memoirs of the Institut on various isolated points of science are numerous and valuable. His "Complete Works" appeared in 13 volumes (1878–1898). Laplace was styled by Airy "the greatest mathematician of the past age."

Lapland, the collective name for the extensive region in the N. of Europe inhabited by Lapps; bounded on the N. by the Arctic Ocean, on the N. W. by the Atlantic, on the E. by the White Sea, on the S., by the parallel, roughly speaking, lat. 66° N. (though Lapps are sometimes found as far S. as lat. 63° N. in Norway and Sweden); pop. about 28,000, thus distributed: 18,000 in Norway, 7,000 in Sweden, nearly 800 in Finland, and 2,000 in Russia (but there are also numerous settlers belonging to these four nationalities in Lapland, chiefly engaged in agriculture, hunting, trading, and in administrative work, some of them no doubt the descendants of the criminals transported thither from Denmark three centuries ago). Norwegian Lapland is of course a mountainous country, its coasts cleft by the narrow, steep-walled fjords; in Swedish Lapland the most characteristic features are ridges with narrow valleys between, the latter generally partly filled with long, narrow lakes; farther E., in Finnish and Russian Lapland, the surface is more level, the rivers and lakes become more numerous, marshes are frequent, and next the Arctic Ocean barren tundras, and many square miles are covered with forests of fir and spruce, yet low ranges of hills occur in some districts, as, for instance, the Umbdek Mountains, in the peninsula of Kola. Some of the lakes are of large size: Lake Enare or Inara, in Finnish Lapland, has an area of 1,147 square miles; Lake Imandra is 65 miles long by 9 wide; and Lake Nuot, 35 miles long by 7 wide. The river Tana, which flows N. to the Arctic Sea, is the second longest river of Norway; and several other rivers of considerable size flow into the White Sea and the Gulf of Bothnia, as the Tulom, the Kemi, etc. The summer is short and comparatively hot, owing to the fact that the sun scarcely ever sinks below the horizon during the three months that summer lasts; during this period the mosquitoes are a terrible plague. For seven or eight weeks in winter the sun does not rise above the horizon; comparative darkness prevails all the time, except when the snow-covered landscape is illuminated by the weird coruscations of the aurora borealis; the cold in winter is excessive, the thermometer generally indicating 60° of frost, and sometimes more; but owing to the prevalent stillness of the air the cold is not felt so severely as might be expected.

Lapland, Wire of. See WIRE.

La Plata (lä plä'tä), the capital of the Argentine province of Buenos Ayres, founded in 1882, after Buenos Ayres city, from which it is about 30 miles S. E., had been made the federal capital; has wide streets, now mostly paved, and over 20 open squares; the central portion is lit with the electric light, the rest with kerosene lamps, and there is a service of tramways; the only buildings of note are the handsome capitol and other offices of the government, an observatory, several chapels,

and a fine railway station; has scores of hotels, inns, and cafés; a college, and, 7 miles away, a hospital and an asylum for the insane; among the manufactories already established is one of cotton and woolen tissues; a canal connects a harbor which has been constructed at La Plata with a larger outer harbor at Ensenada, on the La Plata river; pop. (1906) 80,000.

La Plata, Rio de (rē'ō dā), a wide estuary of South America, between Uruguay on the N. and the Argentine Republic on the S., through which the waters of the Paraná and the Uruguay sweep down to the ocean; length about 200 miles, width 28 miles at Buenos Ayres, and 140 miles at its mouth, between Maldonado and Cape San Antonio. The N. shore is somewhat steep and lofty, but that along the province of Buenos Ayres is low and flat, with wide sandbanks that prevent ships from approaching closely to the shore. The estuary has thus no shelter from the tempestuous storms that come from the S. W.; and even the only good harbor, that at Montevideo, is open to the S. E. The affluents of the La Plata drain an area estimated at 1,600,000 square miles, and the outflow of the estuary is calculated at about 52,000,000 cubic feet per minute — a volume exceeded only by that of the Amazon; the yellow, muddy stream is recognizable 60 miles out at sea. The estuary was discovered in 1515 or 1516 by Diaz de Solis, who was shortly afterward roasted and eaten by the Indians on its bank.

Laporte, a city and county-seat of Laporte co., Ind., on the Chicago and West Michigan, Lake Erie and Western, and several other railroads; 59 miles E. S. E. of Chicago, Ill. It is the farming trade center for the county; and is also engaged in the manufacture of woolen goods, agricultural implements, wheels, hubs, etc. It is an attractive summer resort, having several beautiful lakes in its vicinity; contains a handsome court house, city hall, St. Rose's Academy, and public library; and has an electric-light plant, waterworks supplied from one of the lakes; several churches, National and State banks, daily, weekly and monthly periodicals, and an assessed property valuation of nearly $4,000,000. Pop. (1900) 7,126; (1910) 10,525.

Lappa, in botany, a genus of Composites, tribe Carduieæ, now generally made a synonym of *Arctium*. *L. major* is the same as *Arctium lappa*, sub-species *Lappa* proper; *L. minor* is the sub-species *A. minus*. The root of the burdock is tonic, aperient, sudorific, and diuretic, and was formerly used as a febrifuge. It has been given in rheumatism, gout, and skin diseases, and as a substitute for sarsaparilla.

Lappenberg, Johann Martin (läp'penberg), a German historian; born in Hamburg, July 30, 1794. He pursued historical and political studies in Edinburgh, London, Berlin, and Göttingen. He became the representative of his native city at the Prussian court in 1820, and in 1823 was appointed keeper of the archives to the Hamburg Senate, an appointment which he held for 40 years. The book by which he is best known is "History of England" (1834–1837). Besides this he completed Sartorius' "History of the Origin of the German Hansa" (1830), wrote books on the history of Heligoland and the Steelyard in London, and edited valuable historical documents relating to Hamburg and Bremen, and old chroniclers, such as Thietmar of Merseburg, Arnold of Lübeck, etc. He died in Hamburg, Nov. 28, 1865.

Lapps, the inhabitants of Lapland. The Lapps, who call themselves Sabme or Sabmeladsjak (the Norwegians call them Finns, while the Finns they call Kvæns or Qvæns), belong to the Ural-Altaic stock, and are consequently closely related to the Finns (Suomi). As a race they are the shortest people in Europe (four or five feet in height), and the most brachycephalic. In other respects they are spare of body, with dark, bristly hair and scanty beard, and short, often bandy, legs. Though not very muscular they are capable of great exertion and fatigue, and frequently live to a great age (80 or more). The mouth is large, the lips thick, and the eyes small and piercing, but not obliquely set. The Lapps are usually distinguished as Mountain, Sea, Forest, and River Lapps. The Mountain Lapps, the backbone of the race, are nomads; they move constantly from place to place in order to find sustenance (Arctic moss) for their reindeer herds, their only source of wealth. In summer they go down to the fjords and coasts, but spend the rest of the year in the mountains and on the plains of the interior. The Sea Lapps, mostly impoverished Mountain Lapps, or their descendants, dwell in scattered hamlets along the coast, and live by fishing. The Forest and River Lapps are nomads who have taken to a settled mode of life; they not only keep domesticated reindeer, but hunt and fish. The nomad Lapps live all the year round in tents. The reindeer supplies nearly all their wants, except coffee, tobacco, and sugar. They live on its flesh and milk; they clothe themselves in its skin; and use it as a beast of burden. In winter, harnessed to a boat-shaped sledge (*pulk*), it takes them the longest journeys, across frozen lakes and rivers, and over the mountains and through the forests. It is computed that there are 400,000 reindeer in Lapland, for the most part semi-wild. In his personal habits and in his clothing

the Lapp is the reverse of cleanly. He is, however, very good-natured, rather prone to self-indulgence when the opportunity presents itself (which is not often), but at other times sober enough. As a rule, he is "saving, almost miserly," "selfish and cute in all his dealings," not very trustworthy in the matter of speaking the truth, but on the whole inclined to take life easily. His imagination is easily excited, and he is readily susceptible to religious impressions of a sensational type; a notable "epidemic" occurred at Koutokeino in Norwegian Lapland in 1848–1851. The Lapps all profess Christianity; those of Norway and Sweden belong to the Lutheran Church, those of Russia to the Greek Church. Lapland witches, who are, more correctly speaking wizards, have been famous from very early times. The principal instrument of divination was a curious oval-shaped drum, covered with a variety of figures and signs. In very early times the Lapps probably came much farther S. in both Scandinavia and Russia; the bones of men of a short race, identified with the Lapps, have been discovered in several ancient Scandinavian burial mounds. The Norsemen treated the Lapps as a subject race as early as the 9th century, but had to reconquer them in the 14th; the Russians followed suit in the 11th, and the Swedes in the 16th. From the 13th to the 17th century the Lapps were kept in a state little better than slavery by Swedish adventurers known as Birkarlians. But at the present day both the Scandinavian governments bestow on them every kindness.

Laprade, Victor de (lä-präd′), a French poet; born in Montbrison, Jan. 13, 1812. His earliest poems, as "Magdalen's Precious Ointment" (1839), "Jesus's Wrath" (1840), showed very plainly the influence of Lamartine; and to the end Lamartine was his model. Besides several volumes of lyric poems — "Psyche" (1841); "Odes and Poems" (1844); "Evangelic Poems" (1852); "Heroic Idylls" (1858) — he wrote the tragedy "Harmodius" (1870), and several works in prose; *e. g.*, "Questions of Art and Morals" (1861); "Liberal Education" (1873); "Essays in Idealist Criticism" (1882). He died in Lyons, Dec. 13, 1883.

Lapsed, the name given to such of the early Christians as fell away in times of persecution. It came into prominence in the Decian persecution (A. D. 249–251), the most severe of all. The Church allowed the lapsed to be restored to Christian communion after a long course of penance; the Donatists denied all such restoration. Those who apostatized by actual sacrifice to idols were called *sacrificati* or *thurificati;* those who, without actually sacrificing, purchased a certificate that they had done so were called *libellatici;* others were known as *acta facientes,* because they allowed their names to appear in the official list as having obeyed the imperial edict. Cyprian, *de Lapsis,* is the chief authority on the subject.

Lapsed Devise, in law, a devise which lapses or becomes void by reason of the devisee's death during the testator's lifetime, or by reason of such devise being contrary to law.

Lapsed Legacy. In Blackstone's words: "If the legatee dies before the testator, the legacy is a lost or lapsed legacy, and shall sink into the residuum, except it be a gift to a child or other issue of the testator, which does not lapse if the legatee die leaving issue which survives the testator. And if a contingent legacy be left to any one, as when he attains, or if he attains, the age of 21, and he dies before that time, it is a lapsed legacy."

Lapwing, in ornithology, the genus *Vanellus* and species *V. cristatus.* The specific name refers to the occipital feathers of the male in winter, which are very loose, long, and curved upward, so as to constitute an erectile crest. This crest, the top of the head, the front of the neck and breast are glossy black, the upper parts green with brilliant reflections. The sides of the neck, the under parts pure white, most of the tail black, lower coverts reddish, bill blackish, feet reddish brown. Length about a foot. Color of the female fainter. Albinos sometimes occur. It is seen in spring flying over fields and downs, turning somersaults in the air, and uttering a musical cry, from which it is often called peewit. It lays four eggs, and lures intruders away from its nest by simulating lameness. The "lapwing" of Scripture (Lev. xi: 19, Deut. xiv: 18) is probably the HOOPOE (*q. v.*).

Lar, plural **Lares** (lār′ēz), more rarely **Lars,** a tutelary divinity, usually a deified ancestor or hero. The worship of Lares is a species of MANES WORSHIP (*q. v.*), and was very prevalent among the Romans. They were of two kinds: domestic and public. Of the former the *Lar familiaris,* regarded as the founder of the family, and inseparable therefrom, was the most important, and corresponded to the eponymic hero of the Greeks. The latter were divided into Præstites, guardians of a whole city; compitales watching over a certain portion of a city; Rurales, gods of the country; Viales, protecting travelers; and Marini or Permarini (Liv. xl: 25), gods of the ocean. (See PENATES).

"The statues of the household Lars were set at the fire-place, arrayed in dog-skins, with a figure of a dog beside them. Garlands were hung on them, and offerings of food, wine, and incense

made to them once every month on either the Kalends, Nones, or Ides."—Keightley: "Myth. of Greece and Italy," p. 486.

Lar, capital of the district of Laristan, in South Persia; on a wooded plain, 60 miles from the Persian Gulf and 170 S. E. of Shiraz; has trade in tobacco, cotton, and grain; pop. about 12,000.

Lara (lä'rä), a celebrated Spanish family, the founder of which was Ferdinand Gonzales, Count of Castile and Lara; died in 970. In 1130 the family was divided into two branches, the first from Manrique De Lara, which took the title of Viscount of Narbonne, for its stock; and the second deriving from Ordogno Perez, and preserving the title of Count of Lara till it became extinct in the latter half of the 14th century. The members of this family played an important part in the civil wars of Castile, under Alphonso X., Sancho IV., Ferdinand IV., and Alphonso XI., with whom they often disputed the crown.

Laracor (lar'-), a parish of Ireland, in Leinster, county of Meath, about 2 miles S. E. of Trim. It contains Dangan Castle, the birthplace of the Duke of Wellington.

Laramie, a city and county-seat of Albany co., Wyo., on the Laramie river and the Union Pacific railroad; 58 miles N. W. of Cheyenne, the State capital. It is the trade center for a large stock-raising and mining section; and is also engaged in manufacturing; has large deposits of gold, silver, lead, graphite, antimony, cinnabar, and other minerals, and rolling mills and machine shops. It is the seat of the State University, the State fish hatchery, and the State penitentiary; contains public and college libraries and St. Joseph's Hospital; and has electric light plants, waterworks, daily and weekly newspapers, and an assessed property valuation of over $1,500,000. Pop. (1900) 8,207; (1910) 8,237.

Laramie Mountains, a range which extends through Wyoming and Colorado, and bounds the Laramie Plains on the E. and N. E.; the highest point is Laramie Peak, 10,000 feet high.

Laramie Plains, a plateau in Southern Wyoming, N. W. of Cheyenne, about 7,500 feet above sea-level.

Laramie River, a river rising in Northern Colorado and flowing into the North Platte at Fort Laramie in Eastern Wyoming; length about 200 miles.

Larboard, the left side of a vessel to a person standing on deck and facing the bow. Port is now substituted for larboard, to prevent that word being mistaken for "starboard" owing to similarity of sound.

Larceny, in law, the unlawful taking and carrying or attempting to carry away the personal property of another, with intent to appropriate said goods, and thereby deprive the rightful owner of their use; theft. In the United States in the different States larceny is variously graded, some commonwealths distinguishing it into grand and petit larceny, while others add the further distinction of simple and compound. Of the two former classifications the differentiating circumstance is the value of the goods taken, the theft of less than $50 in value (generally) constituting petit larceny, and of more than that amount grand larceny. As to mixed or compound and simple larceny, American law is coincident with, and founded on, the English law, for which see extract below:

"Larceny, or theft, is distinguished by the common law into two sorts: the one called simple larceny, or plain theft unaccompanied with any other atrocious circumstance; and mixed or compound larceny, which also includes in it the aggravation of a taking from one's house or person. Simple larceny is 'the felonious taking and carrying away of the personal goods of another.' Mixed or compound larceny is such as has all the properties of simple larceny, but is accompanied with either one or both of the aggravations of a taking from one's house or person. Formerly the stealing of goods above the value of 12 pence was called grand larceny; when of goods of that value, or under, it was petit larceny; offenses which were considered distinguished in their punishment. The distinction has been abolished; every larceny being now deemed grand larceny."—Blackstone.

Larch, *Abies larix,* sometimes called *Larix communis,* the larches being elevated into a genus. It is called more fully the common white larch. It is a deciduous tree, growing rapidly, and furnishes a durable timber, which, however, tends to twist and warp. The bark is used in tanning, being second in value, in this respect only, to oak. The common larch yields Venetian turpentine, the branches a saccharine substance, called Manna of Briancon, and when larch forests take fire, a gum called *Gummi orenbergense* exudes from the branches. There is a variety of the common larch with white, and another with red flowers. Yet another, the Russian larch, has cinereous bark.

Larcom, Lucy, an American poet; born in Beverly Farms, Mass., in 1826. In her youth she was a factory girl in Lowell, Mass., and was a contributor to the "Lowell Offering," a magazine conducted by the workers in the cotton mills of that city; was a student for a time at Monticello Seminary, Godfrey, Ill.; afterward taught school; but the greater part of her life was devoted to literary work. In 1866–1874 she was editor of "Our Young Folks." She wrote "Ships in the Mist, etc.," stories (1859), and four or five volumes of poetry; also compiled and edited "Roadside Poems, etc." (1876); "Hillside and Seaside in Poetry" (1877); etc. Her poems of New England life were especially effective, perhaps the best-known one being "Hannah, Binding Shoes." She died in Boston, Mass., April 17, 1893.

Lard, the fat of the hog. Till after the first quarter of the 19th century lard was used only for culinary purposes and as the base of various ointments in medical use. The enormous extent, however, to which pork was raised in the United States rendered it necessary to find some other applications for so valuable a material, and large quantities were pressed at a low temperature, by which the stearine and oleine were separated. The former was used for candle-making; and the latter soon became an important article of commerce under the name "lard oil," which was found to be a valuable lubricant for machinery. See OIL: STEARINE.

Lardaceous Disease. The material which is characteristic of albuminoid disease is pale, structureless, and at first nearly transparent, and may undergo a fatty and granular degeneration known as lardaceous, albuminoid, amyloid, or waxy. The parts chiefly affected are the kidney, liver, spleen, and absorbent glands. It is also known as one form of chronic Bright's disease.

Lardner, Dionysius, an English cyclopædist; born in Dublin, Ireland, April 3, 1793. After four years as clerk to his father, a solicitor, he entered Trinity College. He is best known as the originator and editor of "Lardner's Cyclopædia" (132 volumes, 1830–1844), Lardner himself writing the volumes treating of mechanics, hydrostatics, geometry, arithmetic, heat, and electricity. This was followed by the historical series, the "Cabinet Library" (12 vols. 1830–1832), and "Museum of Science and Art" (12 vols. 1854–1856). He wrote also several useful handbooks of various branches of natural philosophy. In 1828 he was appointed Professor of Natural Philosophy and Astronomy in University College, London, but in 1840 lost his chair by running away with the wife of an army officer, who claimed $40,000 damages from him. He went to the United States, and there made five times that sum by lecturing. He lived in Paris 1845–1859, and died in Naples, Italy, April 29, 1859.

Lardner, Nathaniel, an English clergyman; born in Hawkshurst, Kent, England, June 6, 1684. He studied in London, Utrecht, and Leyden. He belonged to a body of English Presbyterians who had become Unitarians. His "Credibility of the Gospel History" (2 vols. in 1727 and 12 vols. in 1733–1755), and his "Jewish and Heathen Testimonies" (4 vols. 1764–1767) have secured for him a place among the modern apologists for Christianity. He died in Hawkshurst, July 24, 1768.

Lareau, Edmund (lä-rō′), a French-Canadian author; born in St. Gregoire, Quebec, March 12, 1848. He was educated at the College of Ste. Marie de Mannoir, at Victoria College, and at McGill University. He was called to the bar in 1870, became Professor of Law in McGill University in 1876, and in 1886 was elected in the Liberal interest to the provincial legislature. His works, written in French include histories of Canadian law (1872) and literature (1874), and "Historic and Literary Miscellanies" (1877). He died in 1890.

Laredo, a city and county-seat of Webb co., Tex.; on the International and Great Northern, the Mexican National, and several other railroads; 153 miles W. of San Antonio. It is the trade center for the Rio Grande border, with a stock-raising population of 30,000 and an annual trade of $3,000,000; Laredo is in the great Rio Grande coal belt; is a health resort for victims of lung troubles; the seat of Laredo Academy and Laredo Seminary; contains Mercy and Mexican National Railroad Hospitals; and has manufactures of lumber and cigars, deposits of coal, iron, lead, zinc and copper, a large international and local trade, National banks, daily and weekly periodicals, and an assessed property valuation of $2,000,000. Pop. (1890) 11,319; (1900) 13,429; (1910) 14,855.

Larget, a piece of bar-iron, cut off to a length (and weighing about 14 pounds for an average sheet), forming a blank to be heated and rolled into a sheet of iron. It is to the sheet what the loop is to the bloom, the fagot or ball to the bar.

Largo, in music, an Italian word, denoting very slow time, and especially in composition where the sentiment is quite solemn. Larghetto is the diminutive of largo, the time being slightly quicker.

Largs, a watering-place of Ayrshire, Scotland, on the Firth of Clyde, 14 miles S. of Greenock. Here, Oct. 12, 1263, in a war between Scotland and the Norse colonies of Man and the Isles, Alexander III. defeated Haco of Norway, who with 160 ships and 20,000 men had descended on the coast of Ayrshire.

Lariat, a lasso; a long cord or thong of leather, with a running noose, used in catching cattle, horses, etc. Also a rope used for picketing horses, permitting them a limited circle in which to graze.

Laridæ (lar′i-dē), gulls; a family of *Gaviæ* (seabirds), commonly placed under a more comprehensive order *Natatores* (swimmers). The bill is slender, much compressed, and gradually bent; the nostrils are placed laterally in the bill; the wings are very long; the hind toe is small, elevated above the level of the ground, and not united by a web to the outer toes; the plumage is usually white and gray, the former predominating. Species exist on the coasts of most countries. The family

is divided into three sub-families: *Rhyncopinæ* (scissor bills or skimmers), *Sterninæ* (terns), and *Larinæ* (true gulls).

Larissa (lä-rē′sä) (called by the Turks Yenisher), famous in ancient times as the chief town of Thessaly, now the capital of the nomarchy of Larissa in Northern Greece; on the Salambria (ancient Peneus),

COIN OF LARISSA.

in the fertile plain of Thessaly; has manufactures of silk and cotton goods and tobacco; and is the seat of a Greek archbishop. Larissa was the center of the Turkish operations in the war of Greek liberation; it was ceded by Turkey to Greece in 1881. Pop. (1896) 15,373, one-third Greeks, and one-third Turks.

La Rive, Auguste de (lä rēv), a Swiss physicist; born in Geneva, Switzerland, Oct. 9, 1801. The son of Charles Gaspard de La Rive, an eminent physician and chemist (1770–1834), he was Professor of Natural Philosophy in Geneva in 1823; was in Paris in 1830, and there made member of the Institute; in London was admitted to the Royal Society; returned to Geneva in 1836 and conducted the "Universal Library of Geneva." He was especially interested in researches in electricity as well as in investigations of the specific heat of gases, etc., and made some valuable discoveries in magnetism, electro-dynamics, etc. The process of electro-gilding was invented by him. He published a number of works on these subjects, the most important being "Archives of Electricity," and "Treatise on Electricity Theoretical and Applied." He died in Marseilles, France, Nov. 27, 1873.

Lark, the genus *Alauda.* Five species are the best known: the skylark, *A. arvensis;* the shorelark, *A. alpestris;* the crested lark, *A. cristata;* and the woodlark, *A. arborea.* The skylark, with some variations of coloring, leading some ornithologists to suppose that there may be more species than one, extends all through Europe to the Himalayas and China. The lark is heard in full song as it rises into the air, as early as February if the weather be fine. The name lark is given in the United States to one of the *Sturnella* family, the meadow or field lark, and in Australia to *Mirafra horsfieldii,* or the bush lark. The tit-lark belongs to the family *Motacillidæ.*

Larkhana (lär-kä′nä), the capital of a district called "the Eden of Sind," situated 150 miles N. of Haidarabad; has manufactures of silk and cotton cloth, and a great cotton market; pop. 13,188.

Larkspur (*Delphinium*), a showy and popular genus of garden flowers of the natural order *Ranunculaceæ,* natives of the temperate and cold regions of the Northern Hemisphere, and comprising both annual and perennial species. The well-known rocket larkspur (*D. Ajacis*), a native of Switzerland, and the branching larkspur (*D. consolida*), a native of most parts of Europe, doubtfully so of Great Britain, are familiar examples of the annual species; and Barlow's larkspur (*D. Barlowii*) and the great-flowered larkspur (*D. grandiflorum*) are not unfrequent examples of the perennial species; but many more showy varieties have been produced by cultivation and selection which have displaced the older-fashioned species. *D. glaciale* is one of the most distinctively alpine plants in the world. *D. Staphisagria,* corrupted to stavesacre, yields an alkaloid extract from its seeds, named *Delphine,* which is highly poisonous even in very small doses, acting chiefly on the nervous system.

Larmes, in heraldry, when the field is bestrewed with an indefinite number of drops of a blue color, it is said to be *gutté de larmes* (dropped with tears), a nomenclature which, though French, is peculiar to British heraldry, the French blazoning such a shield *gutté d'azur* (dropped with azure).

Larnaka (ancient Citium), the chief port of Cyprus. A small fort built by the Turks in 1625 is now used as the district jail, and the English have built a convenient court house, custom house, and other public offices on the sea front, as well as two iron piers accessible at all times by small boats. Even if Citium be not the Chittim of the Old Testament, it is certain that the King of Citium paid tribute to the Assyrian Sargon in 707 B. C., as appears from a cuneiform inscription on a bas-relief dug up at Larnaka in 1846, and now in the museum at Berlin. Carobs, or locust beans, cotton, and grain are exported; and goods of western manufacture of all kinds are imported, chiefly from Germany. A most interesting fair called *kataklusmos,* "the deluge," and held every year 50 days after the Greek Easter, is traditionally supposed to be the anniversary of the birth of Aphrodite, and is attended by Orthodox Christian Cypriots from all parts of the island in immense numbers.

Larned, Josephus Nelson, author; born in Chatham, Ont., May 11, 1836; received a public school education; was on

the editorial staff of the Buffalo "Express" in 1859–1872, and superintendent of the Buffalo Library in 1877–1897. He is the author of "Talks About Labor" (1877); "History for Ready Reference" (5 vols. 1895, 6th vol. 1901); and "History of England for Schools" (1900).

La Roche, Maria Sophie (lä-rōsh′), a German story-teller; born in Kaufbeuren, Dec. 6, 1731. Her stories show intimate knowledge of the human heart. She was a correspondent of Wieland and of Goethe. She wrote: "The History of Fräulein von Sternheim" (1771); "Moral Tales" (1782); "History of Miss Long" (1789); "Melusine's Summer Evenings" (1806). She died in Offenbach, Feb. 18, 1807.

La Rochefoucauld (rōsh-fö-kō′), **François Duc de, Prince de Marsillac,** a French courtier and man of letters in the reign of Louis XIV.; born in Paris, France, Sept. 15, 1613. He acted a conspicuous part in the civil war of the Fronde, but he is chiefly remembered as the writer of "Reflections and Maxims," a work which has been extolled and criticized in no ordinary degree. Its distinctive characteristic is that hard, worldly wisdom which finds selfishness at the bottom of everything. He also wrote "Memoirs of the Regency of Anne of Austria," and during the latter part of his life his house was a resort of the most eminent wits and literati of France. He died in Paris, March 17, 1680.

La Rochejaquelein, Du Verger de (lä-rōsh-zhäk-la*ng*), an old noble family of France. The name Du Verger is derived from a place in Poitou. Guy du Verger married, in 1505, the heiress of the seigneur of la Rochejaquelein. Several of his descendants distinguished themselves by their devoted loyalty to the old royal house against the fury of the French Revolution. Henri, Comte de la Rochejaquelein; born Aug. 30, 1772, was an officer in the guard of Louis XVI., and after Aug. 10, 1792, left Paris to put himself at the head of the insurgent royalists in La Vendée. He signalized himself by many heroic deeds, and for a time successfully repelled the republican forces, but was severely defeated by Westerman, December, 1793, and escaped with difficulty. He raised a new body of troops, however, in Upper Poitou, but was killed in a battle at Nouaillé, March 4, 1794. His heroic words to his soldiers are memorable beyond most: *"Si je recule, tuez-moi; si j'avance, suivez-moi; si je meurs, vengez-moi!"* ("If I retreat, kill me; if I advance, follow me; if I die, avenge me.") His brother, Louis du Verger, Marquis de la Rochejaquelein, born Nov. 29, 1777, emigrated at the commencement of the Revolution; returned to France in 1801, but resisted all Napoleon's efforts to win him, and in 1813 placed himself at the head of the royalists in La Vendée. Louis XVIII. appointed him in 1814 to the command of the army of La Vendée, and during the Hundred

LA ROCHEJAQUELEIN.

Days he maintained the royalist cause there, supported by the British. He fell in battle at Pont-des-Mathis, June 4, 1815. His wife, Marie-Louise Victoire, Marquise de la Rochejaquelein (1772–1857), published "Memoirs" of the war, of which she was an eye-witness (Bordeaux, 1815), which are of real value to the historian.

La Rochelle (lä-rō-shel′), a seaport of France, on an islet of the Bay of Biscay, formed by the islands Ré and Oleron. The inner harbor, which has two basins, in which ships of any size may remain afloat, is surrounded by fine quays and commodious docks, close to which lie the principal streets and squares. The public buildings most worthy of notice are the arsenal, the palace, the town hall, the cathedral, and the great clock tower, an interesting remnant of the ancient fortifications. By the marriage of Eleanor of Guienne with Henry Plantagenet, afterward Henry II., May 18, 1152, this town came into the hands of the English, and was captured by Louis VIII. in 1224. In 1360 it was ceded to England, but was recovered by Bertrand du Guesclin in 1372. The Huguenots held it from 1557 to Oct. 28, 1628, when it surrendered to Louis XIII. They had sustained a siege from December, 1572 to 1573, when peace was made. It was again fortified by Vauban in the reign of Louis XIV. An attempt made by the English, in 1809, to destroy the French fleet here was unsuccessful.

Larousse, Pierre (lä-rös′), a French lexicographer; born in Toucy, Oct. 23, 1817. For several years he compiled valuable educational text-books. In 1864 ap-

peared the first volume of his "Great Universal Dictionary of the Nineteenth Century" (completed 1876, 15 vols. with supplementary volumes 1878 and 1887). He also published two smaller works of the same class, the "New Illustrated Dictionary" and "Complete Illustrated Dictionary." He died Jan. 3, 1875.

Larra, Mariano José de (lär'ä), a Spanish playwright; born in Madrid, March 26, 1809. He adapted to the Spanish stage several French comedies, and wrote a tragedy, "Macias" (1834), on the tragic ending of a famous Galician troubadour. Five volumes of his contributions to the "Revista Española" were published in 1837; his principal work is "From 1830 to 1835, or Spain from Fernando VII. to Mendizabal" (1836). He died Feb. 13, 1837.

Larrazabal, Felipe (lär-rä-thä'bäl), a Venezuelan biographer and historian; born about 1822. He wrote a valuable "Life of the Liberator Simon Bolivar" (2 vols. 1863), collected a large amount of manuscript material on the history of America, and was on his way to Europe to arrange for the publication of several of his works when he was drowned in the wreck of the steamship "City of Havre," in 1873.

Larrey (lä-rā'), **Dominique Jean,** a French surgeon; born in Baudeau, in the Pyrenees, July 8, 1766. He studied medicine in Toulouse, and after graduating served as surgeon in the navy. But in 1793 he transferred his skill to the army, and introduced the "flying ambulance" service. After teaching for a short time at Toulon and Val de Grâce, he joined Napoleon in Italy in 1797; and from that time onward invariably accompanied the successful Corsican in his campaigns. In 1805 he was placed at the head of the medico-surgical department of the French army, and a few years later was created a baron of the empire. Larrey continued to fill important offices till 1836, when he retired from that of surgeon-general of the Hôtel des Invalides. He died in Lyons, France, July 25, 1842.

Lartius, Titus Flavius (lar'shi-us), the first appointed dictator at Rome, in 498 B. C.

Larva, the term applied in natural history to indicate the first and earliest stage in the development of those animals which undergo a metamorphosis or series of changes in their progress from the egg to the mature and adult state. The class of insects presents many familiar and excellent examples of larval forms, the metamorphic process being very typically represented in these forms. Thus the egg of the butterfly gives origin, not to the perfect winged creature, but to a crawling grub or caterpillar, which is scientifically designated the "larva"; and through the subsequent transformations and development of this larva the perfect form or imago is produced. The term is derived from the Latin word *larva,* meaning a "mask," the word being thus applied in the abstract to indicate the semi-disguised or temporary nature of the being when in the larval state. Metamorphosis, and consequently the occurrence of larval forms, is not limited to the insect class, but is present in many other groups of the animal series, both higher and lower than insects. Thus many of the *Crustacea* — among which barnacles and crabs may be cited as two good examples — pass through larval stages; the *Echinodermata,* including sea urchins, star fish, etc., also exhibit larval forms; and even in *Vertebrata,* as in the case of the frogs and newts (*Amphibia*), we find a larval form represented in the course of the metamorphic development. In the majority of cases the larva is wholly unlike the perfect form; as a rule, the more perfect the metamorphosis the greater is the difference between the larva and the imago. And this difference is one not merely of outward form, but including the internal structure also; the larva being, in the most typical cases and in every respect, an essentially distinct creature from that which subsequently will be evolved from it.

Most larvæ are, further, free, active, and unattached, the characteristic phase of larval habits being the activity of the being as distinguished from the fixed state which many forms assume in their further development, and in their final and adult condition. Thus the larva of the barnacle or acorn-shell swims freely about, while the adult form is firmly fixed or attached; and in the case of butterflies, beetles, etc., we find the larva to be active while the pupa or succeeding state is fixed. The study of the early forms which living beings may thus assume is of the highest importance in advancing the study of comparative anatomy and physiology; and it is only of late years that the phenomena of development have been studied with the care they deserve. Many purely larval forms were thus long described as adult animals, their connection with the forms into which they subsequently become developed being neither suspected nor traced. The larval crab was thus long described as a distinct little crustacean, to which the name of Zoëa was given; and many other and similar instances might be cited. The larval condition is most intimately associated with the series of actions comprehended under the term "nutritive development," or those actions which, after the development in the egg, have to do with the early growth and nutrition of the form.

Larvalia, an order of *Tunicata* represented by *Appendicularia, Fritillaria,* etc., in which the animal retains throughout life the tail which in other tunicates is characteristic of the larval stage. They may be briefly described as tadpole-like forms, in which the tail is folded over the transparent body. Some species secrete a gelatinous case, the Haus of German naturalists which they carry about with them. All are marine and almost microscopic in size.

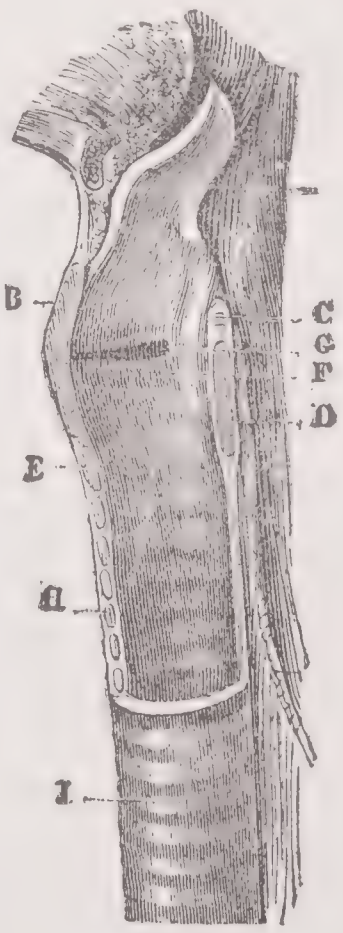
Laryngitis ((lar-in-jī-), inflammation of the windpipe. It may be acute, chronic, mucous, or œdematous, and is produced by cold or damp or as an accompaniment of certain zymotic diseases such as scarlatina, smallpox, and measles. When membranous it is called croup, and may also be frequently found associated with diphtheria. In œdematous laryngitis, as in croup, tracheotomy is sometimes necessary to save life, and is usually successful. It is not confined to infancy, but is common to adults.

Laryngoscope, an instrument used for examining the larynx. It consists of a little plane mirror attached to a stem about four inches long, at an angle of about 120°. This mirror is introduced into the mouth of the patient or person to be examined, and held near the back of the throat, while a strong light is thrown on it from a reflector worn on the forehead or held between the teeth of the examiner. In the strong light of the sun or of an argand burner the light thrown from the reflector is concentrated on the laryngeal mirror which lights up the parts to be examined while it at the same time reflects the images of these parts into the eye of the examiner. In this way the mechanism of the human voice may be studied, and what is of considerable importance, disease if present can be readily detected and the fitting remedy applied. The chief merit of introducing this instrument in a very complete form into medical practice must be assigned to Drs. Turck, of Vienna, and Czermak, of Prague, though Garcia, Liston, Babington, Avery, and others used a reflecting mirror to explore the recesses of the throat. It was not, however, till the two German physiologists took up the subject in 1857 that the benefits arising from its use were fully recognized.

Laryngotomy (lar-in-got'-), an operation by which an incision is made into the larynx to aid in the operation of breathing, when obstruction to it exists, to remove foreign bodies, or for any similar cause. In the first case a little funnel-shaped silver instrument is inserted into the opening to keep it from closing too soon.

Larynx, the vertebrate organ of voice, situated generally at the upper part of the trachea or windpipe, and formed essentially of a dilatation of the windpipe, with modifications of the cartilaginous rings of that organ. The cartilages composing the larynx are lined internally with mucous membrane, and moved on one another by special muscles, the entire apparatus being subservient to the production and regulation of sounds. Only one organ of voice, or one larynx, is generally developed, but in birds two of these organs are found. The superior or upper larynx in birds is situated in the ordinary position, at the upper part of the windpipe; and the second, inferior larynx, or syrinx, as it is termed, is found at the lower end of the trachea, or at the point where the windpipe divides into the main bronchi, or airtubes which supply the lungs with air. This lower larynx is the true organ of voice in birds. Fishes alone, of all vertebrates, want a true larnyx, homologous with the larynx of man; but even in certain of the fishes a rudimentary structure, comparable in some degree with the larynx of higher forms, is found.

Taking the larynx of man as the type of the most perfect organ and as presenting us with the essential parts which enter into the composition of such a structure, we find the skeleton of the organ composed of various gristly or cartilaginous pieces, which are to be viewed, as already stated, as modifications, more or less great, of the ordinary and more simple cartilaginous



Section of larynx in the median line.—A, epiglottis, in front of which the hyoid bone and base of the tongue are seen; B, thyroid cartilage; C, arytenoid cartilage; D, posterior portion of cricoid cartilage; E, anterior portion of cricoid cartilage; F, vocal cord of right side; G, ventricle of the larynx; H, rings of the trachea; I, trachea.

Larynx

rings which strengthen the trachea throughout its length. The chief and largest cartilage of the larynx is known as the thyroid cartilage, which may be popularly recognized from its forming in front the prominence in the throat known as "Adam's apple." The thyroid cartilage is composed of two pieces united in front in the middle line and projecting forward at that point, but open widely behind, where its margins are projected to form upper and lower processes. The upper processes of the thyroid cartilage are joined to the processes of the hyoid bone; while the lower processes unite with the cricoid cartilage, which is situated below the thyroid, and which forms the upper ring or cartilage of the windpipe. The hyoid bone is of a U-shape, and may be felt with the finger as it lies within the fold at the junction of the neck and chin. Its anatomical position is at the root of the tongue and it forms the chief seat of origin for the muscles composing that organ. The hyoid bone is divided into a body portion, springing from which we find four processes, the two greater and two lesser cornua or "horns." The greater cornua are united by ligaments (thyro-hyoid ligaments) to the upper processes of the thyroid cartilage; and the lesser cornua of the hyoid bone are united partly to the body of the bone and partly to the greater cornua. The hyoid bone and thyroid cartilage are further connected by other membranous and ligamentous structures. The thyro-hyoid membrane thus unites the upper part of the thyroid cartilage to the body of the hyoid bone; and other ligamentous attachments between these structures are also described by anatomists. The ring-like cricoid cartilage forming the lower part of the larynx has already been mentioned. This latter structure is narrow in front, but is deeper behind, where it rises to a height of half an inch, and occupies part of the space left between the open alæ, or sides of the thyroid cartilage. The cricoid is attached to the thyroid cartilage in front by the crico-thyroid membrane, and at the sides by the lower processes of the thyroid cartilage. On each side the cricoid and thyroid cartilages are united by a joint, this arrangement permitting of free and definite movements between the cartilages, which movements assist in the functions of the whole larynx.

The two arytenoid cartilages form the next structures of importance which are to be noticed. These cartilages are situated on the upper and back aspect of the cricoid cartilage, in the space between the widely separated posterior edges of the wings of the thyroid cartilage. Each of those structures is somewhat pyramidal in shape, and has three sides, the apex of the pyramid being directed upward. In the fresh state when the arytenoid cartilages are in their natural position, they produce an appearance resembling the mouth of a ewer or water jug, and from this resemblance the name arytenoid (Greek, *arutaina*, a ewer) has been derived. By their oval bases they articulate with the cricoid cartilage; the internal surface of the cartilages, covered with mucous membrane, look toward each other; the hinder or posterior and concave surface of each gives origin to the arytenoid muscle, which draws the cartilages close to one another. At the apex of each arytenoid cartilage a second cartilaginous piece of small size is found and to these minute structures the name cartilages of Santorini has been given. The base of each arytenoid cartilage has two projecting angles, one anterior and one external. To the anterior one is attached a band of elastic tissue, which stretches forward to be connected with the thyroid cartilage about the middle of the junction of its two wings in front. From each arytenoid there stretches such a band, and the two form the true vocal cords, or inferior thyro-arytenoid ligaments. To the external projecting angle of each arytenoid cartilage are attached two muscles, both springing from the cricoid cartilage. These are called the posterior crico-arytenoid muscle, and the lateral crico-arytenoid muscle. When the posterior muscle of each cartilage contracts, the external angle of the cartilage is pulled backward, and the cartilages are so rotated on their base that the vocal cords are separated from one another, and the glottis or space between them greatly widened. When the lateral muscle of each cartilage acts, the external angle is pulled forward, the cartilages are rotated inward, and the vocal cords are approximated so that the space between them is reduced to a mere slit. Now the true vocal cord of each side of the larynx forms the free edge of a fold of the mucous membrane lining the interior of the larynx, and in this fold of mucous membrane, between its free edge — the vocal cord — and the wall of the larynx, runs a flat muscle — the thyro-arytenoid — from front to back, from the angle of the thyroid cartilage in front to the base of the arytenoid cartilage behind. When this muscle contracts it raises the fore part of the thyroid cartilage, and relaxes the true vocal cord. In the interior of the larynx, then, on each side, is this fold of mucous membrane with the free clean-cut edge formed by the vocal cord, and these two folds make a division between the upper and lower parts of the larynx, and this division would be complete but for the space in the middle, between the two vocal cords, a space continued backward between the bases of the two arytenoid cartilages. To this space the term glottis, or rima glottidis, is applied. It, of course, varies in shape with the posi-

tion of the vocal cords. When the cords are widely separated, as in quiet breathing, the space is triangular, the apex of the triangle being in front; when voice is produced the cords are approximated till only a slit separates their edges. In this condition the out-rushing air throws the cords into vibration, and it is thus that the vocal sound is produced.

Above the true vocal cords on each side is a fold of mucous membrane forming the false or superior vocal cord of each side. Between the superior, or false, and inferior, or true vocal cord of each side is situated a ventricle or sinus. These ventricles open into pouches which pass upward for half an inch between the false cords and the thyroid cartilage. The epiglottis forms a structure of great interest and importance in the conformation of the larynx. This structure consists of a single plate of cartilage shaped like a leaf, the stalk of the leaf being placed inferiorly, while its upper and broader portion is free, but is capable of movement in certain important ways. The epiglottis is situated in the middle line and in front of the glottis or opening of the larynx, being contained within the thyroid cartilage and between the cornua of the hyoid bone. Its lower extremity is attached by ligament (thyro-epiglottidean ligament) to the front of the thyroid cartilage and on its inner surface. The epiglottis protects the entrance to the larynx in eating; this structure becoming horizontal falling over and closing the entrance to the glottis when food is swallowed. The retraction of the tongue and elevation of the larynx produce this action of the epiglottis. The production of vocal sounds results, we have seen, from the tightening and approximation of the vocal cords when they are made to vibrate by the force of the air which passes them in expiration, various degrees of tension producing different sounds. The length of the vocal cords varies according to age and sex, as also do the proportions of the entire larynx. In adult males the average length of the vocal cords is five-eighths and in the adult female about four-eighths of an inch. In youth the cords are shorter, especially in boys, the breaking of whose shrill voices results from the elongation of the cords at puberty. The average length of the glottis in adult males is an inch and in females about 10 lines.

The larynx in males and females exhibits little difference in comparative size until the approach of puberty, when the male larynx begins to enlarge, and in about two years attains a size nearly double that of its former extent; while in females the larynx also grows larger after puberty, but does not attain so great proportions or alter so greatly in its intimate constitution as in males. The shape of the glottis or lower laryngeal opening varies in accordance with the different movements to which the parts of the larynx are subject. When in a state of rest the opening is triangular in shape. During dilatation as in quiet or deep inspiration it becomes simply or broadly spear shaped; and during expiration it returns to its triangular form, a result in the latter case effected more by the elasticity of its ligaments than by muscular contraction. In speaking and singing, where the vocal cords are brought into play, the vocalizing position of the glottis is seen, and in this case the opening becomes very narrow and elongated, the vocal cords being brought close together and made very tense and the edges of the glottis are then made as nearly as possible parallel. The muscles of the larynx are very numerous and complicated in their action. Several of these structures have been already mentioned in their relations to the hard structures of the larynx from which they take origin or to which they are connected. The arytenoid muscles have been already mentioned as those which unite the cartilages of that name and which draw the cartilages together and so close the glottis. The lateral crico-arytenoid muscles which pass from the sides of the cricoid cartilage to the outer angle of the arytenoid cartilages, rotate the arytenoid cartilages inward and approximate the vocal cords toward the middle line. The posterior crico-arytenoid muscles pass from the back of the cricoid cartilage to the outer angle of the arytenoid cartilage and serve to rotate the cartilages outwardly and so to separate the cords and dilate the glottis. The functions of the thyro-arytenoid muscles have been already stated to be those of relaxing the vocal cords by raising the fore part of the thyroid cartilage on the cricoid. These latter muscles are situated in the folds of the vocal cords. The crico-thyroid muscles are situated in front of the larynx and arise from the part of the cricoid to be inserted into the lower border of the thyroid cartilage. The action of these muscles is to stretch the vocal cords by pulling the fore part of the thyroid cartilage downward. The larynx is well supplied with blood-vessels and nerves.

Lasalle, a city in Lasalle Co., Ill.; on the Illinois river, and on the Illinois Central and the Chicago, Rock Island, and Pacific railroads; 99 miles S. W. of Chicago. It is the center of a large trade by river, canal, and rail; is in a rich bituminous coal region; and is engaged in coal mining, zinc smelting and the manufacture of sulphuric acid, hydraulic cement, sewer pipe, bottles, clocks and ornamental pressed brick, and common brick. It is the seat of St. Bede College and St. Mary's Hospital; has a public library; good sewerage system, waterworks, hospitals, a National bank, electric light and street railroad plants, and daily

and weekly newspapers. Pop. (1900) 10,446; (1910) 11,537.

La Salle, Jean Baptiste de, a French priest, founder of the Brothers of the Christian Schools (*q. v.*); born in Rheims, April 30, 1651. In 1678 he was ordained to the priesthood, and in 1681 chose the education of the working classes and the teaching of poor boys as his life-work, founding the society above named at Rheims. He assumed charge of schools in the different parishes there, and as the number of teachers increased secured a house for headquarters, establishing rules of poverty, chastity, and obedience. In 1688 he went to Paris, where he introduced his system, and in 1705 was called to Saint-Yon near Rouen. From that time this was the headquarters of the order, and schools were soon established in all the principal cities of France, and the founder had the satisfaction of witnessing the assured success of his educational work. He died in Saint-Yon, April 7, 1719. On May 24, 1900, Pope Leo XIII. canonized him.

La Salle, Robert Cavelier, Sieur de, a French explorer; born in Rouen, France, Nov. 22, 1643. Settling in Canada at the age of 23, he began his travels with an attempt to reach China by descending the Ohio river, which he supposed to empty into the Pacific. As soon as he found that the great S. streams drained into the Gulf of Mexico he formed the project of descending the Mississippi to the sea. After many and severe hardships this long voyage was concluded, and the arms of France set up at the mouth of the great river on April 9, 1682. Two years later an expedition was fitted out to establish a permanent French settlement on the Gulf, which should secure France's claims to the Mississippi valley. But La Salle's bad fortune pursued him; he mistook Matagorda Bay for a mouth of the Mississippi, landed there, and then spent two years in unsuccessful journeys to discover the great river, while his colonists and soldiers gradually dwindled away. His harshness of manner, more than his want of success, embittered his followers, and he was assassinated by some of them March 20, 1687.

La Salle College, an educational institution in Philadelphia, Pa., founded in 1867 under the auspices of the Roman Catholic Church; has preparatory, academic, and collegiate departments; grounds and buildings valued at over $250,000; volumes in the library, over 12,500; average number of faculty, 15; average students, 170.

Lascar, in the East Indies, properly a camp follower, but is generally applied to native sailors on board of British ships, as, for instance, the large steamers of the Peninsular and Oriental Company. The Lascars make good seamen, being both temperate and docile. They are mostly Mohammedans, and speak, besides their native dialects, a *lingua franca* based on Hindustani, with English, Arabic, and other words.

Lascaris, Constantine (läs'kä-ris), a Greek scholar, who, after the capture of Constantinople by the Turks, fled to Italy, where he was instrumental in reviving the study of Greek. He was a descendant of the royal family of Nicæa. Francesco Sforza, Duke of Milan, made him tutor to his daughter Hippolyta. But more important scenes of Lascaris' labors were Rome (where he settled in the train of Bessarion), Naples, and Messina; at this last city he taught rhetoric and Greek letters till his death in 1493. His Greek grammar, entitled "Erotemata," and dated 1476, was the earliest Greek book printed in Italy. His library, which is very valuable, is now in the Escorial.

Lascaris, Theodore, Emperor of Nicæa, a young Greek prince who married, in 1200, Anna, daughter of the elder Alexius, Emperor of the East. On the capture of Constantinople by the Crusaders, in 1204, Theodore, having vainly attempted to save it, escaped into Anatolia, and under the title of despot ruled over part of the empire at Nicæa. In 1206 he took the title of emperor and extended his dominion as far as the river Meander. He was the greatest soldier and the best statesman of his time, and though placed between the Latins on the one hand and the Turks on the other he resolutely and successfully held his ground and reigned prosperously 18 years. He died in 1222.

Las Casas, Bartolomé de (läs-kä'-säs), a Spanish Dominican missionary; born in Seville in 1474. In his 19th year he accompanied his father, who sailed with Columbus, to the West Indies. On his return to Spain he embraced the ecclesiastical profession, in order that he might act as missionary in the Western Hemisphere, "there to spend his days in preaching the Gospel to the Indians, and humanity to their oppressors." Never did man more zealously endeavor to effect a great and good object. Twelve times he crossed the ocean, to plead at the foot of the Spanish throne the cause of the wretched Indians, and passed 50 years of his life in attempting, though with little effect, their amelioration. He was made Bishop of Chiapa in 1544; but he resigned his see in 1551, returned to his native country, and died in Madrid, in July, 1566, in the 92d year of his age. Of the writings of Las Casas, the most valuable is his "General History of the Indies."

Las Cases (läs-käz), **Emmanuel Dieudonné, Comte de,** a French historiographer; born near Revel, Languedoc, France, in

1766. He was a lieutenant in the navy before the Revolution, but then fled from France and supported himself in England by teaching. After Napoleon became consul, Las Cases established himself as a bookseller in Paris. A work that he wrote, "Historical Atlas" (1803–1804), attracted the attention of the emperor, who made him a baron and employed him in the administration. After Waterloo he obtained leave to share the exile of Napoleon in St. Helena, and there the ex-emperor dictated to him a part of his "Memoirs." In 1816 Las Cases was sent back to Europe, and after Napoleon's death published "Memorial of St. Hélèna" (8 vols. 1821–1823), of which O'Meara's "Napoleon in Exile" is a kind of continuation. Both works attack Sir Hudson Lowe, Napoleon's keeper, charging him with undue harshness toward his prisoner. Las Cases died in Passy, France, May 15, 1842.

Laser, a drug to which the ancients attributed miraculous properties, believing that it could cure envenomed wounds, restore sight to the blind and youth to the aged, etc. Lindley believed it came from *Thapsia*, and probably from *T. garganica*, an umbelliferous plant. It was called also asadulcis.

La Serena. See COQUIMBO.

Laserpitium, a genus of plants, order *Umbelliferæ*, containing about 20 species, natives of Europe, North Africa, and West Asia. They are tall perennial herbaceous plants, with pinnate leaves and compound many-rayed umbels of yellowish or white flowers, the fruit with eight wing-like appendages. Some of them are natives of mountainous districts of Europe, and have tonic and other medicinal properties.

Lash, in weaving, a thong formed of the combined ends of the cords by which a certain set of yarns are raised in the process of weaving Brussels carpet. Each yarn (termed an end) passes through an eye (the mail), to which is attached a cord passing over a pulley above the frame of the loom. The cords required to raise to the surface a certain set of yarns, required for one row in the pattern, are bound together into a lash, so as to be operated by a single pull.

Lasker, Eduard (läs'ker), a German political leader; born in Jarotschin, Posen, Oct. 14, 1829. His principal works are: "Constitutional History of Prussia" (1874); "Future of the German Empire" (1877), "Ways and Means of Cultural Development" (1881). He died in New York, Jan. 5, 1884.

Lasker, Emanuel, a German chess player; born in Berlinchen, Prussia, Dec. 24, 1868. He inherited his great abilities at the game to some extent, and about 1890 took a high place at a chess tournament which was held in Berlin, where he defeated some of the leading masters. In 1892 he visited England, and again distinguished himself at a tournament, and defeated Blackburne, the English expert, by six games, four games being drawn. In the New York tournament of 1893 he won his games with all the 13 leading players, including Steinitz, the champion of the world. A set match with Steinitz took place at Moscow in Dec., 1896, and Jan., 1897, and this Lasker won by 10 games to 2, 5 being drawn.

Las Palmas, chief town of the Canary Islands on the N. E. coast of Gran Canaria; is the seat of a bishop, and has sea-bathing and ship-building yards. Pop. (1901) est. 20,000.

Lassa. See LHASSA.

Lassalle, Ferdinand (lä-säl'), a German agitator, founder of the German Social Democracy; born of Jewish parents named Lassal, in Breslau, April 11, 1825. Before entering politics he had earned high distinction in philosophical thought, which had brought him to the notice of Humboldt, Böckh, and others. Among his writings of this period are "Franz von Sickingen," a historical drama (1859); "The Philosophy of Heraclitus the Obscure" (2 vols. 1858); "The System of Acquired Rights" (2 vols. 1860); "Fichte's Philosophy and the Popular Mind of Germany" (1862). He first came into the political arena as the spokesman of the German workingman in 1862, when he published the "Workingmen's Programme." For this he was arrested and imprisoned. Other pamphlets followed: "Science and the Workingmen" (1863); "The Criminal Trial of Lassalle" (1863); "Indirect Taxation and the Condition of the Laboring Classes" (1863). He further developed the Socialist program in an "Open Reply to the Central Committee" (1863). His last work was a spirited attack on one of the foremost opponents of the Social Democracy, "Herr Bastiat-Schulze von Delitzsch, the Julian of Economics; or Capital and Labor" (1864). His talents won him the admiration even of his enemies. He died in Geneva, Aug. 31, 1864.

Lassell, William, an English astronomer; born in Bolton, Lancashire, England, June 18, 1799. He built himself a private observatory at Starfield, near Liverpool, about 1820, and observed there down to 1861. There, too, he constructed and mounted equatorially reflecting telescopes of nine inches aperture and two feet aperture successively. The speculum of the latter was polished by means of a machine of Lassell's own invention. With this same telescope he discovered the satellite of Neptune (1847); the 8th satellite of Saturn (1848), simultaneously with Professor Bond of Harvard;

and two new satellites of Uranus (1851). In 1861 he went out to Malta, and there set up a reflecting telescope of 4 feet aperture and 37 feet focal length, mounted equatorially; with this he made observations till 1865, chiefly of nebulæ and the satellites he had discovered. After his return to England he transferred his observatory to near Maidenhead. There he died Oct. 5, 1880.

Lasso (Spanish *lazo*), a thin, well-plaited rope of raw hide, used in Spanish America for catching wild cattle. One end is fastened to the saddle gear of the man who uses it, the other ends in a small brass ring, by means of which a running noose, usually eight feet wide, is formed. The rider holds a coil of the lasso in the left hand; with the right he dexterously whirls the open noose round his head, and hurls it (to no great distance, but with a wonderfully sure aim) so as to fall over a given object — round the horns of a wild ox, or the like. In Mexico the lasso is *la reata* ("the rope"); thence the term lariat for a kind of lasso in the United States. The lasso has been used in warfare with deadly effect.

Last Sigh of the Moor, The, a rocky eminence in the outskirts of the city of Granada, Spain. It is noted as the spot where Boabdil, the last Moorish monarch, took his farewell of the land of his birth.

Lat, the simplest form of "tope," a kind of sthamba (pillar), constituting a marked feature of Buddhist architecture. Several yet remain. There is one at Delhi, three more exist in Tirhut, near the Gunduck river, and one was removed to Allahabad. It was on a "lat" that the celebrated proclamation of Asoca against taking human life was carved. The lat, borrowed, perhaps, from the Buddhists, exists in connection with Hindu architecture emanating from the professors of Brahmanism.

Latakia (lä-tä-kē'yä) (Turkish Ladikiyeh), a formerly important seaport of Syria, with a sanded-up harbor, on a rocky cape 75 miles N. of Tripoli. It possesses remains of Roman buildings, having been a flourishing port during the early empire; it was still a wealthy city at the time of the Crusades. The present town occupies the site of the ancient Laodicea ad Mare, founded by Seleucus Nicator, and named after his mother. Pop. est. 10,000, who export the Latakia tobacco, grown on the hills in the interior, and some grain, silk, sponges, oils, etc.

Latch, the piece hinged to the needle of a knitting machine which closes over the engaged loop to hold it in position in the needle while the latter is penetrating another loop. The latch is subsequently opened by the latch lifter to allow the loop to be pushed back upon the needle, and is then closed by the latch closer to enable the knock-off to disengage the formed loop or stitch. The latch is sometimes called the fly.

Lateen Sail, a triangular sail, having its upper edge fastened to a long yard, which is inclined at an angle of about 45°. The yard is slung at a point three-quarters of its length from the peak end. It is used principally in the Mediterranean, upon xebecs, galleys, and feluccas, which have three, two, and one mast respectively.

Latent Heat, that portion of heat which exists in any body without producing any effect on another or on the thermometer; termed also "insensible" as distinct from "sensible" heat. It becomes sensible during the conversion of vapors into liquids, and of liquids into solids; and on the other hand a portion of sensible heat disappears or becomes latent when a body changes its form from the solid to the liquid, or from the liquid to the gaseous state.

Latent Life, a phrase often used to describe the physiological condition of organisms in which the functions are for a time suspended, without losing the power of future activity. The condition is one of the grades between full life and total death, and was contrasted by Claude Bernard with the "constant life" of most organisms, and with the "oscillant life" of those which hibernate. It is illustrated by dry seeds and quiescent spores, by encysted ova and Protists, and by those animals and plants (*e. g.* paste eels and lichens) which survive desiccation.

Lateral Pressure, or **Lateral Stress,** a pressure at right angles to the length of a beam. Also pressure acting laterally — *i. e.*, more or less horizontally — on strata, so as to distort them into folds, curves. sharp synclinals, anticlinals, etc. It may be caused by landslips, by earthquake action, etc. Lateral pressure is seen largely in the Alps, the Andes, and other mountain ranges, and also in nearly level countries.

Lateran, Church of St. John, the first in dignity of the Roman churches, and styled in Roman usage "the Mother and Head of all the churches of the city and the world." As cathedral church of Rome it surpasses St. Peter's in dignity. It is called Lateran from its occupying the site of the splendid palace of Plautius Lateranus, which, having escheated (A. D. 66) in consequence of Lateranus being implicated in the conspiracy of the Pisos, became imperial property, and was given to Sylvester by the Emperor Constantine. It was originally dedicated to the Saviour; but Lucius II., who rebuilt it in the middle of the 12th century, dedicated it to John the Baptist; in 1586 it was completely demolished by Sixtus V., and rebuilt from plans by Fontana. It has been the scene of five coun-

cils regarded as œcumenical by the Roman Church. The Lateran Palace was the habitual residence of the Popes till the 14th century. It is now under the control of the Italian government. Pius IX. converted a portion of it into a museum of classical sculpture and early Christian antiquities. In the piazza of the church stands the celebrated relic called the Scala Santa, or Holy Staircase, which is reputed to be the stairs of Pilate's house at Jerusalem, made holy by the feet of our Lord as He passed to judgment.

Lateran Councils, in Church history, certain councils held in the Church of St. John Lateran in Rome. In all five general councils held, besides an important council, not œcumenical, against the Monothelites in A. D. 649. The Lateran Councils proper were:

1. The Ninth General Council, and the first held in the West, under Calixtus II., in 1123. More than 300 bishops and 600 abbots attended. Its object was to end the strife on investiture between the Emperor Henry V. and the See of Rome.

2. The Second Lateran (Tenth General) Council was held in 1139. Innocent II. presided over more than 1,000 prelates. Anacletus II. was declared an anti-Pope, Roger of Sicily, his champion, excommunicated, and silence imposed on Arnold of Brescia.

3. The Third Lateran (Eleventh General) Council, 1179, under Alexander III., decreed the necessity of a majority of two-thirds to secure the election of a Pope.

4. The Fourth Lateran (Twelfth General) Council surpassed in importance all those previously held. It was opened by Innocent III. in 1215, and had two definite objects — the recovery of the Holy Land and the internal reform of the Church; 412 bishops, 800 abbots, and the representatives of many Catholic sovereigns were present. The Bishop of Constantinople was made the first of the Eastern patriarchs, and the supremacy of Rome insisted on. The council decreed the necessity of, at least, annual confession to one's parish priest, and defined the absolute unity of God, the Roman doctrine concerning the sacraments, and transubstantiation.

5. The Fifth Lateran (Eighteenth General) Council was opened by Julius II. in 1512, and closed by Leo X. in 1517. It declared the decrees of the Schismatic Council of Pisa null, condemned the Pragmatic Sanction, and approved the French concordat. It defined (in the bull *Pastor æternus*) the Pope's authority over councils, and (in the bull *Apostolici regiminis*) condemned those who held that the intellectual soul is mortal, or only one in all men.

Laterite, a red jaspery rock, composed of silicate of alumina and oxide of iron. A red earthy rock occurring in beds between basalt and other lava flows, and resulting from their decomposition. It is strongly impregnated with sesquioxide of iron, and sometimes contains hæmatite and beauxite. From being derived from various rocks it varies greatly in character. It abounds in the Deccan and some other parts of Central and Southern India.

Latex, the peculiar juice, becoming milky when exposed to the air, which is found in the laticiferous vessels of *Euphorbiaceæ*, *Papaveraceæ*, *Cichoraceæ*, and other "milky" plants. It appears to consist of a watery fluid, with albumen in solution, with floating particles of caoutchouc and sometimes of starch.

Lath, one of the narrow strips nailed to the studs of partitions to support plastering. Strips of metal are sometimes used for this purpose in fire-proof structures. Such laths have means for securing to the studding or wall, and also affording a key to the mortar which is laid thereon.

Lathe, a machine for turning and polishing flat, round, cylindrical, or other shaped pieces of wood, ivory, metal, etc., in which the object revolves while it is shaped or polished by a tool applied to it. Lathes are of various kinds, and known by various names, according to the construction, mode of driving, etc. The parts of the lathe are: The bed, shears, cheeks, sides, on which the puppets, which form the head stock and tail stock, slide. The mandrel, or live spindle of the live head, and on which is the speed pulley; the centers on the live or front spindle, and the dead or back spindle, respectively, on which the work is turned; the fly wheel (of a foot lathe), on which is the cord passing to the speed pulley of the head stock; the treadle, or foot board, to which the power is applied; the collar plate, cone plate, face plate, chuck, or other means of connecting the work; the rest for the tool.

The bar lathe has a single beam or shear, generally of a triangular shape. On this the heads or puppets slip. The bed lathe is the usual form and has two parallel shears. The center lathe has head and tail stocks, which afford centers for each end of the work turned. The chuck lathe supports the work being turned by means of a grasping tool or socket on the mandrel of the head stock. The geometric lathe is an instrument for producing wavy or eccentric patterns with a general concentric arrangement. The hand lathe is driven by a crank or bow, and is of small size, for the bench or table. The watchmaker's lathe is a small bench lathe, sometimes having pivot centers, on which the work is turned by a

bow, and sometimes a hand lathe or a foot lathe of small proportions. The last lathe is a lathe for turning irregular forms. The mandrel lathe supports the work on a spindle, which is attached to the axle of the head stock, or on the head and tail centers, according to circumstances. The pivot lathe is a small bench lathe whose centers are the ends of rods clamped in the heads and not partaking of the revolution. The pole lathe supports the work on puppets, and the cord passes from the treadle two or three times round the work, and then upward to a spring bar. The power lathe is driven by horse power, water, or steam. The rose engine lathe is a form of the geometric. The spindle lathe has a rotating axis in the head stock, to which the work is attached. The spoke lathe is a lathe for turning irregular forms. The turn bench is a small portable lathe for the work bench or desk.

Lathrop, George Parsons, an American author; born in the Hawaiian Islands, Aug. 25, 1851; was for some years employed editorially on the "Atlantic Monthly" and the Boston "Courier"; wrote: "Rose and Roof-Tree," verses (1875); "A Study of Hawthorne" (1876); "Afterglow" (1876); "An Echo of Passion" (1882); "Spanish Vistas" (1883); "Gettysburg, a Battle Ode" (1888); "Would You Kill Him?" (1889); "Dreams and Days," verses (1892); "Gold of Pleasure" (1892), a novel; "Story of Courage," with Rose Hawthorne. He died in New York, April 19, 1898. See LATHROP, ROSE H.

Lathrop, Rose Hawthorne, an American poet; born in Lenox, Mass., May 20, 1851; daughter of Nathaniel Hawthorne; married George Parsons Lathrop in 1871; became interested in bettering the condition of the destitute and diseased women of New York city, especially those suffering with cancer, and established the St. Rose's Free Home for this class. She was the author of "Along the Shore" (poems); "Memories of Hawthorne"; and "A Story of Courage" (with her husband).

Lathyrus, everlasting pea, bitter vetch, or vetchling, a genus of papilionaceous plants. It resembles vicia, but has fewer leaflets, broader petals, an obliquely truncate staminal tube, and a style longitudinally flattened and bearded on the inner face. A hundred are known. The genus is divided into the sub-genera *Aphaca, Nissolia, Lathyrus* proper, and *Orobus*. *L. pratensis*, the meadow vetchling, a climbing plant, two or three feet long, with yellow flowers, is frequent. The roots of *L. tuberosus* are eatable. The seeds of *L. aphaca* can be eaten when green, but when ripe produce headache and are narcotic. Christison says that flour in which those of *L. cicera* have been ground is poisonous. *L. sativus* is used as green fodder for cattle in the N. of India. It is said to produce paralysis in pigs. *L. aphaca* and *L. imphalensis* (Watt), are also used in India as fodder plants. Nearly 60 species of the genus are cultivated for their handsome flowers — yellow, red, scarlet, purple, and blue. The larger kinds are well adapted for arbors and shrubberies, but require branches for their support.

Latimer, Hugh, an English reformer; born in Thurcaston, Leicestershire, England, about 1490. He was educated at Cambridge, and received the degree of M. A. in 1514. He was then, as he says himself, "as obstinate a Papist as any in England," but became a Protestant chiefly through the influence of Bilney. He strenuously promulgated the doctrines of the Reformation, and being an admired preacher, his influence on his hearers was consequently very great. His fame reaching Henry VIII., he sent for him, and was so pleased with his discourses as to confer on him the bishopric of Worcester. But Latimer was no time server; on the contrary, he expostulated with the king on his cruelties. He afterward resigned his bishopric; and, on the fall of Lord Cromwell, his patron, he was sent to the Tower, where he remained till the accession of Edward VI., who would have restored him to his diocese, but he refused. He then resided with Cranmer, whom he assisted in framing his homilies. When Mary came to the throne, he was committed to the Tower, whence he was sent, with Ridley and Cranmer, to Oxford, to hold a conference with several doctors from the universities. He pleaded that he was old, sick, and had used the Latin tongue but little for 20 years; he was therefore permitted to give in a long profession of faith in writing, for which he was condemned as a heretic, and imprisoned for more than a year in Bocardo, the common jail of Oxford. He was then again summoned before the commissioners, but refusing to recant, he was condemned and burned, near Baliol College, at the same stake with David Ridley, Oct. 16, 1555. Latimer, after commending his soul to God, thus cheered his brother-sufferer: "We shall this day, my lord, light such a candle in England as shall never be extinguished." His sermons have often been printed.

Latin, the language of the ancient Romans. For the literature, see the names of the various Latin authors.

Latin, Low. See LOW LATIN.

Latin Church, the Church of the West, as distinguished from the Oriental Church.

Latin Cross, a cross the transverse beam of which is one-third the length of the vertical one.

Latin Quarter (Fr. *Quartier Latin*), a famous section of Paris, on the S. side of the Seine, in the vicinity of the Sorbonne, the Institute, the Collège de France, the Panthéon, and schools of various kinds. For centuries the student class have resorted to this district from all parts of the world.

Latins, the ancient inhabitants of Latium (*q.v.*), in Italy. Janus, Saturn, Picus, and Faunus, who were deified by their subjects, are represented as the most ancient Latin kings. During the reign of Faunus, Hercules and Evander are said to have arrived in Latium, and the latter is reputed to have taught the inhabitants the alphabet, music and other arts. Evander is also supposed to have succeeded Faunus in the government. About sixty years afterward lived King Latinus, at whose court arrived Æneas, who married the King's daughter, Lavinia and succeeded to his throne. These ancient Latins formed a league of thirty cities, of which the town of Alba Longa became the head. Although Rome was a colony from Alba, she became powerful enough in the reign of her third king, Tullus Hostilius, to seize upon that city and raze it to the ground. Under Servius Tullius, Rome entered the Latin confederacy, and in the reign of his successor, Tarquinius Superbus, she was acknowledged as the head of the league. On the fall of the Tarquins the Latins regained their independence, and struggled long against the republic to maintain it, but in 340 B. C. it was finally lost by the decisive victory of the Romans near Mount Vesuvius.

Latin Union, The, a political combination formed in 1865 by France, Italy, Belgium, and Switzerland. These countries entered into an agreement by which the amount of silver to be coined yearly was fixed for each member of the union. The coinage of all the countries was of like character, and to be received without discount throughout the union on public and private account. Greece joined the union in 1868, Spain in 1871, and subsequently Servia and Roumania also became members. Some of the South American States also used the Latin Union coinage. Spain alone of the countries of the union coins a gold piece not used by the others. The unit of coinage in the Latin Union is the franc; it has different names elsewhere, as, in Italy the lira; in Servia, the dinar; in Spain, the peseta; but the value is always the same. It is the most widely circulated coinage system in Europe, being used by about 148,000,000 people.

Latitude, the angular distance of a star from the ecliptic, measured on a great circle drawn through the star and the pole of the ecliptic. This method of measurement is now not much used, that by right of ascension and declination having largely taken its place. Latitude is the most potent, though not the only cause in determining the climate of the several countries. The latitude of a place on the surface of the earth is its angular distance from the equator measured on the meridian of the place. Latitude is N. or S., according as the place is N. or S. of the equator. Circles whose planes are parallel to that of the equator are called circles of latitude, or parallels of latitude, because the latitude of every point of each circle is the same. The latitude of a place is always equal to the inclination of the axis of the earth to the horizon of the place, and conversely. A degree of latitude is 60 nautical or about 69½ English miles. In surveying, the distance between the two E. and W. lines drawn through two extremities of a course. If the course is run toward the N., the latitude is called northing, if to the S., it is called southing.

Latitudinarian, a party in the Church of England about the middle of the 17th century, who, wearied by the fierce religious disputes of the time, aimed at a broad or comprehensive system which might reconcile the contending parties, or at least diminish the vehemence of their controversies.

Latium, the residence of the Latins, was a district of Central Italy, on the Tyrrhenian Sea, between Etruria and Campania. Besides the Latins, according to Strabo, there were in this region Rutuli, Volsci, Hernici, and Æqui. In the earliest times there was a great laurel-grove on the coast, at the mouth of the Tiber; it extended as far as the city of Laurentum, to which it gave name. Further on lay the little river Numicus and the sources of the Juturna; and still farther to the E. was the city of Lavinium. Beyond the sources of the Numicus and the Juturna was the mountain upon which stood the city of Alba Longa. Behind this lay Aricia. The first colony of the Romans was Ostia, established by Ancus Martius, below Rome. The rivers of Latium were the Tiber, the Liris, the Anio, Numicus, Ufens, Amasenus, and Almo. The Ufens flowed through the great Pontine Marshes. The principal inland body of water was Lake Regillus. The mountains, with few exceptions, were merely hills. Ancient Latium was much more thickly peopled and more highly cultivated than the present Campagna di Roma, to which it nearly corresponds. It was always considered an unhealthful region.

Latona (lā-tō′nä), the daughter of Cæus the Titan, and Phœbe, or, according to Homer, of Saturn. Jupiter having with his usual fatality fallen in love with Latona, Juno, enraged at this additional proof of his perfidy, sent the monster Typhon to pursue her from place to place. Neptune, moved with compassion, caused the island of Delos to rise out of the Ægean Sea; La-

tona there gave birth to Apollo and Diana. Juno obliged her to fly from Delos. After having wandered over the greater part of the earth, and experienced the violence of Niobe and Tityus, she at length, though exposed to the resentment of Juno, became a powerful deity, and saw her children receive divine honors. Her worship was generally established where her children received adoration, particularly at Argos, Delos, and other places where she had temples.

Latour, Antoine Tenant de (lä-tör'), a French historian; born in St. Yrieix, 1808. He wrote an "Essay on the Study of French History in the Nineteenth Century" (1835); a noteworthy study of Luther (1835); an "Account of a Voyage to the East" (1847); and a series of studies of Spain, the land and the people: the series comprises 10 volumes, devoted to separate towns and provinces, as, "Seville and Andalusia"; "Toledo and the Banks of the Tagus"; or to general views, as "Spain, Religious and Literary"; "Spain: Traditions, Manners, and Literature." He died in Sceaux, Aug. 27, 1881.

Latour d'Auvergne, Théophile Malo Corret de (lä-tör' dō-vārny), dubbed by Napoleon "First Grenadier of the Armies of the Republic"; born in Carhaix Finistère, of an illegitimate branch of the family of the Dukes of Latour d'Auvergne, Nov. 23, 1743. He enlisted as a musketeer in 1767, and distinguished himself at the siege of Port Mahon in 1782. But he steadily refused advancement in miltary rank, and was killed, a simple captain, June 28, 1800, at Oberhausen, near Neuburg in Bavaria. His remains were carried to Paris and interred in the Panthéon on Aug. 4, 1889. French biographies are full of instances of his daring valor, his Spartan simplicity of life, and his chivalrous affection for his friends. When he died the whole French army mourned for him three days; his saber was placed in the Church of the Invalides at Paris; and every morning, till the close of the empire, at the muster-roll of his regiment his name continued to be called, and the senior sergeant answered to the call: "*Mort au champ d' honneur*" (Dead on the field of honor). Latour d'Auvergne was also a student of languages, and wrote "Language, Origin and Antiquity of the Bretons."

La Trappe, a Cistercian abbey of Northern France, in a narrow valley of Normandy, 30 miles N. E. of Alençon. Founded in 1140, it had become in the 16th century a haunt of licentious monks known as the bandits of La Trappe. In the 17th century, however, the Abbot Armand Jean le Bouthelier de Rancé instituted a vigorous reform, and caused the monks to adopt a life of severe asceticism. The Trappists prayed 11 hours daily, and passed the rest of their time in hard labor and silent meditation. Beyond the sacred hymns and prayers, and their usual salutation, *Memento mori,* no word passed their lips — even their wishes and wants were indicated by signs. Their meager diet consisted solely of fruits and pulse; meat, fish, butter, wine, and eggs being entirely prohibited. They received no information of what was going on in the world, and no news from their relations; all their thoughts were devoted to penance and death, and every evening they dug their own graves. The Trappists were obliged to leave France at the time of the Revolution; but a considerable number of them found a shelter at Valsainte, in Switzerland. Driven from this shelter they found refuge at Constance, at Augsburg, at Munich, and ultimately in Lithuania and White Russia. Small communities established themselves in Italy, Spain, America, England, and even in France, at Mont Genèvre, despite the prohibitory law. After the restoration their old home at La Trappe was restored to them. La Trappe continues to be the head monastery of the order, and they have also establishments in various parts of Europe, and in America. The professed brothers wear a dark-colored frock, cloak, and hood, which covers the whole face. A female order of Trappists was founded by Louisa, Princess of Condé.

Latreille, Pierre André (lä-trāy'), a French naturalist; born in Brives, Corrèze, France, Nov. 29, 1762. Though he completed his education for the Church, he gave himself chiefly to entomological studies. In 1798 he was commissioned to arrange the entomological collections in the Museum of Natural History at Paris, and in 1830 was appointed to the chair of natural history (along with De Blainville) in the same institution. In 1796 he published his great work, "Generic Character of Insects," an important step toward a truly natural system of entomology. He died in Paris, Feb. 6, 1833.

Latria, a technical term for that supreme worship which can lawfully be offered to God alone. In this sense the word was used by the Greek Fathers, and at the second Council of Nice (Seventh General, 787), St. Augustine adopted it, on the ground that it expressed exactly what no single Latin word would express; and it was probably owing to his influence that it passed into general use.

Latrocinium, the prerogative or right of judging and executing thieves. The term was also applied by Pope Leo the Great to the heretical Council of Ephesus, 449, convoked by the Empress of Eudocia,

at the request of Dioscorus, patriarch of Alexandria, who wished to reverse the decisions of Chalcedon (Fourth General, 451), which condemned Eutyches, and affirmed two natures — a divine and human nature — in Jesus Christ. Dioscorus employed violence toward the papal legates, and is accused of falsifying the acts, which were afterward confirmed by Theodosius, but the churches of Asia Minor, Pontus, Syria, and the West rejected them.

Latten, a kind of mixed metal; a fine kind of brass, of which the incised plates for sepulchral monuments, crosses, and a great proportion of the candlesticks, etc., used in parochial churches were made. Black latten is brass in milled sheets, used by braziers and for drawing into wire. Shaven latten is a thinner article. Roll latten is polished on both sides, ready for use. Latten wire is wire made from latten plate. It was thus made before the invention of wire-drawing.

Latter-day Saints, Church of Jesus Christ of. See MORMONS.

Lattice, any wooden structure composed of laths or thin pieces of wood crossing and forming open checkered or reticulated work. Also a window formed of laths or strips of metal crossing each other diagonally like network. Such windows were once common in England. The panes are diamond-shaped and are set with an acute angle upward. In heraldry, a bordure formed of perpendicular and horizontal bars, either interlaced or not.

Lattice Bridge, a bridge so called from having the sides constructed with cross-framing resembling latticework. Many very large bridges of this kind have been erected with timber framing in the United States. That over the Susquehanna at Columbia, Pa., is about 1¼ miles long, and has 29 spans, each 200 feet wide. See BRIDGES.

Lattice Leaf, or **Lattice Plant,** a remarkable aquatic plant of Madagascar (*Ouvirandra fenestralis*), by some referred to the order *Juncaginaceæ*, by others to the *Naiadaceæ*, and noteworthy for the structure of its leaves. The blade resembles latticework or open needlework, the longitudinal ribs being crossed by tendrils, and the interstices between them open.

Latude, Henri Mazers de (lä-tüd′), a French military officer; born in Montagnac, Languedoc, France, March 23, 1725. A young artillery officer, he sought to secure Madame de Pompadour's favor by revealing to her a plot to poison her. The plot was discovered to be of his own contriving, and he was sent to the Bastille in 1749. In spite of ingenious efforts to escape, he remained in prison till 1777, when he was released on condition of living in his native village. But having come to Paris again, he was imprisoned till 1784. At the Revolution he was treated as a victim of despotism; but he died forgotten, in Paris, Jan. 1, 1805.

Laube, Heinrich (lou′buh), a German dramatist and novelist; born in Sprottau, Sept. 18, 1806. He was director of theaters in several cities of Germany and Austria between 1849 and 1880. Among his dramatic works are: "Gustavus Adolphus" (1829); "Zaganini," a farce (1829); the tragedy "Monaldeschi" (1839); "The Amber Witch" (1842); "Struensee," a tragedy (1847); "The Schoolboys" (1847), a very clever dramatization of an incident in the life of Schiller; "Lord Essex" (1856), his finest tragedy. Among his stories and works of fiction are: "Young Europe" (1833); "Love-Letters"; "The Actress" (1836); "The Pretender" (1842); "Countess Châteaubriand" (1843); "The Belgian Count" (1845); "The German War" (9 vols. 1865); "Life History of Franz Grillparzer" (1884). He died in Vienna, Aug. 1, 1884.

Laud, William, an English prelate; Archbishop of Canterbury in the reign of Charles I.; born in Reading, Berkshire, England, Oct. 7, 1573. He was educated at the free school of his native place and at Oxford; was ordained in 1601; became president of his college in 1611; accompanied James I. to Scotland, as one of his chaplains, in 1617; was installed prebendary of Westminster in 1620; and obtained the see of St. David's in the following year. On the accession of Charles I. his influence became very great; and he was translated to the see of Bath and Wells, and in 1628 to that of London. In 1630 he was elected chancellor of the University of Oxford; to which he was a great benefactor, and which he enriched with an

ARCHBISHOP LAUD.

invaluable collection of manuscripts in a great number of languages, ancient, modern, and Oriental. In 1633 he attended Charles into Scotland, who went there to be crowned; on his return he was promoted to the see of Canterbury, and during the same year he was chosen chancellor of the University of Dublin. The zeal which he displayed for conformity to the Church, and his endeavors to introduce the liturgy into Scotland, created him numerous enemies. At the commencement of the Long Parliament, therefore, he was impeached by the Commons and sent to the Tower. After lying there three years he was brought to his trial before the Lords, by whom he was acquitted, but the Lower House passed a bill of attainder, declaring him guilty of treason, which they compelled the peers to pass; and the archbishop was accordingly beheaded on Tower Hill, Jan. 10, 1645. He was in the 72d year of his age and met his fate with great fortitude.

Laudanine (-nin), $C_{20}H_{25}NO_3$, laudamine or laudanine, an alkaloid, homologous with morphine and codeine, obtained from the aqueous extract of opium. It melts at 165°, and solidifies in the crystalline state on cooling. It is soluble in benzol, chloroform, and boiling alcohol; slightly soluble in cold alcohol; insoluble in ether. It dissolves in concentrated sulphuric acid with a rose-red color, in nitric acid with an orange-red color, and in ferric chloride with a bright green color. Laudanine is tasteless, but its salts are very bitter. From their solutions potash and ammonia precipitate the base in white amorphous flocks, soluble in excess of the precipitant. Laudanine sulphate crystallizes in groups of needles, very soluble in water. The hydrochloride forms delicate colorless prisms, soluble in water and alcohol.

Laudanum, or more correctly TINCTURE OF OPIUM, the most generally used of all the preparations of opium. It is obtained by macerating the sliced or powdered drug in dilute spirit, and filtering. It is of a deep brownish-red color, and possesses the peculiar odor and smell of opium. One of the greatest objections to it is that it is liable to great variations of strength. When the tincture of opium is ordered a definite strength is always obtained, but under the name of laudanum various compounds are sold, and the former term should therefore alone be used. Laudanum is a powerful anodyne and soporific, but is more liable to cause headache than the solution of one of the salts of morphia. The dose for an adult varies from 10 minims to a drachm. To children (as in the case with all opiates) it must be given with extreme caution. One minim, or about two drops, has been known to prove fatal to an infant.

Lauder, Robert Scott, a Scotch painter; born in Silvermills near Edinburgh, in 1803. He lived in Italy and at Munich in 1833–1838, and then chiefly in London till 1849, when he returned to Edinburgh. Among his best works are two portraits, "Christ teaching Humility," and "Sentinels," in the National Gallery of Scotland; scenes from "The Bride of Lammermoor," "The Trial of Effie Deans," and "Meg Merriles." He died in Edinburgh, April 21, 1869. His brother, JAMES ECKFORD LAUDER (1812–1869), was also a subject-painter. His works include "Hagar," in the National Gallery of Scotland; "The Unjust Steward"; and "The Wise and Foolish Virgins."

Laughing Gas, nitrous oxide, or nitrogen monoxide, or protoxide of nitrogen; so called because when inhaled it usually produces exhilaration.

Laughing Jackass, or **Great Kingfisher** (*Dacelo gigas*), a bird belonging to the *Alcedinidæ*, but in some respects an aberrant form. It has the general build of a kingfisher, but is not a fisher. It feeds upon insects, reptiles, and even small mammals. The peculiar hoot which it utters has, of course, given to it its name. It lays its pearl-white eggs in a hole in a gum tree. There is another closely allied species (*D. teachii*), of identical habits; both birds inhabit Australia.

Laughing Philosopher, a characterization of Democritos (469–361) of Miletus. He laughed at the follies of man, whereby they were forever involving themselves in difficulties. He was the originator of the atomic theory, taught the theory of gravitation, and that the milky way is a cluster of stars.

Laughlin, James Laurence, an American educator; born in Deerfield, O., April 2, 1850; was graduated at Harvard College in 1873; was Professor of Political Economy at Cornell University in 1890–1892; accepted the head professorship of the same branch in the University of Chicago in 1892. In 1894–1895 he drew up a plan of monetary reform for San Domingo, which that government later adopted. He is the author of "Anglo-Saxon Legal Procedure in Anglo-Saxon Laws" (1876); "Study of Political Economy" (1885); "History of Bimetallism in the United States" (1886); "Gold and Prices Since 1873" (1887); "Facts About Money" (1895); etc.

Laughter, the expression of mirth, merriment, or satisfaction by laughing; merriment, mirth. The sound of laughter is produced by a deep inspiration, followed by quick, short, interrupted, and spasmodic contractions of the chest, and especially of the diaphragm. From this cause the head nods to and fro with occasional quivering

of the lower jaw. The mouth opens more or less widely with the corners drawn far backward, through the action of the *oris orbicularis* and other muscles, as well as a little upward, and the upper lip somewhat raised. The upper and lower orbicular muscles of the eye are at the same time more or less contracted, for, as in weeping, there is an intimate connection between them and some of the muscles of the upper lip.

Launceston, the second city of Tasmania, is to the N. of the island what Hobart, the capital, is to the S.— the chief port of entry and mart of trade. It stands in a valley inclosed by hills at the junction of the Esk with the Tamar, which, after a course of 40 miles, enters Bass Strait at Port Dalrymple. It is accessible to ships of considerable burden, and carries on a thriving commerce with the principal Australian ports, having steam communication twice a week with Melbourne, and with Sydney fortnightly. There is a railway (133 miles) to Hobart. The town is supplied with water from St. Patrick's river. The principal buildings are the government house, new postoffice, convent, theater, town hall, and mechanics institute with a library of 13,000 volumes. Launceston was incorporated in 1858, and raised to a city in 1889. Pop. (1908) 21,602.

Launch, a term comprehending the apparatus for launching a ship. The largest boat belonging to a ship of war. It is only used for service which cannot be performed by the smaller boats, being hoisted on board and kept on deck just abaft the foremast, where it serves as a receptacle for lumber and stores. In large men-of-war the launch is sometimes decked over and is capable of mounting several light guns. The corresponding boat of merchant vessels is called the long boat. The launch is from 30 to 40 feet long, having a beam from .29 to .25 its length. It has 10 or 12 oars and is carvel-built.

Laura, an aggregation of separate cells tenanted by monks, "under the not very strongly defined control of a superior"; usually but one monk occupied a cell, but in the laura of Pachomius one cell was assigned to three monks. For five days in the week the monks were occupied in basket-making in their cells; on Saturday and Sunday they took meals in the refectory, and worshiped in the common church. The discipline of the laura was an intermediate stage between the eremitical life of Anthony and the monasticism founded by Basil and Benedict. It flourished in the 4th and 5th centuries in the desert country near the Jordan. Euthymius and Sabbas and the abbot Gerasimus were its chief types and promoters. The latter is said to have foretold the conversion of the laura into the monastery proper. This change took place soon after his death.

Laura (Laure de Noves), later **Madame de Sale,** a French lady, famed as the beloved of Petrarch; born in 1308. She was the mother of 11 children. Though she was already married when Petrarch first saw her in a church at Avignon, April 6, 1327, and though she never gave him any encouragement beyond an occasional kindly smile, or word of appreciation of his constant friendship, his attachment for her was most sincere and faithful and 300 of his sonnets are devoted to his remembrances of her. She died in Avignon, France, April 6, 1348.

Lauraceæ, or **Laurineæ,** laurels; an order of perigynous exogens, alliance daphnales. It consists of trees often of large size, with exstipulate alternate or occasionally opposite leaves, entire or very rarely lobed; inflorescence paniculate or umbellate; calyx four to six cleft; petals none; stamens definite, opposite, the three inner segments of the calyx sterile or deficient, the three outer ones rarely abortive; anthers dehiscing by recurved valves; style one; stigma two or three lobed; ovary superior, formed of three valvate, carpellary leaves, but by abortion one-celled; ovules one or two, pendulous; fruit baccate or drupaceous. Found in the tropics of both hemispheres, one straggling into Europe, and Africa having but few. Genera 46, known species 450.

Laurel, the genus *Laurus* and specially the bay, *L. nobilis,* the laurus of the Romans and the daphne of the Greeks. Linnæus called it *nobilis* because it was anciently reserved for priests, heroes, and sacrifices. In its native region — the S. of Europe — it is 30 or even 60 feet high, but sends forth so many suckers and low shoots as to have a shrubby appearance. The color is deep green, inclining to olive; the ripe berries dusk, purple, or black. There are glands on the backs of the leaves, which excrete nectar. The berries, the leaves, and the oil have a fragrant smell, an aromatic astringent taste, and narcotic and carminative properties. Water distilled from them contains prussic acid. *Cerasus laurocerasus,* called the common or broad-leaved laurel, has oblong, remotely serrated pale-green evergreen leaves; flowers in racemes. A native of Trebizond, its leaves, bark, and fruit are virulent poisons.

Laurel Water, water distilled from the leaves of the common or cherry laurel, *Prunus laurocerasus.* It contains the poisonous principle of prussic acid, and is a valuable remedy in bronchitis and kindred affections.

Laurence, Samuel, an English portrait painter; born in Guildford, Surrey, England, in 1812. His portraits of famous

men include those of Carlyle, Browning, Whewell, Dickens, Froude, F. D. Maurice, Thackeray, Tennyson and Lowell. He died in London, Feb. 28, 1884.

Laurens, Henry, an American statesman; born in Charleston, S. C., in 1724 Descended from a French Huguenot family, the early life of Laurens was passed in mercantile pursuits, from which he ultimately realized an ample fortune. On the outbreak of the American Revolution, Laurens, in 1776, was elected a delegate from his native State to the Continental Congress, and became its president, which office he held till the close of 1778. Next year, being appointed minister-plenipotentiary to Holland, he was captured on his way thither by a British frigate, and taken to London, where he was confined as a prisoner in the Tower; and his papers having proved the complicity of Holland in the colonial revolt, a war between Great Britain and Holland followed. On his release, after an imprisonment of 15 months, Laurens was appointed one of the commissioners for negotiating peace, in pursuance of which he proceeded to Paris, where, Nov. 30, 1782, he, conjointly with Franklin and Jay, signed the preliminaries of the treaty. After his return to the United States he passed the remainder of his life in privacy and died in Charleston, Dec. 8, 1792.

Laurens, John, an American military officer; son of the preceding; born in South Carolina in 1756. After receiving his education in England he joined the American Continental Army in 1777, becoming aid-de-camp and secretary to Washington. Laurens so highly distinguished himself in the battles of Germantown and Monmouth, and in other operations of the War of Independence, as to earn for himself the title of the "Bayard of the Revolution." In 1780 he was sent to France to negotiate a loan, and succeeded in obtaining a grant both of money and supplies. He was killed in action at the Combahee river, S. C., Aug. 27, 1782.

Laurent, François, a French historian and publicist; born in Luxemburg, France, July 8, 1810. He studied law at Liege, and was admitted to the bar in 1832. In 1833 he was made Professor of Civil Law at the University of Gand, and was sustained in his chair by the Catholic ministry of Decker in 1836 in spite of the anti-papal tendency of his writings. He was the author of a number of histories and works on civil law, among them being "Principles of French Civil Law," a work in 24 volumes, and "Letters on the Jesuits." He died in Ghent, Feb. 11, 1887.

Laurentian Group, a vast series of rocks, 30,000 feet in thickness, and covering an area of at least 200,000 square miles N. of the St. Lawrence river. It is lower, and consequently older, than the Cambrian. It consists of an immense series of crystalline rocks, gneiss, micaschist, quartzite, and limestone. It is divided into Upper and Lower Laurentian. The Upper, more than 10,000 feet thick, consists of stratified crystalline rocks in which no organic remains have yet been found. It mainly consists of felspars, containing from about 1 to 7 per cent. of soda and potash. Sometimes they alone form mountain masses, at others they are associated with augite and hypersthene. They are often granitoid in structure. The Lower Laurentian, about 20,000 feet in thickness, is unconformable with the Upper. It consists mainly of a reddish gneiss, with orthoclase felspar; interstratified with thin hornblendic and micaceous schists, with beds of usually crystalline origin, and others of plumbago. The limestone may possibly be of animal, and the plumbago of vegetable origin, but the only known fossil is the *Eozoon canadense.* The Laurentian volcanic rocks of Ottawa, Argenteuil, etc., in Canada, consist of fine-grained dark greenstone or dolerite. They vary from a few feet to 100 yards in thickness. They send forth branches and are cut through by intrusive syenite.

Laurentian Mountains, a range in Canada extending for over 3,000 miles from Labrador to the Arctic Ocean, forming the watershed between Hudson Bay, the St. Lawrence, and the Great Lakes, and dividing the same bay from the sources of the Mackenzie river. The average elevation is about 1,500 feet, while some of the peaks attain a height of 4,000 feet. The rock formation belongs to the fundamental metamorphosed sedimentary deposits known as the Laurentian system, and the name was given by Sir William Logan.

Laurentie, Pierre Sébastien (lō-ro*ng*-tē′), a French historian; born in Houga, Gers, France, Jan. 21, 1793. An ardent advocate of the royalist cause, he held several important offices until the revolution of 1830, after which he joined the Legitimist Journal "La Quotidienne," with which he had previously been connected. His extreme royalist sentiments detract from the value of most of his works, among which are: "History of France" (8 vols. 1841-1843); "History of the Roman Empire" (4 vols. 1861-1862). He died in Paris, Feb. 9, 1876.

Laurier, Sir Wilfrid, a Canadian statesman; born at St. Lin, Quebec, Nov. 24, 1841. He received his early education at the College of L'Assomption, studied law in the office of the Hon. R. Laflamme, and was, in 1865, called to the bar of Lower Canada. For a brief period he edited *Le Défricheur* newspaper. He has always been an earnest advocate of temperance, and was a delegate to the Dominion Prohibition Convention held in Montreal in 1875. At the

provincial elections of 1871 he was elected to the Legislative Assembly of Quebec for the constituency of Drummond and Athabasca. This seat he retained until January, 1874, when he resigned it in order to contest the same constituency for the Dominion House of Commons. His brilliant abilities and high character there made themselves felt. He found himself on the right side of the House, and his support of the administration proved so valuable that in October, 1877, he was invited by the premier to enter the cabinet, being allotted the portfolio of inland revenue, which he held until the resignation of the government (1878). At the general elections of 1878, having again offered himself for Drummond and Athabasca, he met with defeat, but the member for Quebec East shortly afterward resigning, Laurier was elected in his place, and has ever since represented that constituency. When Mr. Blake, in the year 1887, withdrew from Canadian politics, Laurier took his place as the recognized leader of the Liberal party. When the Conservative administration of Sir Charles Tupper met defeat in July, 1896, the governor-general called upon Laurier to form a new government. As an orator he is without a peer in Canadian public life. Throughout his career he has been unswervingly faithful to three objects: the maintenance of the principle of federalism, advocacy of civil and religious freedom, and resistance to the injurious influences of racialism, sectarianism and provincialism. J. MACDONALD OXLEY.

Lauriston (lō-ris-tong′), **Alexandre Jacques Bernard Law, Marquis de,** marshal and peer of France; born in Pondicherry, French India, Feb. 1, 1768. He was Napoleon's comrade at the Artillery School, received rapid preferment in the army, and held diplomatic appointments at Copenhagen and London. After Austerlitz (1805) he took possession of Venice. He held high commands at Wagram (1809) and in the retreat from Moscow (1812). He fought at Bautzen (1813) and Katzbach, and was taken prisoner at Leipsic. Already ennobled, he was made a peer by Louis XVIII. as not having joined Napoleon during the Hundred Days, and became marquis in 1817 and marshal in 1821. He died in Paris June 10, 1828.

Laurium, a mountain (1,171 feet) of Attica, Greece, connected by a railway with Athens. It was famous in ancient times for its silver mines, but these were already exhausted in Strabo's day. Since 1874, however, the great heaps of slag have been profitably worked, and fresh deposits of argentiferous lead and of zinc ore have also been found so that the most important mining in the kingdom is carried on here.

Laurustinus (-tī′nus), a beautiful evergreen shrub, a native of the S. of Europe and North Africa, and belonging to the natural order *Caprifoliaceæ*. Its beauty is enhanced by its habit of flowering in winter. The flowers are white, in corymbs, and are succeeded by small black berries with a blue bloom, which inflame the mouth, if eaten, like those of Mezeron, and are said to be violently purgative, yet are the favorite food of certain birds. *Laurustinus* suffers from severe winters in Great Britain, and will not endure the winters of Northern Europe and the colder regions of America.

Lausanne (lō-zän′), capital of the Swiss canton of Vaud, on the S. slope of the Jura Mountains, close to the N. shore of the Lake of Geneva, on which the village of Ouchy (where Byron wrote "The Prisoner of Chillon") forms its harbor. Here Gibbon resided for many years, and the house in which he wrote the greater part of the "Decline and Fall" is still shown. John Kemble was buried here. Pop. (1901) 47,039.

Lauterbrunnen (lou′ter-brön-nen), the name of an Alpine valley in the Swiss canton of Bern, through which flows the Weisse Lütschine, one of the principal feeders of the Aar. The valley is surrounded by perpendicular walls of sandstone from 1,000 to 1,600 feet in height, down which pour about a score of waterfalls. Of these the finest is the *Staubbach* ("dust-stream"), 866 feet in height.

Lautern. See KAISERSLAUTERN.

Lava, a term used vaguely of all molten matter existing within or flowing in streams from volcanic vents, but more specifically confined to the latter, the former being called trap. The lower part of it which has consolidated slowly and under pressure, tends to be of stony consistency, while the upper is scoriaceous. If, however, the lava flow came first and became scoriaceous, it remains so, even if stony material be piled above it. The more compact lavas are often porphyritic, and contain crystals. So do the scoriaceous kinds, the crystals having been derived from older rocks and remained infusible when the original matrix in which they had been imbedded was melted. Lavas vary greatly in composition. Some are trachytic, as in the Peak of Teneriffe; many are basaltic, as in Vesuvius and Auvergne; others andesitic, as in the volcanoes of Chile. Some of the most modern in Vesuvius consist of green augite, and many of those of Etna of augite and Labrador felspar.

Laval (lä-väl′), capital of the department of Mayenne, and one of the most picturesque towns of France, on the Mayenne river; 46 miles E. of Rennes. Its chief buildings, both dating from the 12th century, are the cruciform cathedral and the old ducal castle of the Trémouilles (a prison now), in whose courtyard young Philip de

la Trémouille, Prince de Talmont, was guillotined by the Republicans in 1794. Since the 13th century, when Flemish weavers settled here, the town has been the center of a district noted for its linen manufactures —linen, ticking, sacking, etc. In the vicinity the Vendeans gained a victory over the Republicans. Pop. (1901) 30,356.

Lavater, Johann Casper, a Swiss theologian; born Nov. 13, 1741, in Zürich, Switzerland, where his father enjoyed the reputation of a skillful physician. He was endowed with a lively imagination and early gave himself up to solitary reveries. While yet at school he was persuaded that he had received direct answers to his prayers. His imagination even at that early period, appears to have been so actively employed that he never acquired much knowledge of philology or classical antiquity. Jn 1763 he traveled in company with Fuseli, the subsequently distinguished painter, to Leipsic and Berlin and became acquainted with the scholars and theologians of Northern Germany. In 1764 he returned to his native city, and in 1767 appeared as a poet in his "Schweizerlieder," which, as well as his "Aussichten in die Ewigkeit" (1768), gained him many admirers. In 1769 he was made deacon at the Orphan Church in Zürich, and became its first pastor in 1774. His sermons were rendered attractive by their pleasing style, his enthusiastic zeal, and a certain mysticism which always characterized him. They were printed in 1772 and were admired even in foreign countries. All his activity was, in fact, devoted to the service of religion till he undertook his work on physiognomy. Lavater had become acquainted with a great number of persons and his lively imagination had led him to the conclusion that there exists a much closer connection between the internal man and the external expression in the face than is generally supposed. He reduced this external expression of disposition and character to a system and considered the lines of the countenance as sure indications of the temper. He had adopted this idea in 1769 and collected the features of distinguished people from all parts of the world. His great work (in 4 vols. 4to), under the title "Physiognomical Fragments" (1775 *et seq.*), made him known all over Europe. It was rendered valuable by the many portraits it contained, mostly well executed by some of the engravers of Germany. Lavater had added explanations in a poetical style full of enthusiastic exclamations. As may easily be imagined, a theory so novel found warm admirers whose zeal often rendered it ridiculous. Lavater himself seems later to have given up his theory in a great degree. He published several other works, including poems and works of religious instruction, and his reputation became so great that his journeys resembled triumphs. In 1786 he became pastor of St. Peter's Church in Zürich. The beginning of the French Revolution filled him with pleasure; but the execution of the king produced a violent and permanent revulsion of feeling. Hence, when the revolution appeared in Switzerland, he spoke with boldness against the new order of things, the Swiss Directory, etc., and was finally transported to Basel in the year 1799. He was soon set at liberty, but on the capture of Zürich (Sept. 26, 1799) by Masséna, while occupied in the street assisting the distressed and giving refreshment to exhausted soldiers, he received a shot in his side. He lingered over a year, during which time he wrote a number of interesting works. His death occurred on Jan. 2, 1801.

Laveleye, Emile Louis Victor de (läv-lā), a French political economist; born in Bruges, Belgium, April 5, 1822. He studied at Paris and Ghent, and was appointed to the chair of political economy at Liége in 1864. His works include "Property and Its Early Forms," "Contemporary Socialism," "Elements of Political Economy"; and works on "rural economy" in the Netherlands, and on current topics of the day, such as popular education, luxury, the gold question, etc. He died in Doyon, near Liége, Jan. 3, 1892.

Lavender. a menthoid plant with hoary leaves and grayish-blue flowers; wild in the S. of Europe and in Western Africa. It is cultivated for the sake of the fragrant, volatile oil, combined with a bitter principle, contained in the flowers and used in perfumery. Medicinally they are carminatives, stimulants, tonics, and sternutatories. French lavender is *Lavandula spica*, taken from the S. of Europe to England before 1558. The name French lavender is sometimes given also to *Lavendria stœchas*, which is neither as fragrant as the true lavender nor used medicinally in Europe. But the Hindu doctors prescribe it in chest diseases, and those of Arabia as an antispasmodic. It is a resolvent, deobstruent, and carminative. It yields oil of spike, used by painters on porcelain, and to make varnishes for artists. Sea lavender is the genus *Statice.*

Laver, in Jewish history, a large basin containing water for the priests to wash their hands and feet when they offered sacrifices. It rested on a basis, or foot, and stood between the altar and the door of the tabernacle (Exod. xxx:17-21). In place of the old laver there were, in Solomon's Temple, a molten sea, with 10 bronze lavers, 5 on the N. and 5 on the S. of the court of the priests (1 Kings vii: 23-40).

Laver, a name given to a number of kinds of seaweed which are used as food, especially *Porphyra vulgaris* and *P. laciniata*, of the sub-group *Florideæ*, or red sea-

weeds. These plants grow on rocks and stones in the sea. They consist of a very thin, flat, purple frond, which is not gelatinous. The frond of *P. vulgaris* is wavy and undivided, that of *P. laciniata* (sometimes called sloke) is deeply cleft, and has the segments lobed and cut at the edges. Laver is sometimes stewed and brought to table; also pickled and eaten with pepper, vinegar, and oil, or with lemon juice. It is regarded as useful in scrofulous affections and glandular tumors, a property which it probably owes to the iodine which it contains. Porphyra is the "red laver" of commerce. The name of green laver is given to *Ulva latissima*, of the sub-group *Chlorophyceæ*, or green algæ. It is a common seaweed of the British shores, the frond of which is green, membranous, broad, flat, wavy, and sometimes inflated. It is bitterish, but is often used in the same way as the true laver, and possesses similar properties.

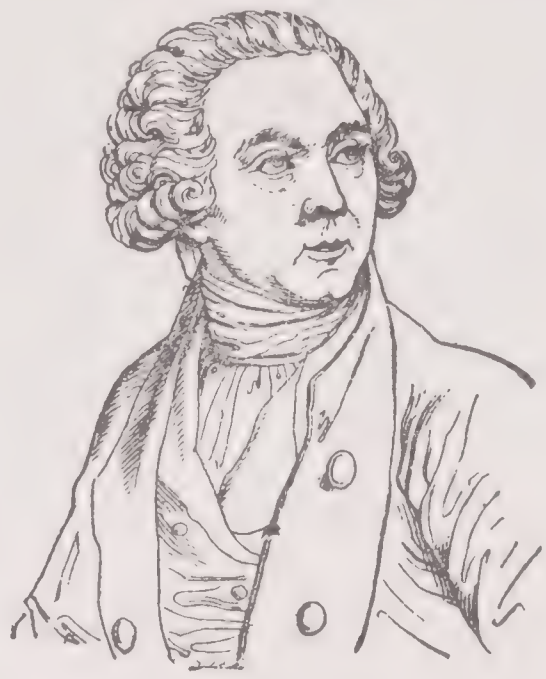
Laverna, among the Romans and Latins, the patron goddess of thieves. A grove on the Via Salaria at Rome was sacred to her. The origin of the name is doubtful.

Lavigerie, Charles Martial Allemand, (lä vēzh-rē′), a French clergyman; born in Bayonne, Oct. 31, 1825. He was made Roman Catholic bishop of Algiers in 1867, and cardinal in 1882. He strove to suppress the slave trade. He died in Algiers, Nov. 26, 1892.

Lavinia, the daughter of Latinus, said by Vergil to have been given in marriage to Æneas after being betrothed to Turnus, which led to the war described by the poet.

Lavisse, Ernest (lä-vēs′), a French historian; born in Nouvion-en-Thiérache, Dec. 17, 1842. His historical researches have chiefly to do with Prussia and the German Empire, as in "The Mark of Brandenburg under the Ascanian Dynasty" (1875); "Studies of the History of Prussia" (1879); "Frederick the Great Before his Accession" (1893); "The Three Emperors of Germany: William I., Frederick III., William II." (1888).

Lavoisier, Antoine Laurent (lä-vwäzyā), a French chemist, one of the founders of modern chemistry; born in Paris, France, Aug. 16, 1743. Starting from the discoveries which the phlogistonists had added to the work of the much-libeled alchemist, he demonstrated experimentally the acidifying action of "dephlogisticated air," or, as he renamed it, "oxygen gas." He was the first to analyze water, and to obtain by synthesis "fixed air," or as he called it, "carbonic acid." He first gave system to chemistry; and not least of his services to science was his part in devising — with Guyton de Morveau — a consistent scheme of chemical nomenclature. Besides papers contributed to the proceedings of learned societies, he wrote an "Elementary Treatise on Chemistry" (1789). He was a farmer-general of taxes, and was guillotined in Paris, May 8, 1794.



LAVOISIER.

Law a term variously defined, according to its application. The laws of nature, as expounded by men of science, are general propositions as to the order in which physical events have occurred, and will probably recur; the moral law, or the law of God, is a body of truth thrown into the form of rules for the guidance of human conduct. But when we speak of law we usually mean to indicate the law which is set and enforced by civilized states. Law, in this sense, derives its sanction, or binding force, from the penalties by which men are constrained to obey it or punished for breaking it. The earliest source of law is custom; the customary rules of a primitive community formed the basis of the civil law at Rome, as they form the basis of the common law in England and the United States. Customary law is rigid and formal; in a progressive society it is relaxed and improved by the use of legal fictions, by the influence of equity, and by legislation. At Rome, for example, the growing commerce of the city compelled the prætor to go beyond the civil law (which was a law for Romans only), and to devise a new law of nations, based on principles of equity, such as all civilized men could understand. When the Romans began to study Greek they identified this law of nations with the law of nature as expounded by the Stoics. The civil law, amended and rationalized by successive prætors and emperors, has furnished most of the nations of modern Europe with the greater part of their legal rules and ideas; even England, while refusing to borrow directly from the *Corpus*

Juris Civilis (body of the civil law), has derived no small part of her law from that source. Scotch law has largely drawn its principles and nomenclature from Roman law.

It is usual to distinguish public law (constitutional and criminal) from private law (which applies to personal status, family relations, property, and contract). Constitutional law is of especial importance in the United States. Canon law is not received, as an entire system, by any modern state; but its rules are followed in defining the powers and functions of ecclesiastical persons. The law of nations, or international law, is also divided into public and private.

Law, George, an American financier; born in Jackson, N. Y., in 1806. Learning the trades of mason and stone-cutter he became a contractor for the construction of railroads and canals; afterward owning a line of steamships to California and Panama, and engaging in other large enterprises, including the Panama railroad. He died in 1881.

Law, John, a Scotch financier; born in Edinburgh, Scotland, April 21, 1671. His father was a goldsmith and banker, and

JOHN LAW.

proprietor of the estate of Lauriston, near Edinburgh. Law early showed a most remarkable talent for arithmetic, algebra, and kindred sciences. At 20 he removed to London, where he found admission into good society, but was soon compelled to flee, in consequence of a duel in which he killed his adversary. He went to Amsterdam, and spent his time in studying the credit operations of the bank. About the year 1700 he returned to Edinburgh, a zealous advocate of a paper currency; but his proposals to the Scotch Parliament on this subject met with an unfavorable reception. He now visited different parts of the Continent, where he won and lost vast sums in gambling and speculation, but sought in vain to win the favor of governments for his financial schemes. At last he settled in Paris, and, in company with his brother William, set up in 1716 a private bank. This was soon so successful and prosperous that the Duke of Orleans, the regent, adopted in 1718 Law's plan of a national bank, and issued prodigious quantities of bank notes, which enjoyed perfect credit, while the ordinary national bonds remained, as they had long been, at a price far below their nominal value. In 1719 Law originated his "Mississippi Scheme" and the following year was made a councilor of State and comptroller-general of finances. When the bubble burst he became an object of popular hatred and found it best to quit France. After wandering here and there he finally settled in Venice, where he spent his last years poor and forgotten, yet to the very end occupied with plans for restoring himself to power and prosperity. He died in Venice, Italy, March 21, 1729.

Law, William, an English divine; born in King's Cliffe, Northamptonshire, England, in 1686. He was educated at Emmanuel College, Cambridge; and lived for the most part a retired life at the house of Mrs. Hester Gibbon, aunt of the celebrated historian to whom he had been tutor. He wrote against Bishop Hoadley, and was also the author of some valuable practical books, as, "A Serious Call to a Devout and Holy Life"; "A Treatise on Christian Perfection," etc. In his latter days he fell into the mystic reveries of Jacob Boehme, whose works he intended to publish. He died in King's Cliffe, April 9, 1761.

Lawfeldt, or **Laveld,** the scene, close to Maestricht, Belgium, of the defeat of the combined Austrian, Dutch, and English forces under the Duke of Cumberland by the French commanded by Marshal Saxe, July 2, 1747.

Law French, the old Norman-French dialect used in all English legal documents and judicial proceedings from the time of William the Conqueror till the reign of Edward III.

Lawless, Emily, an Irish novelist; daughter of the 3d Baron Cloncurry; born in 1845. She was the author of several popular romances of Irish life, full of pathos and picturesqueness, among which may be noticed: "A Millionaire's Cousin," "Hurrish," a study; "Grania," her most powerful work; "Maelcho," a story of the rebellion of Sir James Fitzmaurice in the 16th century. She was also the author of "Ireland," in the "Story of the Nations" series.

Law Merchant, a name often used in law to denote the customs which have grown up among merchants in reference to mer-

cantile documents and business, such as bills of exchange, bills of lading, etc. These customs become incorporated with, and form part of, the common law, and are binding as such.

Lawn, a very fine, white goods, cotton or linen, finer than cambric, of an open texture; plain or printed. The white sleeves, which form a characteristic part of the dress of a bishop in the English Church, are of lawn; hence, by metonymy, the office, dignity, or position of a bishop.

Lawn Tennis. See TENNIS.

Lawrence, a city and one of the county-seats of Essex co., Mass., on both sides of the Merrimac river, and on the Boston and Maine railroad; 26 miles N. W. of Boston. The river at this point has a gradual descent of 26 feet in a distance of half a mile, affording excellent water power. It is dammed by a solid granite wall 900 feet long and 30 feet wide, the water being drawn off through a system of canals and distributed to the various factories. Lawrence is a great cotton and woolen milling center, and has extensive manufactures of foundry and machine shop products, wall paper, stationery, cars, carriages, sewing machines, steam engines, boilers, hardware, belting, hats, boots and shoes and flour. The city has an admirable public school system, public library, court house, waterworks system, numerous public parks, daily and weekly newspapers, electric lights, and electric street railways connecting Andover, Haverhill, Lowell and neighboring towns. The charitable and educational institutions include the City Hospital, Roman Catholic Hospital, Essex County Truant School, and High School. In 1901 there were 5 National banks with $1,025,000 capital, and the assessed property valuation aggregated $39,855,797. Pop. (1890) 44,654; (1900) 62,559; (1910) 85,892.

Lawrence, a city and county-seat of Douglas co., Kan.; on both sides of the Kansas river and on the Atchison, Topeka, and Santa Fé, and the Union Pacific railroads; 40 miles W. of Kansas City. It is the farming trade center for Douglas and parts of two other counties; and is principally engaged in manufacturing, which is greatly promoted by the excellent water power furnished by the river. It is the seat of the Kansas State University, Haskell Institute, and Indian Industrial School; contains a hospital, public library, and several public parks; and has flour and paper mills, barbed-wire, ice, shirt, sash and door factories, and foundry and machine shops. There are electric light plants, waterworks, several National and State banks, daily, weekly and monthly periodicals, and an assessed property valuation of over $1,000,000. The city was settled by an anti-slavery colony from the East in 1854 and during the Civil War was almost entirely destroyed by Confederate raiders. Pop. (1900) 10,862; (1910) 12,374. See KANSAS.

Lawrence, a martyr of the early Church, the subject of an elaborate hymn by Prudentius. According to the legendary account he was born at Huesca in Spain, and became a deacon of Rome in the pontificate of Sixtus I. (3d century). In the persecution of Valerian, being summoned before the prætor as a Christian, and being called on to deliver up the treasures of the church, he produced the poor and the sick, who were his special charge; and on his persisting in his refusal to sacrifice, he was condemned to be broiled on a gridiron. The martyrdom is unquestionably historical, its probable date 258. His day is Aug. 10. The Escorial is dedicated to him.

Lawrence, St., River. See ST. LAWRENCE RIVER.

Lawrence, St., Gulf of. See ST. LAWRENCE GULF.

Lawrence, Abbott, an American diplomatist; born in Groton, Mass., Dec. 16, 1792; conducted a cotton industry in Lowell, Mass., with his brother; was a commissioner in 1842 to settle the Northeastern Boundary question and arranged a basis for settlement with Lord Ashburton which was satisfactory to both the United States and England; was minister to Great Britain in 1849–1852; founded the Lawrence Scientific School of Harvard University, to which he gave $100,000. He died in Boston, Mass., August 18, 1855.

Lawrence, James, an American naval officer; born in Burlington, N. J., Oct. 1, 1781; entered the American navy as a midshipman, 1797; was with Decatur as his 1st lieutenant in the engagement against Tripoli. While in the Mediterranean he was promoted, and rose to the command successively of the "Vixen," "Wasp," "Argus," and "Hornet." While cruising with the latter off Delaware, Feb. 24, 1813, he met the British vessel "Peacock," which he captured after a brilliant engagement of only 15 minutes. On his arrival in the United States he was received with acclamation in consequence of this dashing success, and was made post captain and given command of the frigate "Chesapeake." He was preparing for sea, with his vessel in the roads of Boston, when the British frigate, the "Shannon," Captain Broke, appeared off the harbor and challenged the "Chesapeake," which Lawrence, though his ship was in an incomplete condition as to crew, armament and stores, resolved to accept. He accordingly put to sea as morning broke, June 1, 1813. The "Shannon" bore away at his approach, but the "Chesapeake" hauling to and firing a gun,

the enemy followed suit and the action began. At almost the first fire Lawrence was severely wounded in the leg. Nothing daunted the brave commander continued the engagement, which was soon brought to close quarters. Lawrence now received a mortal wound in the abdomen, and as he was carried below, in the hottest of the struggle, he cried out these immortal words, "Don't give up the ship." The battle, however, did not last long. Captain Broke grappled with the "Chespeake," and boarding, overpowered her. The struggle lasted 11 minutes. Captain Lawrence lingered four days in extreme suffering, and died on the "Chesapeake," at Halifax, June 5, 1813, and was buried with military honors in Halifax by the British. His uniform coat, chapeau, and sword are now in possession of the New Jersey Historical Society.

Lawrence, John Laird Mair, Lord, a British administrator; born in Yorkshire, England, March 4, 1811. Educated at the college of Haileybury, he went to India in 1829, where his rare administrative ability attracted attention and caused him to receive the appointment of chief commissioner of the Punjab in 1853, after he had served in minor posts. The entire wisdom of this appointment was demonstrated during the Indian Mutiny of 1857. By the influence which he had gained over the Sikhs, Lawrence was able not only to keep the Punjab quiet, but to collect native forces and send them to assist in the early capture of Delhi. He was known as the savior of India, and his services were rewarded by his being made governor-general in 1863. On his return to England in 1868 he was raised to the peerage under the title of Baron Lawrence of the Punjab and of Grately. He died in London, June 26, 1879.

Lawrence, Sir Thomas, an English portrait painter; born in Bristol, England, May 4, 1769. At the age of 18 he entered as a student of the Royal Academy, having a little while previously taken to painting in oil. In 1791 he was elected associate, and in 1798 full member. After Reynolds' death he was appointed limner to the king in 1792, and was knighted in 1815; and on Benjamin West's death in 1820 he succeeded him as president of the Royal Academy. Lawrence was the favorite portrait painter of his time, had an immense practice, and obtained higher prices perhaps than were paid to any previous portrait painter. His talent was overrated during his lifetime; his work, in spite of the elegance and taste that often distinguish it, scarcely rises above the conventional level. He died in London, Jan. 7, 1830.

Lawrence, Sir William, an English surgeon and anatomist; born in Circencester, England, July 16, 1783. He was Professor of Anatomy and Surgery at the College of Surgeons in 1815, and was made the successor of Abernethy at St. Bartholomew's Hospital, as lecturer on surgery. He published, among other works, his "Lectures on the Physiology, Zoölogy and Natural History of Man," and was refused the protection of the author's rights in them by the courts, because they were believed to be in contradiction to the Bible. He died in London, July 5, 1867.

Lawrence, William Beach, an American jurist; born in New York city, Oct. 23, 1800; was graduated at Columbia College in 1818; admitted to the bar in 1823 and practised in New York, where he attained eminence; settled in Newport, R. I., in 1850; elected lieutenant-governor of Rhode Island in 1851, and soon after became acting governor. He gained a reputation by his connection with the "Circassian case" in 1873 before the American and British International Court in Washington, D. C. His arguments won the case for his clients and led to the only reversal of a decision by the United States Supreme Court that had ever occurred. He was the author of "Address to the Academy of Fine Arts" (1825); "Bank of the United States" (1831); "History of the Negotiations in Reference to the Eastern and Northeastern Boundaries of the United States" (1841); "Belligerent and Sovereign Rights as regards Neutrals During the War of Secession" (1873); etc. He died in New York city, March 26, 1881.

Lawrence, The, Perry's flagship in the battle of Lake Erie.

Lawrie, Todd. See THORBURN, GRANT.

Lawrence University, a coeducational institution in Appleton, Wis.; founded in 1847 under the auspices of the Methodist Episcopal Church; has endowment funds exceeding $630,000; grounds and buildings valued at over $356,000; volumes in the library, about 26,000; scientific apparatus, etc., $68,000; ordinary annual income, $75,000; average number of faculty, 40; average student attendance, 650; number of graduates, over 800.

Lawson, Cecil, an English portrait painter; born in 1851. He exhibited at the Academy in 1870, but remained obscure, many of his portraits being rejected by the Academy, till 1878, when his "Minister's Garden" and a "Pastoral" at the Grosvenor made him famous. The short remainder of his life was a brilliant success. He died in 1882.

Lawsonia, a genus of *Lythraceæ*, tribe *Lythreæ*. *Lawsonia alba* is a small, elegant, and sweetly-scented bush. There are two varieties, *L. spinosa* and *L. inermis*, the

first spiny and the other smooth. It is wild in Baluchistan, on the Coromandel Coast, and perhaps in Central India, but is cultivated throughout India, and furnishes henna. The seeds yield an oil. The flowers are used in perfuming and embalming, and a fragrant otto is distilled from them in Lucknow and Benares. The wood is gray, hard, and close-grained. A decoction of the leaves is used by Hindu doctors to purify the blood, and as an astringent, and in the cure of ulcers, skin diseases, leprosy, etc.

Lawson's Cypress (*Cupressus Lawsoniana*), a species of cypress found in the valley of Northern California, where it grows to the height of 100 feet. It was introduced into Great Britain in 1852, and has become a favorite in ornamental grounds. The branches are numerous and are drooping, slender, and regularly disposed, forming a symmetrical columnar mass of rich green spray.

Lawton, Henry Ware, an American military officer; born in Manhattan, O., March 17, 1843; entered the military service as a private, April 16, 1861; became a sergeant of Company E, 9th Indiana Infantry, April 18, 1861; 1st lieutenant of the 30th Indiana Infantry, Aug. 20, 1861; captain, May 17, 1862; lieutenant-colonel, Feb. 15, 1865; mustered out Nov. 25, 1865; entered the regular army as 2d lieutenant in 41st Indiana Infantry, July 28, 1866; transferred to the 4th U. S. Cavalry in January, 1871; promoted to captain, March 20, 1879. In 1876 he was conspicuous in the expedition against the hostile Sioux, sharing every privation and going into dangers into which he would not send one of his soldiers. He took part against the Ute Indians in Colorado, in October, 1879, reliquishing his command to join the expedition. In the spring of 1886 he was selected by General Miles to lead a picked body of troops into Mexico in pursuit of the murderous Geronimo. For three months he led his little command in pursuit of the savages from one range of mountains to another, sometimes scaling peaks 9,000 to 10,000 feet above the sea level, and then descending into the depths of the cañons where the heat was almost intolerable. During this time Lawton and his command marched 1,396 miles. The country was mostly parched and barren desert. Saltless mule meat and sometimes little of that, was their staple ration. But Lawton and his men were undaunted, and kept up the chase till Geronimo and his band were captured. At the beginning of the American-Spanish War Lawton was a lieutenant-colonel and was made a Major-General of volunteers, July 8, 1898. He was in command of the 2d Division of the 5th Army Corps before Santiago, and was in the thick of the fighting preceding the capture of San Juan Hill and will go down in history as the "hero of El Caney." At the close of the war with Spain General Lawton was transferred to the Philippines where he began active operations against the insurgents; captured Santa Cruza, a Filipino stronghold, April 10, 1899, and San Isidro, May 15; was placed in command of Manila, June 1, and early in the fall began an offensive campaign looking toward the capture of Aguinaldo; arrived at Arayat Oct. 19, and made Cabanatuan his headquarters. On Dec. 19, he was on the firing lines at San Mateo, where owing to his tall figure and brilliant uniform he was easily picked out by insurgent sharpshooters. He had scarcely been warned of his danger when he cried, "I am shot," and fell dead.

Lawton, William Cranston, an American educator; born in New Bedford, Mass., May 22, 1853; was graduated at Harvard in 1873; studied in Europe from 1880 to 1883; was a classical teacher in New Bedford and Boston for several years; and subsequently a professor at Bryn Mawr college and Adelphi College. Besides contributions to periodicals, he published: "Three Dramas of Euripides"; "Folia Dispersa," a volume of verse; "Art and Humanity in Homer"; "Successors of Homer," etc.

Lawton, a city and county-seat of one of three counties formed from the Comanche reservation and added to Oklahoma, Aug. 6, 1901. By the day set for opening the town site to settlers, 25,000 people were encamped close to the town limits, forming a tent frontage of 8 miles. The city is named for Gen. Henry W. Lawton, killed in the Philippines. The entire tract added to Oklahoma is larger than the State of Connecticut and contained within three months from the opening about 50,000 inhabitants. The other county-seats are Anadarko and Hobart. Pop. (1910) 7,788.

Laxist, a school of theologians in the Roman Church, who held that even slightly probable opinions might be followed. They were condemned by Pope Innocent XII., and no longer exist as an avowed school; but their teaching is still maintained to some extent by the Equiprobabilists and Moderate Probabilists.

Lay, John Louis, an American inventor; born in Buffalo, N. Y., Jan. 14, 1832; served in the Civil War; distinguished himself in July, 1862, by going with the expedition against the Confederate ram "Albemarle," which was destroyed by a torpedo of his invention; promoted first assistant engineer in October, 1863. Later he conceived the idea of a moving submarine torpedo. In 1867 he designed the weapon

named after him and subsequently sold it to the government. He died in New York city, April 17, 1899.

Layard, Sir Austin Henry, an English archæologist; born in Paris, France, March 5, 1817. He came of a family originally French, and was partly educated in Italy. In 1839 and following years he traveled in the East, and in 1845 began his celebrated excavations on the site of ancient Nineveh, publishing the results of his discoveries in 1849–1853. He was appointed attaché to the British embassy at Constantinople in 1849. In 1852 he entered Parliament in the Liberal interest; became under-secretary for foreign affairs in 1860, commissioner of works in 1869, and ambassador to the Porte in 1877 under Lord Beaconsfield's government, when he accomplished the annexation of Cyprus. He is best known by his books: "Nineveh and its Remains" (1849), and "Discoveries in the Ruins of Nineveh and Babylon" (1853). He died in London, England, July 5, 1894.

Lay Brother, or **Lay Sister,** a person who takes the habits and vows of religion, but is employed mostly in manual labor, and is therefore exempt from the duties of the choir, where such exist, or from the studies, etc., incumbent on the other members of religious orders where there is no choir. The first instance on record of lay brothers occurred in the monastery of Vallombrosa, in the earlier part of the 11th century. Lay brothers and lay sisters are now universal, or nearly so; and are found in the sisterhoods of the Anglican obedience.

Lay Clerk. See Lay Vicar.

Lay Communion, an almost obsolete expression, frequent in the early Church to describe the state to which a cleric was reduced by forfeiting the right to exercise his functions without being excommunicated and losing the ordinary privileges of a Christian. In the Roman Church a cleric in minor orders is reduced to lay communion by marriage; and a priest dispensed by the Pope from his obligation — wearing the clerical dress, reciting the breviary, and observing celibacy — is usually prohibited from exercising sacerdotal functions.

Lay Figure, a jointed human figure used by painters, made of wood or cork, which can be placed in any attitude, and serves when clothed as a model for draperies, etc.

Laying, or **Layering,** a mode of propagating trees, shrubs, and perennial herbaceous plants employed by gardeners and nurserymen. It consists in bending and fastening a branch so that a portion of it is imbedded in earth, there to throw out roots, the extremity being made to grow erect in order to form a new plant. The separation from the parent plant is not effected till the layer is sufficiently provided with roots. Any injury which prevents the free return of the sap greatly promotes the formation of roots, and a notch is therefore usually made in the under side of the branch at the place where the formation of roots is desired; it is also often a little split up from the notch; and sometimes a ring of bark is cut off, or a wire is twisted round it. The time which must elapse before the layer should be separated from the parent plant is very various; a few weeks being sufficient for some, and two years requisite for others. Many plants which cannot readily be propagated by cuttings are most easily and successfully propagated by layers.

Laynez, Jacobo (lī-neth'), a Spanish Jesuit; born in Castile in 1512. He was educated at the University of Alcala, and from there went to Paris, where he made the acquaintance of Ignatius Loyola. Laynez was ordained priest in Venice, 1537, and while there he and Loyola formed the project of establishing the Society of Jesus. After the order had been confirmed by Paul III. (1540), and Loyola, at the request of Laynez, had been appointed the first general, he made many journeys for the purpose of extending the society of the Jesuits, and in 1558 he succeeded Loyola as general of the order. He died in Rome, Jan. 19, 1565.

Lay Reader, in the Anglican Church, is a layman who receives authority to read the lessons or a part of the service. The incumbent can permit any one to read the lessons, but for authority to read the morning or evening prayer a license from the bishop of the diocese is required. The absolution, of course, cannot be read by a lay reader, or any part of the communion service, but he may receive permission, especially in connection with missions, to preach, or to read the sermons of others. Readers have existed as an order in the church from at least the 3d century; in the Greek Church they constitute the first, in the Latin Church the second of the minor orders that lead to the priesthood. (The office was anciently a favorite one with well born youth. Julian, afterward the Apostate, was in his younger years a reader in the church of Nicomedia.) Their duty at first was only to read (and perhaps to interpret) the lessons; afterward they were often employed also as bishops' secretaries, and had some other functions assigned to them. The appointment of readers in the Anglican Church received the sanction of the bishops in 1866; but they were not to be ordained.

Lay Vicar, one of the officers of a cathedral whose duty it is to sing that portion of the music of the services which can be performed by laymen or men in minor orders. In some of the old cathedrals they formed a corporation, often jointly with the priest vicars. In many cathedrals vicars

choral were formerly in priest's orders. With certain exceptions, in the new cathedrals lay vicars are not in holy orders and are merely stipendiary singers.

Lazareff, Port, a fine natural harbor, 40 to 60 feet deep, and 8 square miles in extent, in Broughton Bay on the E. side of Korea. It is 390 miles from Vladivostok to the N. and 480 from Port Hamilton to the S., and is free from ice in winter.

Lazaret, or **Lazaretto,** a name given in Italy, and other parts of Southern Europe, to certain public buildings for the reception of the poor, and such as are afflicted with contagious disorders. The name is derived from St. Lazarus, who is the patron saint of lepers; and during the Middle Ages, when leprosy was common in Italy and other parts, the hospitals in which the lepers were confined received that name, and the lepers themselves were called *lazzari.* Howard wrote "An Account of the Principal Lazarettos in Europe" (1789). Those buildings and inclosures attaching to seaport towns chiefly on the Mediterranean, where the crews and passengers of ships from places where contagious disease is known to prevail, are also called lazarettos. These lazarettos consist generally of various detached buildings, with courts between, the whole being surrounded by a wall, and placed in an airy situation outside the town, or sometimes on a small island near the coast.

Lazarists, or **Lazarites,** a name for the "Congregation of Priests of the Mission," founded by St. Vincent de Paul, in March, 1624, and established a few years later in the College of St. Lazare at Paris, whence their name. The Congregation (confirmed by Urban VIII. in 1632) had a threefold purpose: the sanctification of its own members, the work of the missions, and the training of an exemplary clergy. They were expelled from France in 1792; allowed to return under Napoleon I.; and, under the Restoration, a house was assigned them in the Rue de Sévres. The missions in China and the Levant, left vacant by the suppression of the Jesuits in 1773, were transferred to the Lazarists. They have one house in England, one in Scotland, and five houses in Ireland, where they are usually known as Vincentians, from their founder.

Lazarus, Emma (laz'a-rus), a Hebrew-American poet; born in New York city, July 22, 1849. She labored diligently in behalf of her race and devoted her pen largely to Hebrew subjects, publishing a much discussed article in the "Century" on "Russian Christianity versus Modern Judaism." Her first volume was composed of "Poems and Translations" (1866), written between the age of 14 and 17. This was followed by "Admetus" (1871); "Alide: an Episode of Goethe's Life" (1874); "Songs of a Semite" (1882), all of which are marked by naturalness of sentiment, vivid effect, and artistic reserve of expression. She died in New York city, Nov. 19, 1887.

Lazulite, blue-spar, a phosphate of aluminium, magnesium, and iron, a mineral of a light or indigo-blue color, crystallizing in oblique four-sided prisms.

Lazzari, Donato. See BRAMANTE D' URBINO.

Lazzaroni, till lately a special class of the inhabitants of Naples. They had no fixed habitations, regular occupation, or secure means of subsistence, but occasionally obtained employment as messengers, porters, boatmen, itinerant venders of food, etc. They performed an important part in all the revolutions and movements in Naples, and were wont annually to elect a chief (*Capo Lazzaro*), who was formally recognized by the government.

Le. See LEH.

Lea, Henry Charles, an American publisher and historian; born in Philadelphia, Pa., Sept. 19, 1825; entered his father's publishing house in 1843; became the principal in 1865; and retired from business in 1880. Between 1840 and 1860 he wrote many papers on chemistry and conchology. After 1857 he devoted his attention to European mediæval history, his chief works being: "Superstition and Force" (1866); "An Historical Sketch of Sacerdotal Celibacy" (1867); "History of the Inquisition of the Middle Ages" (1888); "Formulary of the Papal Penitentiary" (1893); "A History of Auricular Confession and Indulgences" (1896); "The Moriscos of Spain"; etc. He died Oct. 24, 1909.

Leach, a vat or chamber in which a body is placed, in order that its soluble portions may be removed by soaking and infiltration. It is a filtering operation in which the liquid removes the soluble matter from the material through which it flows. A familiar instance is the ash-leach. In the bark-leach, the bark is contained between two perforated horizontal partitions in the leach, the lower one having a coiled steam pipe for heating the contents. The menstruum may be forced through the bark in either direction by means of pipes furnished with valves to determine the said current.

Lead (Greek, *molybdos;* Latin, *plumbum,* whence the chemical symbol Pb). This metal was well known to the ancients. Several lead mines in Great Britain were worked by the Romans, with whom the leaden waterpipes were common. Lead is an abundant and widely distributed metal. It is a constituent of a very large number of minerals, but in practice the metal is obtained from only a few of these, especially from the sulphide and carbonate.

Physical Properties.— Lead is soft and

Lead

ductile, but has very little tenacity. It is malleable and can be rolled into thin sheets (lead foil), and though it is ductile owing to its low tensile strength it cannot be easily drawn into fine wire. Like all ductile metals it flows freely under pressure and at a slightly elevated temperature so readily that it can be squeezed or squirted into the form of rod or pipe. It can be readily cut, can be scratched with the nail, and marks paper. Under ordinary circumstances, for example in rolled sheets, it is not sonorous, but a cast mass which is more or less crystalline, rings when it is struck. It melts at about 326° C. (619° F.) and volatilizes at a bright red heat so that there is considerable loss in all furnace operations where it is exposed to high temperatures. It is a poor conductor of heat and electricity. Lead is bluish gray in color and a freshly cut surface shows a brilliant luster, which, however, becomes dull very rapidly.

Chemical Properties.— Lead is not much acted on by air either wet or dry at ordinary temperatures, the bright luster of a clean surface soon disappears but oxidation goes no further. In presence of carbon dioxide a superficial film of a white carbonate may be formed, but under ordinary atmospheric conditions the action is very slight. Under suitable conditions, however, the action may be complete and the whole of the lead converted into a basic carbonate. Water containing carbonic acid has a slight action on lead, carbonate being formed and dissolved, but this action is apparently hindered by the presence of some salts and accelerated by others, especially nitrates or chlorides. Pure water corrodes lead pipes more rapidly than that which contains such salts in solution.

When lead is heated to redness in air it is oxidized, litharge (PbO) being formed. A thin iridescent film first forms over the surface of the metal, then a skin of litharge which may remain solid or melt according to the temperature, and if this film be removed so as to expose a fresh surface of metal, the whole may be oxidized. Lead is attacked by nitric acid and by hot strong sulphuric acid, but dilute sulphuric or hydrochloric acids have but little action. It is therefore largely used for the construction of sulphuric acid chambers and chemical works plants. At high temperatures it combines readily with sulphur and many other elements, and alloys readily with many metals, though with zinc, copper, or iron it does not form homogeneous alloys.

Lead Oxides.— Five oxides of lead are known, namely, the suboxide (Pb_2O), the monoxide (PbO), the sesquioxide (Pb_2O_3), the red oxide (Pb_3O_4), and the dioxide (PbO_2); and others may exist. Of these, however, only three — the monoxide, the red oxide, and the dioxide — are of any importance.

Lead Monoxide (*Protoxide*), PbO, *Litharge, Massicot.*— This oxide is largely used in the arts, and is made by heating molten lead in a shallow reverberatory furnace with free access of air, the litharge as it forms being pushed on one side so as to expose a fresh surface of the metal. The mass thus obtained is ground and separated from intermixed lead. It is then the buff-colored powder known as ground litharge or massicot. When the oxidation takes place above the melting point of the oxide, as in cupellation, the litharge on solidification breaks up into orange-colored scales and is then known as "flake litharge." Litharge melts at about 600° C. to a clear liquid and at higher temperatures volatilizes. It is slightly soluble in water, giving it an alkaline reaction.

Lead oxide is a powerful base. It dissolves in acids forming salts. At high temperatures it combines readily with silica, forming fusible silicates, and therefore has a very corrosive action on crucibles or fire bricks which contain silica. Under some conditions it combines with bases, apparently acting as an acid oxide; thus it forms fusible compounds with oxide of iron and other metallic oxides.

Red Oxide (Pb_3O_4).— When litharge is heated to dull redness with free access of air, oxygen is taken up and the red oxide (red lead) is formed. It is manufactured by this process on a large scale. The ground litharge is roasted with free access of air for about 24 hours; it becomes dark purple and on cooling bright red. The operation is carried on till the required tint is obtained. On heating to a bright red color red lead loses oxygen and forms litharge. It is used as a pigment, owing to the ease with which it parts with its oxygen it is a powerful oxidizing agent. It is decomposed by acids, except acetic, which dissolves it, forming a strongly oxidizing solution.

Lead Dioxide (brown or puce colored oxide, PbO_2).—When red lead is dissolved in nitrate acid, lead nitrate is formed, and this oxide is left as a brown powder. This is a powerful oxidizing agent, and is used in the manufacture of matches and for other purposes. On heating, it loses oxygen and forms litharge.

All the lead oxides are easily reduced by carbon or some other reducing agent at a very moderate temperature. Lead only forms one series of salts, that derived from the monoxide.

Lead Chloride ($PbCl_2$).—This is a white crystalline solid which is soluble in hot water but much less so in cold, so that a hot solution on cooling deposits crystals. When it is fused in presence of air it takes up oxygen and loses chlorine, forming oxychlorides, one of which is used as a yellow pigment under the name of Turner's yellow (Pb_2OCl_2). Lead bromide and lead iodide

Lead

are similar. The former is yellowish and the latter golden yellow in color. They resemble the chloride in their solubility in water, and on cooling a hot solution of the iodide brilliant golden yellow crystals (mosaic gold) fall.

Lead Sulphide.— When lead and sulphur are fused together a gray crystalline sulphide (PbS) is produced, and the same body is obtained as a black precipitate when hydrogen sulphide is passed through a solution of a lead salt. Lead sulphide is insoluble in dilute acids, but dissolves in hot strong hydrochloric acid and in hot dilute nitric acid, but hot strong nitric acid oxidizes it to sulphate It melts at a red heat, forming a very fluid liquid which has a great power of penetrating clay crucibles, and it is said to volatilize uncharged. Heated with free access of air, sulphate and oxide are formed, sulphur dioxide being evolved, and these may react on unchanged sulphide, liberating metallic lead. Lead sulphide is not reduced by carbon, but iron and potassium cyanide separate the lead completely from the molten mass. Molten lead sulphide combines very readily with other sulphides, forming very fusible double sulphides, many of which are difficult to reduce. The same tendency is shown when the salt is precipitated in presence of excess of hydrochloric acid, a red chlorosulphide (Pb_2SCl_2) being thrown down.

Lead Carbonate ($PbCO_3$).— When sodium carbonate is added to a solution of a lead salt, a white precipitate of a basic carbonate is thrown down. White lead is a basic carbonate, $2PbCO_3Pb(OH)_2$ though the composition varies somewhat, which is largely used as a base in paints.

Many other salts are known but are of little importance They include the nitrate, $Pb(NO_3)_2$; the sulphate, $PbSO_4$, one of the few insoluble sulphates, prepared by adding sulphuric acid or any soluble sulphate to the solution of a lead salt; the phosphate, $Pb_3(PO_4)_2$; the chromate, $PbCrO_4$, used as a pigment under its name of chrome yellow; the acetate, $Pb(C_2H_3O_2)_2 3H_2O$, or sugar of lead, so called from its sweetish astringent taste. Nearly all the lead salts are soluble in water or acids, the sulphate and chromate being the most important of the insoluble salts and serving to detect the presence of the metal. All lead compounds are decomposed when heated on charcoal before the blowpipe, a malleable bead of lead being left, with an incrustation of litharge on the charcoal, and they impart a pale blue color to the Bunsen flame. All soluble lead salts are very poisonous.

Lead Minerals.— Lead compounds are fairly abundant in nature, and a large number of lead minerals are known, but only one or two are of importance. The great tendency of the metal to form double salts is well shown by the large number of double minerals that have been found. Essentially, the lead minerals are of two classes: (1) Sulphides, very frequently with the sulphides of other metals, forming more or less complex double or triple sulphides. (2) Oxysalts — oxides, and salts containing oxygen — with which may be included the chloride and similar bodies. The former seem in most cases to be the normal compounds existing in the mineral veins, the latter being formed by surface oxidation and therefore only occurring at the outcrop of the veins and in surface deposits. In the case of chlorides, sea water or salt in the air may have had an influence.

Galena (PbS) belongs to the former class. This is the most important and most widely distributed lead mineral, and is the source of nearly all the lead of commerce. It has a lead-gray color, and a bright metallic luster, on account of which it is often called lead glance, but is frequently tarnished on the surface. It occurs in masses which may vary from finely granular to largely crystalline. The crystals belong to the cubic system and are usually cubes. The crystals have a very perfect cleavage parallel to the faces of the cube, so that when the mineral is broken up the fragments are more or less cubic. Its specific gravity is about 7.5, and it contains 86.6 per cent. of lead. Galena always contains silver, the amount varying from a mere trace up to hundreds of ounces to the ton, and the rich argentiferous galenas of the Western States of America yield a considerable proportion of the silver of the world.

Galena is the only sulphide of lead, but double sulphides or sulpho-salts of lead and arsenic and antimony occur, often containing copper and other metals. These minerals are gray in color, usually with a metallic luster, more or less resembling galena. They are of little importance commercially, as the metals present spoil the lead and are very difficult to remove. Sometimes these minerals carry silver enough to be worth smelting.

Lead Ores.— The ores smelted for lead are almost always composed mainly of galena, the other minerals being mostly surface products and therefore only occurring in small quantity. Lead ores are very widely distributed over the world, occurring in almost all countries. Great Britain has yielded a large quantity of lead from Derbyshire, Northumberland, Shropshire, North Wales, South Wales, Cornwall, the Leadhills (Lanarkshire); and Ireland has considerable deposits. The large proportion of the lead of commerce comes from Spain, the United States, and Australia, the ores of the two last named

being rich in silver. Lead ores occur mainly on two geological horizons — the carboniferous limestone, as in Derbyshire, parts of the United States, and many other places; and the Silurian, also often, though not always, in limestones. The associated minerals are usually calcite, quartz, barytes, fluorspar, siderite, zinc blende, and iron pyrites.

Ore Dressing.— As galena is very heavy, it can be easily separated from most of the lighter minerals with which it is associated, and as these would interfere with the smelting, dressing is almost always resorted to. The heavier minerals, such as barytes, pyrites, and blende, are not so easily or completely separated, and even the separation of the lighter ones will depend on how intimately they are mixed with the ore, since very fine crushing is objectionable. In Great Britain the ore is crushed to pass through about a half-inch sieve, and is dressed to contain over 76 per cent. of lead. In other countries the concentration is not so high and sometimes no dressing is resorted to. This is specially the case in districts where the blast furnace is used for smelting, since finely divided material is unsuited for the blast furnace.

Smelting.— The processes of lead smelting — galena being the ore — which have grown up in various parts of the world are strikingly similar in principle, though differing much in detail. Essentially there are two processes: (1) the air reduction, and (2) the iron reduction process.

The Air Reduction Process.— This derives its name from the fact that no reducing agents are used, the reactions being brought about by the air. When galena is roasted with free access of air it is oxidized to oxide and sulphate. Thus, (1) $PbS + 3O = PbO + SO_2$, and (2) $PbS + 4O = PbSO_4$. When either of these is heated with lead sulphide mutual decomposition takes place, and lead is separated. Thus, (3) $2PbO + PbS = 3Pb + SO_2$, and (4) $PbSO_4 + PbS = 2Pb + 2SO_2$. The process therefore is very simple. The charge is roasted till enough of the sulphide is converted into oxide, then the whole is melted down, and any oxide that remains is reduced by coal or charcoal. The process is only applicable to pure ores. If antimony sulphide or double sulphides be present, these render the charge so fusible that it softens and clots before it is sufficiently oxidized; and if much silica be present, it combines with the oxide of lead as soon as it is formed, forming lead silicate ($2PbO.\ SiO_2$), and as this is not reduced by carbon at a moderate temperature, a large quantity of lead is carried into the slags.

The Iron Reduction Process.— This depends on the reduction of galena by iron at high temperatures: thus, $PbS + Fe = FeS + Pb$. The iron is supplied either in the form of scrap-iron or of oxide of iron and charcoal, the latter being preferable, as the excess of oxide of iron fluxes away the silica. Oxide ores, such as the carbonate, are readily reduced by carbon alone: $2PbCO_3 + C = 2Pb + CO_2$; but the sulphate cannot be so treated, as it is reduced to sulphide: $PbSO_4 + C = PbS + 2CO_2$, so that with it iron must be used.

One or two typical processes will be described as examples.

The Flintshire Process.— This process grew up in Flintshire, and is still in use in many localities. The ores used are fairly pure, containing but little silica, the gangue being mainly carbonate of lime, and free from antimony and similar sulphides. The furnace used is a reverberatory, provided with three working doors on each side, the hearth being made to slope from all directions to a well under the middle door on one side, where a tap-hole is made, communicating with a pot outside. A ton (21 hundredweights) of the ore in a fine state of division is let down on to the hearth through a hopper in the roof, spread evenly, and the doors are closed. As soon as the charge is hot and has ceased to decrepitate, the doors are opened so as to allow free access of air, and the charge is roasted for some hours with constant turning so as to expose fresh surfaces to the air. Reactions (1) and (2), explained above, take place, and, after a time (3) and (4), and lead begins to trickle out. The fire is now made up, the doors are closed, and the charge is melted down. The molten charge separates into two layers—lead below, and a slag containing fused galena, lead silicate, etc., above. The doors are opened, and this, cooling the surface, tends to make the slags pasty, and this is facilitated by the stirring in of a little lime. The pasty slags are spread on the hearth and again roasted, whereby further oxidation takes place and more lead separates. The charge is again melted down, the slag is again thickened with lime, and is raked out of the furnace while the metal is tapped into the pot. The products are lead, ready for softening and desilverizing, and gray slag, a mixture of unchanged galena, lead silicate, and lime, which often contains 30 per cent. of lead, and therefore must be further treated. Twenty-one hundredweights of ore containing 80 per cent. of lead will yield about 14 hundredweights of lead, and the working of a charge takes six to eight hours. This process is costly in time and fuel, and can only be used with very pure ores.

The Hearth Process.— This process, used in the North of England and in Scotland, is based on exactly the same principles as the Flintshire process, but the furnace

Lead

used and the details of manipulation are very different. The furnace is a small hearth, made of an iron dish about 24 inches by 22 inches, and 6 inches deep, which is surrounded on three sides by iron blocks about 16 inches high, and is covered with a flue. In front of the open side is a sloping plate, and in front or beside this, a pot to receive the lead. Air is supplied by one tuyere at the back. A fire is lighted, and when it is burnt up ore and coal are added. The air supply is large, so that the atmosphere is oxidizing, and the reactions take place exactly as in the Flintshire process. Lead is reduced, and when the hearth is full flows over into the lead pot. The hot charge above the reduced lead is drawn out into the work plate, any hard lumps of slag are picked out and thrown into water, more ore and coal are thrown into the hearth, and the residue on the work plate is sprinkled with lime and returned to the hearth. A portion of the charge is drawn out every four minutes, so that the labor is very heavy. At the Leadhills the men work six-hour shifts, two men to each hearth, and each hearth yields about one ton of lead per shift. The gray slag is much the same in character as that obtained in the Flintshire process, except that it is black and contains a large quantity of carbon, and the cooling in water breaks it up.

The Slag Hearth.— The gray slag obtained by the air reduction process is rich in lead, and needs further treatment. It is reduced in a small blast furnace in which a higher temperature can be attained than is possible in the ordinary furnaces, and lime is kept in excess so as to form a lime silicate slag — so that the lead silicate is reduced and any unaltered galena is oxidized and reduced. As a rule the slag hearth is only run for a few months each year, as enough slag accumulates for a campaign. The products are slag which is thrown away, and a hard impure lead generally called slag lead.

Blast Furnace Smelting.— The blast furnace is always preferable to the reverberatory where it can be used, and many attempts were made to use the blast furnace for lead smelting, but these were not attended with success, as the lead oxide rapidly corroded and destroyed the masonry. Some small furnaces were lined with iron, but this was rapidly destroyed by the hot sulphide. These difficulties were overcome by the introduction of the water-jacket blast furnace, which has now become almost universal for lead smelting.

The upper part of the furnace, where the temperature is low, is built as usual of brick, but the lower portion is made of an iron casing, through which water is constantly kept in circulation. This keeps the iron cool, and a layer of slag, which is constantly being melted away and constantly replaced, protects the iron from corrosion. The lead is either tapped as usual or allowed to flow into a pot when the hearth is full, and the slag and regulus flow away continuously over the slag notch into deep molds, so that any entangled lead separates before solidification.

As finely divided ore is not suitable for treatment in the blast furnace the dressing must either be omitted or the ore must be clotted by fusion, with or without partial separation of the lead in a reverberatory furnace. The furnaces used are of comparatively small size; they are sometimes circular, with a diameter of 5 or 6 feet, or rectangular, about 10 feet long and 5 feet wide, and about 20 feet high up to the top of the charge, the water jacket extending about 3 feet 6 inches to 4 feet above the top of the hearth in which the metal accumulates. They are provided with from 4 to 12 tuyeres, and the air is supplied at a pressure of from 2 to 3 pounds on the square inch.

The charge will of course vary with the nature of its ore. This will consist of: (1) The ore galena, roasted or not, with perhaps other lead salts, such as the carbonate, sulphate, etc.; iron pyrites, perhaps copper and zinc, and the ore may carry gold and silver. (2) Fuel, almost always charcoal or coke; and (3) fluxes, which will consist principally of iron oxide and limestone. The object is, of course, to obtain the lead as metal, the copper in a matt or regulus, and the earthy impurities in a slag. The carbon present will reduce any lead oxide or similar compound and the oxide of iron, partly to iron, partly to ferrous oxide, which will form silicate. Enough iron ore must be added to yield iron to combine with all excess of sulphur and arsenic, and to yield enough ferrous oxide to form, with the limestone added and the silica present, a suitable slag. The charge is introduced into the top of the furnace as usual, and the products are tapped out at the bottom. The products are lead, carrying almost all the silver and gold, and usually hard; matt, mainly ferrous sulphide, carrying the copper as sulphide, the nickel and cobalt as sulphides; arsenide of iron and other constituents; and the slag mainly a silicate of iron and lime, often containing oxides of zinc and other metals.

The blast furnace has now almost completely superseded the reverberatory furnace for lead smelting, as it is much cheaper to work and gives a much larger output. The charge can be modified so as to allow of the smelting of ores of all classes.

The lead obtained by any of the processes contains various impurities which must be separated, some because they hard-

Lead

en the lead, others, such as gold and silver, because they are valuable. The lead therefore needs further treatment.

Softening.— The lead is melted in a large reverberatory furnace, the heart of which is usually an iron pan, and is kept exposed to the air at a cherry-red heat for from 4 to 24 hours. The impurities in the lead, together with some of the lead, oxidize and rise to the surface as a scum or dross which is removed, and the operation is continued till the residual lead is quite soft and malleable. The loss of lead in the process may be up to 20 per cent. The softening pan dross is reduced and gives a hard lead.

Desilverization.— All lead contains silver, and generally enough to make it worth extracting. The process of desilverization at present in use consists of two stages: (1) The concentration of the silver in a smaller quantity of lead; and (2) the cupellation of the enriched lead. As the lead may contain anything from one or two up to several hundreds of ounces, the amount of concentration that will be necessary will vary. Two processes are in use.

The Pattinson Process.— This was discovered by Mr. Pattinson of Newcastle in 1829, and very soon became general. It depends on the fact that if a mass of silver-lead be melted and allowed to cool slowly, the portions which solidify first are comparatively free from silver. If these crystals be removed, a residue is ultimately left much richer in silver than the original lead. Owing to the difficulty of completely separating the liquid lead from the crystals, a quantity of silver is retained, so the process must be repeated several times.

The usual plant consists essentially of 10 or 12 iron pots capable of holding about 10 tons of lead, each with its own fire, suitable ladles, and sets of cranes for the handling of the lead. The pots are numbered 1 to 10 or 12, No. 1 containing the desilverized lead, being known as the D or market pot. Suppose lead to come down to the Pattinson house containing 24 ounces of silver to the ton. About 9 or 10 tons of this (for simplicity, say 9 tons) will be put into No. 6 pot, melted and well stirred. The fire will be drawn and the metal left to cool. Solid lead being heavier than liquid, the crystals will sink to the bottom. They are fished out and transferred to No. 5 pot, till two-thirds has been passed down. The fire is then lighted again, the residual one-third remelted and ladled up into No. 7 pot. There will then be 6 tons of lead in No. 5, which will be found to contain about 12 ounces to the ton, and 3 tons in No. 7 which will contain 48 ounces. So that

the 9 tons containing 24 ozs. per ton, or 216 ozs.,
will yield 6 times 12 ozs. per ton, or 72 ozs.,
3 times 48 ozs. per ton, or 144 ozs.

The process is then repeated. No. 5 is filled up with 12-ounce lead and yields 6-ounce and 24-ounce, and No. 5 when filled and crystallized yields 24-ounce and 96-ounce; and so on, so that the lead which reaches No. 1 pot contains about 75 ounces per ton, and that which reaches No. 12, 1,500 ounces.

As a concentrating process the Pattinson process was a great success, but it has many disadvantages. These are: (1) The large amount of handling the metal has to receive in passing up and down, which is very costly; (2) the large amount of "floating" silver and lead necessary; (3) the length of time which must elapse before the silver in a poor lead can be realized; (4) the difficulty of obtaining very high concentration; and (5) the great loss of lead by oxidation — this, however, being recovered by resmelting the "pot dross." On the other hand, this oxidation has the advantage that it assists in the removal of impurities and leaves a very soft, pure lead. Chemical lead, for the construction of sulphuric acid chambers, is always desilverized by this method.

The Zinc Process.— This has now almost completely superseded the Pattinson process, except for the production of chemical lead. It was first suggested by Parkes many years ago, but it is only recently that it has been reduced to a practicable form. It depends on the fact that while zinc and lead mix in the liquid condition they separate almost completely on cooling, and the zinc, being lighter rises to the top carrying with it the silver which can then be secured. The lead to be desilverized is melted in a large pot which may hold 10, 20, or more tons. About one and a half pounds of zinc (spelter) is then added for each ounce of silver present, the temperature is raised to the melting-point of zinc, and the whole well stirred. The mixture is then allowed to cool, when the zinc rises to the top, and as it solidifies is removed to a small pot with a perforated ladle. Here it is heated to the melting point of lead so that as much lead as possible may be melted out. The lead left in the large pot is treated a second time with zinc so as to remove the last trace of silver, and the zinc is used for treating the next pot. The lead is run into molds. As it retains a small quantity of zinc it must be thoroughly softened, and the trace of zinc which remains even after the most elaborate softening is said to impair its power of resisting the action of acids. The lead separated from the zinc is added to the next lead pot for treatment. The zinc residue is distilled, and leaves a very rich silver lead containing 3,000 or 4,000 ounces of silver to the ton, which is cupelled directly. This process needs much less labor, the silver can be obtained quickly, and

there need not be a large stock of lead, as any lead can be treated at once.

Condensation of Fumes.—Lead is volatile, and in all operations where lead is heated there is a considerable loss, while the fumes also carry away with them a considerable quantity of silver. The loss of lead and silver would be serious, and as also the fumes are highly destructive both to animal and vegetable life, a system of condensation must be used. The flues from all the furnaces are led into one main flue and thence to the condensing plant. The simplest condenser is a long flue either of brick or stone, or of sheet iron. If the former be used and a slope can be given up a hill, no artificial draught is necessary, as is the case with all other methods. Another method is to pass the fumes through chambers filled with brushwood or similar material down which a stream of water is kept falling; and the most modern method is to draw the fumes through filter bags, by which the solid matter is retained and can be easily collected.

Uses of Lead.—Lead is used for many purposes, in the form of sheet, pipe, rod, shot, etc., and in its various compounds.

Sheet lead is made by casting a thick cake and rolling down in a rolling mill to the required thickness. Sheet lead is easily worked and is but little attacked by the atmosphere, and its resistance to the action of sulphuric acid renders it valuable for chemical purposes. It is much used in the roofing of buildings. Sheets of lead can be united by fusing the edges together without the use of solder.

Lead pipes are used to an enormous extent in connection with the water supply of houses. They are usually made in machines worked by hydraulic pressure. The lead is run in a fluid state into a cylinder provided with a ram, and having an orifice of the required size provided with a mandril corresponding with the internal diameter of the pipe. The lead is allowed to solidify, and is then forced out of the opening by the pressure of the ram, the metal flowing quite readily and the pipe being coiled on a drum as it passes out.

Shot is made of lead to which a little arsenic is added to give increased fluidity. The molten metal is broken up into drops of the required size by runing it through a screen pierced with a large number of holes, and the drops are allowed to fall from such a height that they solidify before reaching a vessel of water put to receive them, the spherical form being due to the molecular attraction in the liquid drop. The badly shaped shot are separated from those which are truly spherical, the latter are sieved into sizes, and polished by agitation with graphite.

In the calendar year 1908 the total production of lead in the United States was 396,433 short tons, the antimonial lead amounting to 13,629 tons, desilverized, 295,420; soft, 101,013. Domestic ores and base bullion yielded 298,672 tons; foreign, 40,272. The production of 1907 broke all records, 414,189 tons, of which all excepting 43,925 tons was from domestic ores.

Lead, an instrument for discovering the depth of water. It is composed of a large piece of lead shaped like an elon gated clock weight, from 7 to 11 pounds in weight, and is attached by means of a strap to a long line, generally of about 20 fathoms, called the lead line, which is marked at certain distances — 5, 7, 10, 13, 17, and 20 — to ascertain the fathoms. When the depth is great the deep-sea lead, weighing from 25 to 30 pounds, is used. The line, which is much longer than the former and called the deep-sea line, is marked by knots every 10 fathoms and by a small knot every 5. The shorter line is called the hand line. A hollow is scooped out in the lower part of the lead, and filled with tallow, that the nature of the bottom may be known from the portions of it that adhere to the tallow. To heave the lead is to throw it into the sea in such a manner as shall best ascertain the soundings.

Leading Light, a signal displayed on a coast for the benefit of seamen. Two lights are exhibited from two towers; one may be higher than the other, so as to confer a special characteristic. Certain bearings as to channel are indicated when the lights are seen in one line, the opening of the lights on either side of their conjunction indicating when to tack.

Lead Poisoning, painters' colic; characterized by a blue line along the gums, with dropped wrist indicative of paralysis, swelling of the tongue; occasionally, pains in the stomach, bowels, and bones, with debility and emaciation. The only remedy is the elimination of the lead from the system.

Leadville, a city and county-seat of Lake co., Col., on the Atchison, Topeka and Santa Fé, the Denver and Rio Grande, and the Union Pacific railroads; 80 miles S. W. of Denver, the State capital. Leadville is one of the most important localities in the world for the mining and reduction of the ores of the precious metals, some of the mines being 700 feet deep. It is the mining, farming and grazing trade center for an extensive region; contains a court house, jail, hospital, and almshouse; has rich deposits of gold, silver and lead, large sampling, refining and reduction works, smelting furnaces, etc. The city is lighted by electricity and gas; has an excellent water supply, well organized fire and police departments, daily and weekly periodicals; National banks; and an assessed property valuation of over $650,000. Pop. (1890) 10,384; (1900) 12,455; (1910) 7,508.

Leaf, Walter, an English scholar; born in 1852. After a brilliant career at Cambridge University, where he was Senior Classic, Chancellor's Medalist, and Fellow of Trinity, he entered mercantile life in 1877, retiring in 1892. In addition to his duties as vice-president of the Chamber of Commerce and director of charitable and educational organizations, he became editor of the "Journal of Hellenic Studies," and published: "The Story of Achilles" (1880), with J. H. Pratt; "The Iliad of Homer Translated Into English Prose" (1882), with A. Lang and E. Myers; "The Iliad" (1886–1888); "Companion to the Iliad" (1892); "A Modern Priestess of Isis" (1894), from the Russian; etc.

Leaf Cutters, a popular name for the hymenopterous genus *Megachile*, from their habit of cutting portions of the leaves of trees and plants to line their nests. Called also leaf-cutting or upholsterer bees.

Leaf Insect, or **Walking Leaf,** a very remarkable genus of orthopterous insects, of the family *Phasmidæ*, natives of the East Indian region. The abdomen is flattened out, and covered in the wingless females by a pair of wing-covers which together look exactly like a leaf. The color is green, and the suggestion of midrib and netted veins is marvelously mimetic. The legs are also flattened, green, and leaf-like. The male has functional wings, but is also remarkably mimetic. As the insects live among leaves, and are sluggish, their detailed resemblance to the surroundings cannot but be usefully protective. The name of the commonest species (*P. siccifolium*) refers to the fact that when the insects die the green color changes into that of a withered leaf.

League, a combination or union between two or more persons for the promotion of mutual or common interests, or for the execution of any design in common. Also a treaty, alliance, or confederation between two or more sovereigns or governments for mutual aid and defense. An offensive league or alliance is when two or more States agree to unite in attacking a common enemy; a defensive league is when the contracting parties agree to assist each other in their defense against a common enemy.

League, a measure of length, varying in different countries. The English land league is 3 statute miles; a nautical league 3.457875 statute miles. A Spanish league is 7,416 English yards. A Portuguese league 3.84 English miles. An Italian league is 4 miles, of 5,000 feet each. A French land league is rather less than 2½ English miles; a French nautical league rather more than 3½ English miles, and a French astronomical league about 2¾ English miles.

League, Land. See LAND LEAGUE.

Leah, the elder daughter of Laban, and the first wife of Jacob, though less beloved than her sister Rachel. She had through life the remembrance of the deceit by which her father had imposed her upon Jacob. She was the mother of seven children, among whom were Reuben — Jacob's first born — and Judah, the ancestor of the leading tribe among the Jews, of the royal line, and of our Lord (Gen. xxxi: 16–35; xxx: 1–21. She is supposed to have died before the removal of the family into Egypt (Gen. xxxix: 31).

Leake, William Martin, an English antiquarian; born in London, England, Jan. 14, 1777. An officer in the West Indian service (1794–1798), and artillery instructor at Constantinople in early life, he later traveled in the East, and was engaged in surveys and diplomatic business for the British government in Greece (1805–1809). Among his publications are: "Researches in Greece" (1814); "Topography of Athens" (1821: 2d ed. 1841), a learned and still valuable work; "Historical Outline of the Greek Revolution" (1826); "Travels in Northern Greece" (4 vols. 1835); "Peloponnesiaca" (1846). He died in Brighton, Jan. 6, 1860.

Leamington, a health resort of Warwickshire, England. It is wholly of modern growth, having become important only since the rediscovery of its mineral waters in 1784.

Lean, Mrs. Francis. See MARRYAT, FLORENCE.

Leander, the adventurous lover of Hero, who swam nightly across the Hellespont to visit her, but eventually was drowned.

Leander, Richard. See VOLKMANN, RICHARD VON.

Leander Clark College. See WESTERN COLLEGE.

Liao-Tung. See SHENG-KING.

Leap Year, a year which leaps over, as it were, one day more than an ordinary year; a year which contains 366 days, as distinguished from an ordinary year, which includes only 365 days. Every year, the number of which is divisible by four is a leap year, except when it happens to be any number of hundreds not divisible by four. Thus, 1884 is a leap year, but not 1900, this omission of one leap year in every four centuries being necessary to correct the error which arises from the excess of the addition of one day in four years (*i. e.*, six hours) to the year over the true length of the year, *i. c.* 365 days, 5 hours, 49 minutes.

Lear, Edward, an English author; born in London, England, May 12, 1812. From boyhood he had a passion for painting, and in 1835 went to London to study. Later he was sent by the Earl of Derby to Italy and Greece, where he painted many landscapes in Albania, Athos, the Morea, and the is-

lands of the Ægean. He exhibited at the Royal Academy 1850–1873. His later years were spent in Italy. Lear made himself better known by his illustrated books of travels than by his paintings. Of these the most important were his "Sketches of Rome and its Environs" (1842); "Illustrated Excursions in Italy" (1846); "Journal in Greece and Albania" (1851), which called forth the praises of Tennyson in a well-known poem—"I read and felt that I was there"; "Journal of a Landscape Painter in Calabria" (1852); "In Corsica" (1869). The "Book of Nonsense" (1861) went at once to the heart of all English-speaking children. "More Nonsense Rhymes" followed in 1871, "Nonsense, Songs, Stories," and "Botany" in 1870, "Laughable Lyrics" in 1876. He died in San Remo, Italy, Jan. 30, 1888.

Lear, King, a legendary King of Britain, who in his old age divided his kingdom between Goneril and Regan, two of his daughters, who professed great love for him. These two daughters drove the old man mad by their unnatural conduct. Shakespeare made this story the subject of one of his plays.

Learned, The, in the days of the Italian Republics, Padua.

Learned, Walter, a American author; born in New London, Conn., June 22, 1847; received a common school education and engaged in banking. He is the author of "Between Times" (poems, 1889) and the translator of "Coppee's 'Ten Tales'" (1892); "Coppee's 'The Rivals'" (1894); etc.

Leary, Richard Phillips, an American naval officer; born in Baltimore, Md.; was graduated at the United States Naval Academy in 1860; served with the blockading squadron off Charleston, S. C., in 1863–1865; promoted commander in 1882. During the revolution at Samoa in 1888, when the Tamasese government was overthrown, he was the senior naval officer present; promoted captain in April, 1897; commanded the cruiser "San Francisco" in 1897–1898; and when the "New Orleans" was purchased from Brazil convoyed that vessel to the United States. At the close of the American–Spanish War he was appointed the first American governor of Guam; and served there till relieved on his own request, in April, 1900. He died in Boston, Mass., Dec. 27, 1901.

Lease, the contract establishing the relation between landlord and tenant. Every lease has its own peculiar clauses, as to drainage, houses, cropping, etc.

Leasehold, a dependent tenure derived either from a freehold or a copyhold, and held by lease. Schemes for the enfranchisement of leaseholds (allowing persons having long leases of small portions of land a right to purchase the fee-simple) concern mainly building leases.

Leather, the skins of animals chemically modified by tanning and otherwise, so as to arrest that proneness to decomposition which characterizes unprepared skins, and to give to the substance greatly increased strength, toughness, and pliancy, with insolubility and unalterability in water. Some method of preparing skins so as to make them wearable must have been known from the very earliest times, and there yet exist remains of tanned leather made in Egypt not less than 900 years B. C. In modern times the methods and principles of leather making have come to be well understood; but the processes employed in the manufacture have not been seriously modified; the attempts made to hasten the essentially slow processes having met with but limited success. There are three methods by which leather is prepared: first, and by far the most important, with tan barks and other vegetable substances containing tannin; second, by tawing with alum, bichromate of potash, and other mineral salts; and third, by shamoying or impregnating the raw skin with oil. The skins of all animals used for leather making consist chiefly of a fibrous gelatigenous substance called collagen, which on being boiled forms the ordinary gelatin of commerce, with an interfibrous compound called coriin, insoluble in water, but which in common with collagen unites with tannin to form the insoluble and unalterable compound tanno-gelatin, the chemical basis of tanned leather. The compounds are similarly acted on by bichromate of potash and other mineral salts in tawing, whereby insoluble combinations are formed.

The skins of all animals may be made into leather; but in practice the raw materials of the manufacturer consist of the skins of certain animals which are reared and slaughtered primarily for other purposes, and of which the supply is sufficiently large to form the basis of a great industry. Large skins, it may be remarked, such as those of oxen and horses, are in trade termed hides; those of calves, sheep, goats, and other smaller creatures are called skins. Of all leather making hides the most important are those of oxen, which are primarily distinguished as ox, cow, and bull hides, and calf skins. To the tanner they come in several forms and from many quarters. The first source of supply is the local slaughter house, from which the newly flayed skins called market hides are obtained. Leading sources of supply are Australia, the Cape of Good Hope, the River Plata and South America generally, and China and Japan. From the East Indies there come vast quantities of small hides termed kips, both salted and tanned. Buffalo hides are imported in large quantities from Singapore,

Leather

Batavia, Bombay, Kurrachee, and Calcutta. Horse hides are brought in considerable quantities from South America. Sheep skins, from the vast quantities yearly available in nearly all parts of the world, are a most important source of leather. Goat skins and kid skins come from the Cape, the East Indies, Asia Minor, and Switzerland; but many of the East Indian and Asiatic skins are when imported already tanned, and require only dressing. Other skins which have only a local or a limited market are the walrus, rhinoceros, and elephant, from which leather of great thickness, suitable for polishing wheels and other mechanical purposes is obtained; and hog or pig skin is an important source of leather for saddle making and other purposes. The skins of various species of deer and antelope, porpoise and kangaroo, are also sources of leather; and from the Cape there are occasionally sent to the London market skins of the gnu and quagga. As sources of leather for fancy articles there may be mentioned the alligator (a leather now extensively imitated), and certain snakes' and sharks' skins.

Tanning.—The operations of tanning and the duration of the process vary very widely according to the nature of the tanning materials employed, the nature and thickness of the hides and skins under treatment, and the class of leather being produced. The sources of tannin are exceedingly numerous, but oak bark is the most important, and that which produces the most valuable and substantial of all leathers. Oak tannage is, however, a very tedious process, and the common practice is now to hasten the completion of the operation by mixed tannage, in which more rapidly acting agents play a part. In the United States hemlock bark from *Abies canadensis* is the most important tanning material; and the mimosa or wattle barks of Australia are very largely used in the British colonies as well as in Great Britain. Standard extracts containing a fixed percentage of tannin have also come into favor for rapid tannage. But, with all the devices which have been suggested, tanning is essentially a slow operation, and it cannot be forced through without injury to the resulting leather, any more than can the operations of roasting beef or toasting bread be hastened unduly. The many processes which have been suggested, involving chiefly the use of strong tan liquors, or ooze as it is technically called, and the transfusion of these liquors through the hides, have resulted generally in the production of hard and intractable leather, or of a superficial tanning only. Such imperfectly made leather gets an appearance of uniformity and finish by being impregnated with grape sugar, or with sulphate of magnesia, chloride of barium and other salts, which add weight, but which otherwise are the most rank and deleterious adulterants.

In the treatment of ox hides for the production of, say, sole leather, the first object of the tanner is to clean and soften the hide. This is done by washing with water, and if necessary working the hide under stocks till the whole is uniformly soft and pliant. The unhairing and removal of the scarf skin is the next operation, for which in English tanneries the hides are steeped in pits containing lime water, while in the United States the plan adopted consists of sweating the hides, or artificially heating them till incipient putrefactive fermentation is set up. The hides are afterward stretched over a tanners' beam, and the hair and scarf skin are removed by shaving with a fleshing knife. At the same time the flesh side is gone over, and any fragments of fiber or fat adhering to it are pared away. All traces of lime in the hides must be got rid of, and that sometimes is effected in the first tan pit, containing acid liquors weak in tannin, and sometimes by "bating" in "pure"—which is a warm decoction of pigeons' or other fowls' dung. The method of actual tanning varies endlessly, but in general it may be said to consist in suspending or depositing in layers the hides in a successive series of pits containing tan liquor or ooze whch is weak at first, but which as the tanning proceeds is made increasingly rich in tannin. In the early stages of the tanning the hides are frequently handled or turned over in the tan pits as often as two or three times daily at first; but as the tanning progresses this handling becomes less and less frequent till in the final pits, in which strong liquor is used, and where, moreover, the hides are interstratified with raw bark, they may rest for six weeks without being disturbed. When finally taken from the tan pit the hides are carefully drained in a heap covered over from the light, after which they are suspended in the loft for drying, in which condition they form rough leather, hard, uneven, and refractory. To finish the hides they are damped and softened in water, scoured to remove the bloom from their surface, then liberally oiled and the whole surface worked over by pressure with a three-sided steel implement called a striking pin. This operation removes all creases and smooths out and solidifies the leather—an operation carried further and finished after renewed oiling, by rolling the hide on a smooth floor under a heavy hand roller. For both these operations very efficient machinery is now generally substituted for the old method of hand labor. The different portions of an ox hide, and of all hides in some degree, possess distinct qualities which render them available for special applications; hence in the trade they receive distinctive names and frequently are separately dealt in. An en-

tire hide is termed a crop, one-half the crop cut longitudinally forms a "side," the pieces around the margins form the "offal"; the neck and shoulders are sometimes detached from the "butt," which forms the hide minus the "offal" and half a butt cut lengthways makes a "bend."

Dressed Leather.— Under this head there is embraced a great range of leathers which after tanning undergo a varied series of finishing operations at the hands of the currier and leather dresser, to fit them for the diverse uses to which dressed leather is applied. The currier has to do with the paring down of the flesh side of the leather, to smooth its surface, and to equalize its thickness; and he also, when desirable, splits hides by means of a machine into two or more useful layers or splits. His further and principal operations have for their objects the rendering of the leather soft, flexible, and waterproof, and giving it the finished surface, grained or smooth, waxed or blackened, glacé or enameled, dyed, etc. For stuffing the leather, which is the most essential operation of the currier, it is first softened in water, then the surface is gone over with a scraping tool or slicker, and while still wet it is liberally covered with a dubbing composed of mixed tallow and cod oil. As the moisture evaporates from the leather the grease penetrates and thoroughly permeates the whole texture. For the numerous operations of currying and finishing leather elaborate machinery is now employed, which has almost entirely superseded hand work. Morocco leather is a term which now applies rather to the finish of a certain class of goods than to the source of the skin of which it is formed. It is a richly grained and dyed leather, originally and properly made from goat skins tanned in sumach; but now sumach-tanned split calf skins and sheep skins are the source of much so-called morocco. Sheepskins roughly tanned and undressed are termed basils; dressed and dyed as for morocco, but finished smooth, they form roans; and split sheep skins (the flesh sides of which go to be shamoyed to form wash leather) tanned and dressed are known as skivers. Russia leather is now any smooth finished thin leather, impregnated with the empyreumatic oil of birch bark, which gives the substance its peculiar odor and insect resisting qualities. Originally it was made in Russia of dressed calf skins.

Tawing.— Tawing consists in dressing skins with certain mineral salts, and is useful principally for glove leathers and the so-called kid leather employed for the uppers of ladies' boots. It is also by tawing that furriers' skins are prepared, and hides and skins in the hair generally preserved. The process of tawing a lamb skin may be taken as a typical example of the process, which, however, is much varied, as experience suggests. The skins are generally limed on the flesh side with cream of lime to detach the wool, which is removed as in ordinary hide tanning. After thorough cleansing, the pelts are steeped for two or three weeks in a pit filled with water and lime, being taken out from time to time and drained on sloping benches. When removed finally from the lime pit, the skins are worked with the knife to render them still more supple, and they are then put into the branning mixture. This consists of bran and water in the proportion of two pounds of bran to a gallon of water. From this mixture in about two days, they are transferred to another bath consisting of water, alum, and salt. After the proper amount of working in this mixture they undergo what is called the pasting, if intended to form white leather. The paste is a mixture of wheaten bran and sometimes flour and the yolks of eggs. They are usually worked in a rotating cylinder with this paste and water, and are found in time to have absorbed the paste, leaving little more than the water. If the skins are not intended to be white, other materials are often used, and much pigeons' and dogs' dung is employed. Lastly the skins are dried and examined, and, if necessary, the pasting is repeated; if not, they are dipped into pure water and worked or staked by pulling them backward and forward on what is called a stretching or softening iron, and smoothed with a hot smoothing iron. Numerous other tawing processes are in use and have been suggested.

Shamoying.— This consists simply in impregnating and saturating skins with oil. The name is derived from the fact that the process was originally applied for the preparation of the skins of the Alpine chamois, and as it was also used for other deer skins the name buck leather or buckskin was also given to the preparation. Shamoy leather now consists principally of the flesh splits of sheep skins. The oil is worked by means of stock slowly into the interstices of the skin and there becomes oxidized, forming a kind of combination with the gelatinous constituents, and yielding a peculiarly soft and spongy texture. A good deal of the buff leather of commerce is prepared by a process which partakes of the features of both tawing and shamoying.

Leather Cloth, a fabric covered with a waterproof composition, usually having a polished surface. It generally consists of a paint or a varnish, sometimes the former with a covering coat of the latter. The changes in menstruums, resins, pigments, and coarse and cheap materials, which are added for quantity, are so various that

room cannot be afforded for stating them at length.

Leatherwood (*Dirca palustris*), a deciduous shrub of 3–6 feet high, with the habit of a miniature tree, a native of North America. It belongs to the natural order *Thymeleaceæ*. The bark and wood are exceedingly tough, and in Canada the bark is used for ropes, baskets, etc. The leaves are lanceolate-oblong; the flowers are yellow, and appear before the leaves.

Leathes, Stanley, an English clergyman; born in Ellesborough, Bucks, England, March 21, 1830; was educated at Cambridge; took orders four years later; and after serving several curacies became in 1863 Professor of Hebrew in King's College, London, and in 1869 minister of St. Philip's, Regent Street. He was Boyle lecturer (1868–1870), Hulsean lecturer at Cambridge in 1873, Bampton lecturer at Oxford in 1874, and Warburtonian lecturer at Lincoln's Inn (1876–1880). Further preferments were a prebend in St. Paul's (1876) and the rectory of Cliffe at Hoo, near Gravesend (1880). Leathes was a member of the Old Testament Revision Committee. His books include "The Witness of the Old Testament to Christ" (Boyle Lectures), "The Gospel its own Witness" (Hulsean), "Religion of the Christ" (Bampton), "Studies in Genesis" (1880), "The Foundations of Morality" (1882), "Christ and the Bible" (1885), and several volumes of sermons. He died April 30, 1900.

Leaven, a substance used or intended to produce fermentation, as in dough; specifically, a portion of sour dough which, being mixed with a larger quantity of other dough, causes fermentation, and makes it lighter; yeast; barm. Also any mixture which causes or tends to cause a general change in the mass. It generally means something which depraves or corrupts that with which it is mixed.

Leavenworth, a city and county-seat of Leavenworth co., Kan., on the Missouri river and the Atchison, Topeka and Santa Fé, the Burlington Route, the Chicago, Great Western, the Chicago, Rock Island and Pacific and several other railroads; 26 miles N. W. of Kansas City. It is the trade center for a farming and coal mining region; manufactures flour, syrup, glucose, stoves, machinery, bricks, castings, carriages, wagons, boots and shoes, metallic wares, iron bridges, furniture, cigars, and brooms. It contains Mount St. Mary's Academy, Cushing and St. John's Hospitals, Kansas State Orphan Asylum, Whittier library, State Orphan Asylum, and protective home; and has electric light and street railroad plants; excellent water supply; the pro-cathedral of the Immaculate Conception; over 30 churches; National and savings banks; daily, weekly, and monthly periodicals, and an assessed property valuation of over $4,000,000. Adjoining the city on the N. is Fort Leavenworth. Pop. (1890) 19,768; (1900) 20,735; (1910) 19,363.

Leavenworth, the name of a fort in Kansas on the W. side of the Missouri river, about 4 miles below Weston, Mo. It is the oldest and most important military depot on the Missouri river, the fort having been built in 1827.

Lebanon, a mountain range in Syria. The word Lebanon is derived from a Semitic root meaning "white"; and this name is given to the mountains, not because their peaks are covered with snow (as they are even in summer), but because of the whitish color of their rocks. The mountains belong geologically to the Cretaceous system, and consist principally of limestones and chalks. They are divided into two parallel ranges, the Lebanon on the W. and the Anti-Lebanon (or more correctly Anti-Libanus) on the E. Between them lies the deep valley of the Bukâ'a (the ancient Cœle-Syria), which is from 4 to 6 miles wide, and is watered by the rivers Litany and El-Asi (the ancient Orontes). The former flows S. W., then, turning abruptly to the W., reaches the sea a little N. of Tyre; while the latter flows in the opposite direction, and after crossing the plains of Hamath likewise turns to the W. to the Mediterranean. The highest summits occur in the N. in both ranges, but are higher in Lebanon than in Anti-Lebanon; in the former they vary from 10,018 (El-Kazib) to 7,000 feet and less, and in the latter are about 8,000 or 9,000 feet. In both ranges the E. versant is the steeper and sterner. The W. slopes of Lebanon are broken by numerous deep transverse valleys, running between the spurs that the main chain sends down to the very edge of the sea, where they often terminate in bold headlands. The W. slopes of Anti-Lebanon are not so much cut up by valleys as those of Lebanon, but are more barren and more broken by crags and bare rocks. The valleys and the lower slopes of the hills are generally verdant with vegetation. The vine is extensively grown, and wine is made, but is all consumed at home. Mulberry trees figure prominently; for the manufacture of silk is one of the most important industries of the mountaineers — it was introduced from China in Justinian's time. Olive groves and orchards (nuts and figs) abound everywhere. The higher slopes are in many districts covered with forests of oak, cypress, pine, plane, etc. Contrary to the current belief, remains of the great cedar forest of Solomon's time exist in more places than the single grove of 377 trees at the head of Kedisha valley. Thickets of low, scrubby bushes, generally thorny, and

often aromatic, are found at nearly all altitudes. Tobacco, wheat, barley, and millet are the chief crops cultivated. Owing to the elevated situation, the climate is healthy and bracing. Streams of clear water are numerous. The inhabitants (estimated at over 221,000 in all) are a hardy, ruddy race of people, of Syrian (Aramæan) descent, who keep large herds of sheep and goats. The predominating element is the Maronites, more than two-thirds of the total; next come the Druses. Besides these there are Mohammedans, members of the Greek Church, Metawilé (a sect of Shiite Moslems), and a few converts of the American Protestant and the Roman Catholic missionaries of Beyrout. After the bloody quarrels of the Druses and Maronites in 1860, the district of Lebanon was separated (1861) from the Turkish pashalik of Syria, and put under a Christian governor, the European powers constituting themselves the "guardians" of the new province.

Lebanon Valley College, an educational institution in Annville, Pa.; founded in 1866 under the auspices of the Union Brethren; has grounds and buildings valued at over $240,000; endowment exceeding $40,000; scientific apparatus, etc., $10,000; ordinary income, about $30,000; average number of faculty, 23; average student attendance, 260; graduates, over 650; volumes in the library, about 6,000.

Lebrun, Charles (le-brung'), a French painter; born in Paris, France, Feb. 24, 1619. He studied under Vouet and Poussin, and after his return from Rome was made president of the new Royal Academy of Painting and Sculpture. From 1661 he was principally employed in embellishing the residences of Louis XIV. and his nobles, with works of art, and in superintending the brilliant spectacles of the court. Lebrun possessed a comprehensive genius, which was cultivated by the incessant study of history and national costumes. He wrote a treatise on the passions, and another on physiognomy. He died in Paris, Feb. 12, 1690.

Lebrun, Charles François, a French administrator; born in St. Sauveur-Landelin, France, March 19, 1739. He came at an early age to Paris; and being nominated deputy to the states-general in 1789, he occupied himself, during the session, with affairs of police, finance, and domestic administration. In 1795 he was elected to the council of elders, and became president in 1796. He was appointed third consul in December, 1799, nominated arch-treasurer of the empire in 1804; and in 1805 governor-general of Liguria and Duke of Placentia. Having signed the constitution that recalled the house of Bourbon to the throne, he was created a peer of France by the king, and in the beginning of July was appointed president of the first bureau of the Chamber of Peers. After the return of Napoleon he accepted the peerage from him, and likewise the place of grand master of the university, a proceeding which rendered him incapable of sitting in the new Chamber of Peers, formed in August, 1815. In the early part of his life he translated the "Iliad" and "Odyssey," and Tasso's "Jerusalem." He died near Dourdan, France, June 16, 1824.

Le Brun, Marie, a French painter; born in Paris, France, April 16, 1755. She was a daughter of one Vigél, a painter of little note, and in 1776 married J. B. P. Le Brun, a picture dealer, and grandnephew of Charles Le Brun. Her great beauty, as well as the charm of her painting, speedily made her the fashion in Paris and at Versailles. Her first portrait of Marie Antoinette (in 1779) led to a lasting friendship with the Queen of France. She subsequently painted numerous portraits of various members of the royal family, and in 1783 was admitted, on the proposition of Joseph Vernet — though after much opposition on account of her sex — a member of the Royal Academy of Painting. She became more than ever the fashion, but left Paris for Italy at the outbreak of the Revolution in 1789, and after a species of triumphal progress through Europe, being admitted a member of the principal academies of painting, including that of St. Petersburg, she arrived in London in 1802. There she painted portraits of the Prince of Wales, Lord Byron, and other celebrities. In 1805 she returned to Paris, where she lived till her death, March 30, 1842.

Lebrun, Pierre Antoine, a French poet; born in Paris, France, Nov. 29, 1785. For his "Ode to the Grand Army" (1805), Napoleon conferred on him a pension of 6,000 francs a year; and his "Ode on the Campaign of 1807" won for him the place of chief collector of indirect taxes. He was elected to the Academy on the publication of his "Travels in Greece" (1828). He wrote several mediocre tragedies; his "Mary Stuart" (1820), which still holds a place in the French theatrical repertoire, is half imitation, half translation, of Schiller's play. He died in Paris, May 27, 1873.

Lebrun, Pigault. See PIGAULT-LEBRUN.

Lecanora, a genus of gymnocarpous lichens, family *Parmelidæ*, or of the tribe *Lecidineæ*. It is akin to *Lecidea*, except that the epithecium has a thickish border formed of the crust and of the same color with it. *L. perella*, *L. tartarea* (cudbear), *L. hæmatomma*, and *L. atra* are used for dyeing. *L. esculenta* and *L. affinis* are found in Armenia, Algeria, etc., and are

blown about by the wind. The natives eat them in times of scarcity, and believe them to have been the manna of the Israelites. The ethereal extract of *L. atra* is collected in the neighborhood of Palermo, Sicily. It is a mixture of two acids, which can be easily separated by means of chloroform; one (atranoric acid) is colorless, and very slightly soluble in chloroform; the other, which closely resembles susnic acid, is yellow, and very soluble in chloroform.

Lech (le*h*), a right-hand tributary of the Danube, rising in the Alps in Vorarlberg, flowing N. past Augsburg, and after a course of 177 miles joining the Danube a few miles E. of Donauwörth. It is a mountain stream and not navigable. Near Rain, not far from its mouth, the imperialist general Tilly was defeated and killed, April 5, 1632, by the Swedes under Gustavus Adolphus.

Le Chevalier, Jean Baptiste (luh shuh-vä-lyā′), a French archæologist; born in Trelly, France, July 1, 1752. Before the Revolution he made an archæological exploration of the Troad, and published (1794) "A Visit to the Troad, or the Plain of Troy as It Now Is." He wrote also "The Propontis and the Euxine" (2 vols. 1800). He died in Paris, July 2, 1836.

Lecky, William Edward Hartpole, an Irish historian; born near Dublin, Ireland, March 26, 1838. He was educated at Trinity College, where he graduated B. A. in 1859 and M. A. in 1863. Already in 1861 he had published anonymously "The Leaders of Public Opinion in Ireland," four brilliant essays on Swift, Flood, Grattan, and O'Connell. Later works were his learned, luminous, and dispassionate "History of the Rise and Influence of the Spirit of Rationalism in Europe" (2 vols. 1865); "History of European Morals from Augustus to Charlemagne" (2 vols. 1869); and "History of England in the Eighteenth Century" (8 vols. 1878–1890). The last is not a history in strict chronological form, but rather a philosophical study of events and their causes, relieved by an admirable series of finished historical portraits. Perhaps the ablest and most original portion of the work is the treatment of the American war of independence; not the least interesting and valuable are the pages on Ireland. Later appeared "Democracy and Liberty." He strongly opposed Home Rule. He died Oct. 22, 1903.

WILLIAM E. H. LECKY.

Lecithin, a name applied to several phosphoretted fatty bodies, of very similar chemical and physical properties, derived from brain substance, nerves, blood, gall, the yolk of eggs, etc., and also from some vegetable substances (maize, etc.), and which appear as constant constituents of the cell substance of organized bodies. It is a viscous body, insoluble in water, slightly soluble in cold alcohol, but very soluble in boiling alcohol and ether. From its saturated solution in alcohol it crystallizes in radially-grouped needles which dry up *in vacuo* to a white powder. It may also be crystallized from glacial acetic acid. Every lecithin is a fat containing only two fatty acid radicals, the third hydroxyl group being replaced by ethylen-trimethyl ammonic hydrate (neurine) in combination with phosphoric acid.

Leclaire, Edme-Jean, a French social scientist; born in Aisy-sur-Armançon, France, May 14, 1801. After learning to read and write he was engaged in farm work from 10 to 17, and afterward as a mason's apprentice. Acting on sudden impulse, he started for Paris, where he arrived friendless and penniless, and apprenticed himself to a house painter. He proved a capable and industrious workman, and in his 26th year began business on his own account. By energy and by doing good work he soon secured a large business and took the front rank in the trade. His desire to benefit his workmen and do away with the existing antagonism between employer and employed led him to take M. Frégier's advice, and allow the workmen to participate in the profits of the master. Besides, he compelled people to be honest by issuing pamphlets exposing the tricks of the painting trade by means of which bad and scamped work was passed off for good. He also discovered a method of utilizing white of zinc, instead of white of lead, much to the benefit of the workmen's health. His system of profit sharing, which worked most successfully, was begun in 1842. He died July 13, 1872.

Le Clerc, John, better known as JOHANNES CLERICUS, a Genevan Reformed theologian; born in Geneva, Switzerland, March 19, 1657. He made his studies there in philosophy and theology, next repaired to Grenoble, Saumur, Paris, and London, gradually adopted the Remonstrant theology, and became in 1684 Professor of Philosophy in the Remonstrant seminary at Amsterdam. His works were over 70 in number.

many of a polemical character. In his controversy with Richard Simon he revealed opinions which were startling then, however innocent now, on the composition and Mosaic authorship of the Pentateuch, and on inspiration generally, and especially as applied to Job, Proverbs, Ecclesiastes, and Canticles. His commentaries on the Bible began with Genesis in 1693, and were not completed till 1731. Another important contribution to its subject was his edition of the Apostolic Fathers of Cotelerius (1698). He died in Amsterdam, Holland, Jan. 8, 1736.

Leclercq, Michel Theodore (luh-klerk′), a French dramatic poet; born in Paris, France, April 1, 1777. He wrote after the manner of Carmontel a series of "Dramatic Proverbs," little pieces for the drawing-room, which, by their pointed, witty dialogue, their fine character drawing, and their elegant style, won universal favor. He died in Paris, Feb. 15, 1851.

Lecocq, Alexandre Charles (luh-kok), a French composer of comic operas; born in Paris, France, June 3, 1832. From his first successful opera, "Doctor Miracle" (1857), he shows Offenbach's influence and tendency. His best known works are "The Daughter of Madame Angot" (1872), "Giroflé-Girofla" (1874), "The Little Duke" (1877).

Lecompton Constitution, a pro-slavery constitution adopted by the Legislature of Kansas in 1857, but rejected by the people of the Territory, Jan. 4, 1858.

Leconte de Lisle, Charles Marie René (le-kôn*gt*′duh lēl′), a French poet; born in the Isle of Bourbon (Réunion), Oct. 23, 1818. Settling in Paris (1846), he was at first an enthusiastic socialist and disciple of Fourier; afterward he became an impassioned admirer of the ancient religions of Greece and India, and a pantheistic conception of the universe dominated all his thoughts. In his "Antique Poems" (1853), he sings in verse exquisite in form the praises of the ancient gods and heroes; in his "Barbarian Poems" (1862), with a poet's insight he seeks to interpret the mythological ideas of the Hebrews, Irish, Bretons, Scandinavians, Indians, and Polynesians. His "Tragic Poems" (1882) were crowned by the French Academy. He made admirable translations of ancient Grecian poets — Homer, Hesiod, Theocritus, Anacreon, and the dramatists. He died in Louveciennes, near Paris, July 17, 1894.

Le Conte, John, an American physicist; born in Liberty co., Ga., Dec. 4, 1818. He was Professor of Physics, Industrial Mechanics and Physiology in the University of California from 1869 till his death, and was president of that institution from 1876 to 1881. He wrote a large number of papers on scientific subjects, which were printed in scientific journals on both sides of the Atlantic. He died in Berkeley, Cal., April 29, 1891.

Leconte, John Lawrence, an American naturalist; born in New York city, May 13, 1825. He was surgeon of volunteers during the Civil War and chief clerk of the United States mint in Philadelphia from 1878 till his death. He traveled all over the United States making scientific researches, and secured large collections of botanical, zoölogical, and other specimens, which at his death were given to the Museum of Comparative Zoölogy, Cambridge, Mass. He wrote many entomological papers. He died in Philadelphia, Pa., Nov. 15, 1883.

Le Conte, Joseph, an American scientist; born in Liberty co., Ga., Feb. 26, 1823. He practised medicine for several years at Macon, Ga., but in 1850 went to Cambridge, Mass., where he studied natural history under Agassiz. He subsequently held several professorships, and after 1869 occupied the chair of geology and natural history in the University of California. "The Mutual Relations of Religion and Science" appeared in 1874, and was followed by "Elements of Geology," "Light," "A Compend of Geology," "Evolution and Its Relation to Religious Thought." He died in the Yosemite Valley, California, July 6, 1901.

Lecouvreur, Adrienne (luh-kö-vrur′), a French actress; born near Châlons, France, April 5, 1692, made her début at Strasburg in 1717, and soon became famous for her power as an actress, her fascinations, and the number and eminence of her admirers, among whom were Marshal Saxe, Voltaire, and Lord Peterborough. Her death, in Paris, March 20, 1730, was unjustly suspected to be due to poison administered by a rival, the Duchess Bouillon. This is the plot of the play by Scribe and Legouvé, in which Rachel, Bernhardt, etc., won distinction.

Lectern, a choir-desk from which the antiphons and lessons were read. Also the stand from which the Gospel was sung. They were sometimes constructed of wood, but frequently of brass, in the form of an eagle with outspread wings.

Lectica, a kind of litter or palanquin, borne by horses or slaves, and used for transporting females, sick persons, and ultimately the luxurious rich, from place to place. They were provided with cushions, canopies, and curtains.

Lection, a term applied in the early Church to portions of Scripture read in the public services, but now almost entirely confined to the passages from the inspired writings, the Acts of the Martyrs or Lives of the Saints, and homilies by Fathers and

Doctors of the Church, which are read in the Roman office of matins.

Lectionary, a book containing passages of Holy Scripture to be read in the public service of the Church.

Roman: The oldest known Latin lectionary is that commonly attributed to St. Jerome, and known as the *Comes,* distinguished as major, if it contained the Gospels and Epistles for the year; as minor if only the beginnings and endings. It is undoubtedly of early date, but the question of authorship cannot be decided. The lectionary found by Dom Mabillon in the convent of Luxeuil is interesting as showing that, according to ancient Gallican use, three lessons were read at mass.

Anglican: In the article, "Concerning the Service of the Church," in the Episcopal Prayer Book, general rules are laid down as to the reading of Scripture in divine service; the system of Daily and Proper Lessons was established in 1559; the tables were drawn up in 1599, and in 1661 the lectionary was settled in the form it kept for two centuries.

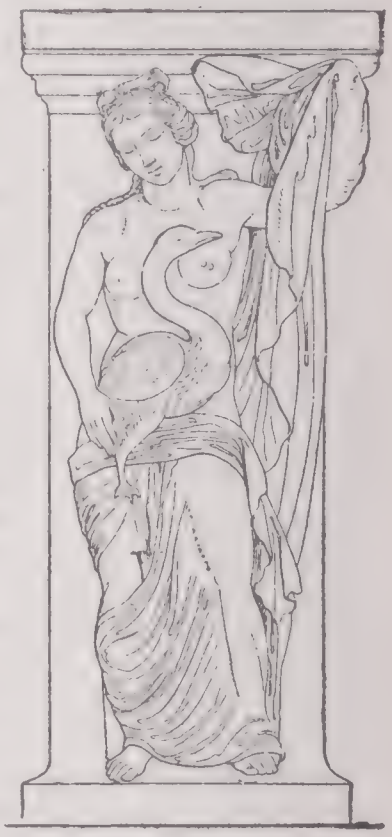
Lectisternium, a sacrifice of the nature of a feast offered to the gods, an evident survival of the idea common in early stages of religious development that divinities actually partook of the offerings presented to them (see the apocryphal story of Bel and the Dragon). On occasions of extraordinary solemnity, or in times of public calamity, the Greeks and Romans placed tables with food before images of the gods reclining on couches. According to Livy (v: 13), the first Roman lectisternium took place A. U. C. 354, when a terrible plague affected the cattle. These sacrificial feasts were of two kinds — ordinary, occurring almost daily (Liv. xlii: 30); and extraordinary, occurring at intervals, and lasting from three to eight days, or even for a longer period (Liv. xii: 10).

Lector, the second of the Minor Orders among the Latins, and the first among the Greeks. The office — that of reading the church lessons — is of great antiquity, mention being made of it by Eusebius; and the form of ordination now in use is nearly the same as that employed at the close of the 4th century. Lectors exist in the Greek Church and among the Copts, Syrians, Jacobites, and Nestorians. The Anglican communion recognizes lay lectors, who are set apart for their duty by a special form.

Lecture, a discourse read or pronounced on any subject; usually, a formal or methodical discourse or dissertation intended for instruction; as, a lecture on anatomy — sometimes a familiar and extemporized discourse, in distinction from a sermon or set homily. A magisterial exordium; a formal or judicial reproof; as, his father gave him a lecture on the impropriety of his conduct. In the English universities a rehearsal of a lesson or thesis.

Lecythidaceæ, an order of epigynous exogens, alliance Myrtales. It consists of large trees, with alternate entire or toothed undotted leaves, and minute deciduous stipules. The flowers are large, showy, terminal, solitary, or racemose; calyx superior; two to six-leaved; corolla of six petals, sometimes cohering at the base; stamens indefinite epigynous, part formed into a unilateral mass; often without anthers; ovary inferior, from two to six-celled; fruit a woody capsule; seeds several. They are natives of Guiana and other hot parts of South America. Genera seven; known species 38.

Leda, in classical mythology, a daughter of King Thestius, and wife of Tyndareus, King of Sparta. Being seen bathing in the river Eurotas by Jupiter, the god, struck with her beauty, resolved to deceive her. He persuaded Venus to change herself into an eagle, while he assumed the form of a swan, and, after this metamorphosis, Jupiter, as if fearful of the cruelty of the bird of prey, fled to the arms of Leda, who willingly sheltered the trembling swan. Nine months after she brought forth two eggs, from one of which sprang Pollux and Helena, and from the other Castor and Clytemnestra. The two former were deemed the offspring of Jupiter, and the others claimed Tyndareus for their father.



LEDA.

Ledeganck, Karel Lodewyk (led-uh-gänk′), a Flemish poet; born in Eecloo, Nov. 9, 1805. He was one of the most popular of Flemish writers. His first collection of poems was "Flowers of My Springtide" (1839). His poem on "The Three Sister Cities"— *i. e.,* Ghent, Bruges, Antwerp — is considered his finest production. He died in Ghent, March 19, 1847.

Ledochowski, Miecislas Halka (led-ō-kof′skē), a Polish Roman Catholic ecclesiastic; born in Galicia, Oct. 29, 1822. He studied theology at Warsaw, Vienna, and Rome; became domestic prelate and prothonotary apostolic to Pius IX.; entered the

papal diplomatic service and became papal auditor successively at Madrid, Lisbon, Rio de Janeiro, and Santiago de Chile. In 1861 he was made Archbishop of Thebes. By his appointment to the archbishopric of Guesen and Posen in 1866 he became primate *ex officio* of Poland. He was an active opponent of the Prussian ecclesiastical laws which gave the people of dioceses and parishes the privilege of choosing their own bishops and priests. In 1873 he headed this movement of opposition, and being called to appear before the courts to justify his action, he refused to obey the decree of the court, in consequence of which and his opposition to the ecclesiastical laws his property was confiscated, and he was made a prisoner at Ostrowa. He was made cardinal in 1875, and Prefect of the Propaganda in 1892. He died July 22, 1902.

Ledru-Rollin, Alexandre Auguste (luh-drü-rō-la*ng'*), a French agitator; born near Paris, France, Feb. 2, 1807. Admitted to the bar in 1830, he made a name as defender of Republican journalists and men of like views in the reign of Louis Philippe, and subsequently obtained a great reputation as a democratic agitator and leader of the workingmen's party. He was elected in 1841 deputy for Le Mans. On the outbreak of the revolution of 1848 he became a member of the provisional government, as minister of the interior, and in May was elected one of the five in whose hands the Constituent Assembly placed the interim government. But he offended his supporters, his colleagues, and the moderates by his arbitrary and injudicious conduct, and resigned. He next ventured on a candidature for the presidency against Louis Napoleon in December, but was ignominiously beaten. An unsuccessful attempt to provoke an insurrection against his fortunate rival put an end to his political activity and his influence. For the next 20 years he lived alternately in London and Brussels, being only amnestied in 1870. After his return to France he was elected to the Assembly in 1871, and again in 1874. He died in Fontenay, France, Dec. 31, 1874.

Ledum (Labrador tea), a genus of *Ericaceæ*, tribe *Rhododendreæ*. Calyx four-toothed; petals five, spreading; stamens 4 to 10; capsule five-celled, five-valved; seeds winged. The leaves of *Ledum latifolium* and *L. palustre* infused in beer produce headache, nausea, and even delirium. They have been prescribed in tertian ague, dysentery, and diarrhœa. Ledum is used in the tanning of Russian leather.

Ledum Oil, an oil obtained by distilling the leaves of the marsh wild rosemary (*L. palustre*). It is a yellowish, viscid oil, lighter than water, and possessing a pungent odor. When exposed to the air it gradually solidifies to a crystalline mass, insoluble in water, but soluble in alcohol and ether. It appears to be a mixture of a volatile oil and a solidified oil (ledum camphor). The analysis of ledum camphor leads to the formula $C_{28}H_{48}O$.

Ledyard, John, an American traveler; born in Groton, Conn., in 1751. He was a companion of Captain Cook in his third voyage round the world (1776–1780). He planned a journey through Northern Europe and Asia in the early part of 1788, but reached no farther than Irkutsk, Russia, where he was arrested on suspicion of being a spy, and was compelled to abandon his enterprise. In June of the same year he started on a voyage of exploration to Central Africa, under direction of the African Association, which was cut short by his death, in Cairo, Egypt, Nov. 17, 1789.

Ledyard, William, an American military officer; born in Groton, Conn., about 1750. He was in command of Fort Griswold, near New London, Conn., when it was attacked, Sept. 6, 1781, by an overpowering force of British under Lieutenant-Colonel Eyre. The fort was compelled to surrender and after this was done it is said that Ledyard was run through with his own sword, (Sept. 7, 1781) by the English officer, Major Bromfield, who had assumed command on the death of his superior in command.

Lee, the side or quarter of a ship opposite to that from which the wind blows; the sheltered side; the shelter afforded by an object interposed and keeping off the wind.

Lee, Ann, founder of the Society of Shakers in America; born in Manchester, England, Feb. 29, 1736. She was poor and uneducated, and in 1758 joined the Shakers, a sect allied in their belief to the Friends, but who were peculiar in their form of worship. They practised curious dances in which the whole body was shaken and thrown into strange postures. Ann Lee was married in 1762 to a blacksmith named Standerin, or Stanley. She believed herself inspired, and was imprisoned in 1770 for preaching the new doctrine of celibacy. In 1774 she emigrated to America and founded the Society of Shakers. She was greatly revered by her followers, and by them was called "Mother Ann." She died in Watervliet, N. Y., Sept. 8, 1784.

Lee, Arthur, an American diplomat and statesman; born in Westmoreland co., Va., Dec. 20, 1740. He was intrusted with missions to England and France, and conducted negotiations with France, Spain, Prussia and Holland, spending the years 1770–1780 in these duties. In the latter year he returned to America and was a member of Congress in 1782–1785. He died in Middlesex co., Va., Dec. 12, 1792.

Lee

Lee, Charles, an American military officer; born in Dernhall, Cheshire, England, in 1731. In 1775 he was made Major-General. He was captured by the British in 1776, and was exchanged in 1778. For disobedience of the orders of Washington at the battle of Monmouth in 1778, he was tried by court-martial and sentenced to one year's suspension from the army, and afterward was altogether dismissed by Congress. He died at Philadelphia, Pa., Oct. 2, 1782.

Lee, Eliza Buckminster, an American prose writer; born in Portsmouth, N. H., in 1794. Her "Sketches of New England Life" appeared in 1837, and was followed by "Delusion" (1839); a translation from the German of the "Life of Jean Paul Richter" (1842); "Naomi; or, Boston Two Hundred Years Ago" (1848); "Parthenia; or, The Last Days of Paganism" (1858); and a translation of Berthold Auerbach's "Barefoot Maiden" (1860). She died in Brookline, Mass., June 22, 1864.

Lee, Fitzhugh, an American military officer; born in Clermont, Fairfax co., Va., Nov. 19, 1835. He was graduated at the United States Military Academy in 1856. At the outbreak of the Civil War he resigned his commission and entered the Confederate Army, rising through its grades to that of Major-General. He participated in all the battles of the Army of Northern Virginia, and was severely wounded at Winchester in 1864. He commanded a cavalry corps of the Army of Northern Virginia in 1865, surrendering to General Meade in March. He was governor of Virginia from 1886 to 1890. Appointed consul-general at Havana in 1893 he served there till 1898, and was at the head of affairs in Cuba during the period immediately preceding the outbreak of the war with Spain. The Spanish government endeavored, without success, to effect his recall. President McKinley having intended to send an additional message to Congress on April 6, 1898, the effect of which would have been an immediate outbreak of hostilities, Consul-General Lee forwarded him a dispatch, stating that he would not be able to secure the removal of American citizens from Cuba before the night of the 9th. The President thereupon withheld his message, and on the appointed evening the Americans in Cuba who wished to leave were all conveyed from the island. During the war with Spain he was a Major-General of Volunteers; after peace was military governor of Havana; Brigadier-General U. S. A. and retired in 1901; Director-General, Jamestown Exposition, at time of death, April 28, 1905.

Lee, Francis Lightfoot, a signer of the Declaration of Independence and a brother of Richard Henry Lee; born in Stratford, Va., Oct. 14, 1734. He died in Richmond, Va., April 3, 1797.

Lee, Frederick George, an English clergyman and miscellaneous writer; born in Thame Vicarage, Oxfordshire, England, Jan. 6, 1832. At Oxford he was both University and College prizeman. He was ordained in 1854, and was vicar of All Saints', Lambeth. He was author of nearly 50 poems, essays, lectures, sermons, religious and historical studies, among which are: "Poems" (2d ed. 1855); "The Beauty of Holiness" (1859), lectures; "The Martyrs of Vienne and Lyons" (3d ed. 1866), an Oxford prize poem; "Glimpses of the Supernatural" (1875); "A Glossary of Liturgical and Ecclesiastical Terms" (1877); "Historical Sketches of the Reformation" (1878); "The Church Under Queen Elizabeth" (1880); "King Edward the Sixth, Supreme Head" (1886); "Cardinal Reginald Pole" (1887); "A Manual of Politics" (1889).

Lee, Frederic Richard, an English landscape painter; born in Barnstaple, Devonshire, England, in June, 1798. He chose the army for his profession, but being obliged by ill health to quit it, he turned his attention to painting (1818) and was a constant exhibitor at the Royal Academy from 1824 till 1870. He was elected an A. R. A. in 1834 and R. A. in 1838, retiring in 1871. Lee was one of the most thoroughly national painters of his day, the river scenery, parks, leafy lanes, and picturesque villages of his native country forming the favorite subjects of his pencil. He died in Cape Colony, Africa, June 4, 1879.

Lee, Mrs. Hannah Farnham Sawyer, an American author, wife of George Gardiner Lee; born in Newburyport, Mass., 1780. Her works, which exerted considerable influence during the first quarter of the 19th century, are: "Grace Seymour" (1835); "Three Experiments in Living" (1838); "The Huguenots in France and America" (1842); "Memoir of Pierre Toussaint" (1853). She died in Boston, Dec. 27, 1865.

Lee, Henry, an American soldier; born in Leesylvania, Va., Jan. 29, 1756. He was graduated at Princeton College in 1774, and on the outbreak of the Revolutionary War joined Washington's army. He speedily won distinction for his dash and daring, being styled "Lighthorse Harry Lee." He led the army of 15,000 men that put down the "whiskey insurrection" in Pennsylvania in 1794. He first uttered the words, "First in war, first in peace, first in the hearts of his countrymen," applying them to Washington, whose commemorative oration he delivered. He died on Cumberland Island, Ga., March 25, 1818.

Lee, Nathaniel, an English dramatist; born about 1657. He was educated at Cambridge, whither he went in 1668. He afterward went to London, and in 1675 produced his tragedy of "Nero," from that time to

1681 producing a tragedy yearly, the best known being the "Rival Queens" (1677). He also tried his abilities as an actor, but failed in the attempt. In 1684 he became insane and was confined in Bedlam till 1688, when he was discharged and wrote two more tragedies, the "Princess of Cleves" and the "Massacre of Paris," which appeared in 1689 and 1690. He died in 1691 or 1692.

Lee, Richard Henry, an American statesman; born in Stratford, Westmoreland co., Va., Jan. 20, 1732. He received part of his education in England, and after his return to his native country was chosen a delegate to the House of Burgesses from Westmoreland county. In the opposition to unjust British claims he played throughout a most important part, and on being sent as delegate from Virginia to the first American Congress at Philadelphia (1774) was at once recognized as a leader in that assembly. He drew up most of those addresses to the king and the English people which were admitted by his political opponents to be unsurpassed by any of the state papers of the time. When war became inevitable Lee was placed on the various committees appointed to organize resistance. On June 7, 1776, he introduced the motion finally breaking political connection with Great Britain. In consequence of weak health he was unable to serve in the field, but his activity as a politician was as unceasing as valuable. In 1784 he was unanimously elected president of the Congress, and when the federal Constitution was established he entered the Senate for his native State. In 1792 he retired into private life. He died in Chantilly, Va., June 19, 1794.

Lee, Robert, a Scotch clergyman; born in Tweedmouth, Scotland, Nov. 11, 1804. In 1857 he began his reform of the Presbyterian Church service. He restored the reading of prayers, as well as the custom of kneeling at prayer and standing during the singing; and in 1863 he introduced a harmonium, in 1865 an organ, into his church. These "innovations" brought down on him bitter and harassing attacks, extending over many years; and "the Greyfriars case" was still pending before the General Assembly when Lee fell from his horse in Princes Street, struck with paralysis. His works include a "Handbook of Devotion," "Prayers for Public Worship," a "Reference Bible" (1854); "The Family and Its Duties" (1863), and "The Reform of the Church" (1864). He died in Torquay, England, March 14, 1868.

Lee, Robert Edward, an American military officer; born in Stratford House, Westmoreland co., Va., Jan. 19, 1807. He was graduated at United States Military Academy in 1829, and entered the United States army as 2d lieutenant, becoming 1st

lieutenant in 1836, and captain two years later. In 1846 Lee was appointed engineer-in-chief to the United States army in Mexico; was brevetted major in April of that year for "gallant conduct at the battle of Cerro Gordo"; lieutenant-colonel in August, 1847, for distinguished bravery in the actions of Contreras and Churubusco; and colonel (Sept. 13, 1847), for eminent services at Chapultepec. After the close of the war Colonel Lee was reappointed a member of the United States Board of Engineers, and in 1852 was made superintendent of West Point Military Academy, which he held till March, 1855, when he was appointed lieutenant-colonel of cavalry. In 1861 he received his colonelcy, but resigned his commission within a month afterward, and offered his sword to his native State, Virginia, which had just seceded from the Union, and was then threatened by the National forces. His offer being promptly accepted, Colonel Lee was appointed commander-in-chief of the Virginia troops, with the rank of general in the Confederate army. He occupied himself with the placing of his troops in a state of perfect organization and equipment, till May, 1862, when he superseded Gen. J. E. Johnston in the command of the army intrusted with the defense of Richmond, at that time threatened by a formidable Union army under the command of General McClellan, his old companion-in-arms, and coassociate in the commission sent by the United States government, in 1854, to the Crimea, to report on the Allies' operations there. In the sanguinary campaign that ensued, the object of which was on one side the capture and on the other the defense of the Confederate capital, General Lee, aided by "Stonewall" Jackson, made a vigorous assault on McClellan's army, and succeeded, in a series of severe battles, known as the "Seven Day's Battles," in forcing it back from its

ROBERT E. LEE.

position in front of Richmond. In August of the same year, General Lee forced the Union army under General Pope to fall precipitately back upon Washington. The campaigns he conducted in Maryland and Pennsylvania in 1862–1863, were, however, not so fortunate. After fighting a hotly-contested and drawn battle at Antietam, Sept. 17, 1862, Lee was obliged to retreat across the Potomac; and though victorious in the first day's battle at Gettysburg (July 1, 1863), he met with a disastrous repulse two days afterward, and was again compelled to retire across the Potomac. Previous to this, however, General Lee had signally defeated General Burnside's army at Fredericksburg, Dec. 12–16, 1862, and also defeated General Hooker at Chancellorsville, May 1–4, 1863. From August, 1863, till May, 1864, General Lee was engaged in operations along the line of the Rappahannock, and fought a succession of desperate battles in the Wilderness, and from there S. to his old position before Richmond, during May, 1864. On Feb. 5, 1865, General Lee was appointed commander-in-chief of all the Confederate armies in the

STEPHEN D. LEE.

field, and till April in that year held the defenses of Petersburg and Richmond, fighting several battles to retain them. On April 2 he was at last dislodged from his intrenchments by superior forces, compelled to retreat from Petersburg, and eventually to surrender himself and army to General Grant, April 9, after a long and gallant contest with his resolute and able adversary. General Lee was installed president of Washington College, Va., Oct. 2, 1865. He died in Lexington, Va., Oct. 12, 1870.

Lee, Stephen Dill, an American military officer; born in Charleston, S. C., Sept. 22, 1833. He was graduated at United States Military Academy in 1854. He served in the army till 1861, when he resigned to enter the Confederate service, rising through its military grades to that of Lieutenant-General. He fought gallantly in the battles around Richmond, at the second Bull Run and other engagements. After the war he was active in organizations of Confederate veterans. In 1899 he became commander of the Vicksburg National Park. He died May 28, 1908.

Lee, Sophia and **Harriet,** English novelists; born in London, England, Sophia in 1750, Harriet in 1757. They were daughters of John Lee, actor. Sophia at 29 wrote a very successful comedy, "The Chapter of Accidents." In "The Recess: A Tale of Other Days" (1784) and in "Canterbury Tales" (5 vols. 1797–1805), which she wrote in conjunction with Harriet, and which soon became a general favorite, is seen the beginning of the historical school in novel writing. One of the "Canterbury Tales"—"Kruitzner; or, the German's Tale"—written by Harriet, suggested to Byron the subject of "Werner." She also wrote the stories "The Errors of Innocence" (5 vols. 1786), and "Clara Lennox" (1797). They died — Sophia in Clifton, England, March 13, 1824, Harriet in Clifton, Aug. 1, 1851.

Lee, William, an English inventor; born in Nottinghamshire, England, about 1560. He was a graduate of Cambridge University and best known as the inventor of the stocking frame. He presented a pair of silk stockings, knit by his machine, to the queen in 1598, but the hand-knitters violently opposing the introduction of machinery to do their work, he went to France. Meeting with no better success there he became greatly discouraged, and his death is said to have been the result of his disappointment. He died in Paris, France, about 1610.

Lee, Vernon, pseudonym of VIOLET PAGET, an English essayist and miscellaneous writer; born in 1856. Her writings include: "Studies of the Eighteenth Century in Italy"; "Belcaro," a volume of essays; "The Prince of a Hundred Soups," a fairy tale; "Miss Brown," a novel; and many others. She lived in Italy for years.

Leech, any individual of the suctorial order *Hirudinea,* of which the best known examples are the horseleech, and the medicinal leech, under which name two species are commonly employed: *H. medicinalis,* chiefly imported from Germany, Bohemia, and Russia; and the Hungarian leech (*H. officinalis*). Greenish-olive to dark green, six yellow-reddish or yellow bands along the back; numerous black spots on abdomen. The body is composed of from 90 to 100 rings, and furnished with a discal and caudal sucker. The anterior sucker is small, the mouth furnished with three semicircu-

lar toothed jaws meeting in a point. Leeches grow very slowly, and some years elapse before they arrive at maturity. They are not fit for medical purposes before the age of 12 or 18 months. They inhabit pools and marshy places; and in the S. of France they are bred in large marshes chiefly for the continental market. Leeches are employed for the local extraction of blood when cupping is not advisable. Care should be taken that they do not enter the mouth or any other cavity of the body. To destroy a leech in the stomach, injections of salt and water are used.

Leech, John, an English artist and humorist; born in London, England, Aug. 29, 1817. He was educated at the Charterhouse School. He studied at St. Bartholomew's Hospital for a time, but forsook medicine, and commenced drawing on wood for publications. His first important work was illustrations to the "Ingoldsby Legends." In 1841 he joined the staff of "Punch," his first drawing appearing in August of that year. For that periodical he worked with preëminent success, supplying weekly political satires and pictures of all phases of English life, showing no less artistic power than versatile humor. His designs for "Punch" have nearly all been republished as "Pictures of Life and Character," and as "Pencillings from Punch." He also executed the illustrations for "Mr. Sponge's Sporting Tour," "The Comic History of England," and other books. No artist has excelled John Leech in his particular line. He died suddenly in London, Oct. 29, 1864.

Lee-Chee. See LITCHI.

Leeds, a manufacturing town of England, in Yorkshire, on the river Aire, which here becomes navigable and is crossed by eight bridges. The Leeds and Liverpool Canal communicates with the Aire, which again gives water communication with Hull, etc. The town extends for about 7½ miles from E. to W. and about 7 from N. to S. The houses are almost entirely built of brick. Among the most conspicuous of the public buildings are the town hall, a massive stone building of the Corinthian order, considered one of the finest municipal buildings in the kingdom; the infirmary, a building in the Gothic style; the municipal offices and free library, the royal exchange, the mechanics' institute and school of science and art, the Grand Theater, etc. The chief educational institution is the Yorkshire College for science, technology, and medicine, affiliated to the Victoria University, Manchester. The charities and charitable institutions are numerous. Leeds possesses a public park of 300 acres, while throughout the town various pieces of land have been laid out by the corporation as recreation grounds. The waterworks and the gasworks are the property of the city. Leeds has been for generations the chief seat of the woolen manufacture of Yorkshire. In the wholesale clothing trade several thousand hands are employed, as also in steel works, iron foundries, rolling mills, tool and machine factories. The boot and shoe factories, the leather trade, and the cloth-cap trade also employ large numbers of men and women, and there are extensive color printing works, tobacco manufactories, chemical and glass works, works for making drainage pipes, fire-bricks, terra cotta, pottery, etc. Nearly 100 collieries are worked in the district. The history of Leeds extends over more than 1,200 years, the town being mentioned under the name of Loid or Loidis by the Venerable Bede as the capital of a small British kingdom about 616. In the neighborhood is the fine ruin of Kirkstall Abbey. Pop. (1901) 428,953.

Leek, a biennial plant, believed now by many of the best authorities to be a cultivated variety of the British species, *Allium Ampeloprasum,* a well-known biennial species of the onion family, much esteemed for culinary purposes. In gardens much attention is given to its cultivation. The more liberal the culture the more delicate and tender is the produce; therefore it is generally grown in trenches, which have a liberal supply of manure dug into them in the same way as celery. The stems are blanched by earthing up, which increases their delicacy. Scotland is famous for the splendid quality of its leeks, and Musselburgh is the center in which the most approved kinds are grown for seed saving. Seeds grown there have a special commercial value, which is due entirely to care, year after year, in selecting only the best types for the purpose of seed saving. St. David, patron saint of Wales, is credited with having advised the Britons, on the eve of battle with the Saxons, to wear leeks in their caps, so as easily to distinguish friends from foes, and thus to have helped to secure a great victory. Hence the Welsh custom of wearing leeks in their hats on St. David's day.

Lee Rifle, a gun manufactured for the use of the United States navy. Technically described the Lee rifle is a weapon discharging a steel-jacketed bullet with smokeless powder. The velocity of the bullet is 2,460 feet per second, and the penetration, at the regulation range of 15 feet, is 62 pine boards each seven-eighths of an inch in thickness. The pressure on the gun when fired is 60,000 pounds to the square inch. The rifle will kill at over a mile.

Leeuwarden (lā'vär-den), capital of the Dutch province of Friesland, on the Harlingen and Groningen Canal, 113 miles

from Utrecht. It contains handsome law courts and town hall, has an ancient palace of the Princes of Orange, a library with valuable archives, and 12 churches. Linen fabrics, mirrors, pianofortes, and wagons are manufactured. Leeuwarden is one of the largest fruit and cattle markets in Holland, and does considerable trade in agricultural produce, groceries, wine, and brandy. In the 13th century it was situated on an arm of the sea, which subsequently sanded up. Pop. (1906) 34,397.

Leeuwenhoek, Anton van (lā'venhek), a Dutch scientist; born in Delft, Netherlands, Oct. 24, 1632. He enthusiastically pursued microscopic work with self-made instruments in 1654, made many important discoveries, and died in Delft, Aug. 27, 1723.

Leeuwin, Cape (lā'vin), the S. W. corner of Australia, notable on account of the tempestuous weather usually encountered there.

Leeward. See LEE.

Leeward Islands, the W. section of the Lesser Antilles (so called in distinction from the Windward Islands with reference to the trade winds). Of the whole group Guadalupe, Martinique, St. Bartholomew, and part of St. Martin belong to France; St. Eustatius, Saba, and part of St. Martin to Holland; and some of the Virgin Isles to Denmark. Those which belong to Great Britain were grouped together in one federal colony in 1871, and consist of the five presidencies of Antigua (with Barbuda and Redonda), Montserrat, St. Kitts and Nevis (with Anguilla), Dominica, and the Virgin Islands. The Leeward Islands confederation has representative government, with a governor, executive, and Federal Legislative Council, though each presidency possesses its own constitution. The capital and seat of government of the Leeward Islands is St. John, Antigua. The chief products are sugar and molasses.

Le Fanu, Joseph Sheridan (luh fänü' or lef'a-nū), an Irish journalist and novelist; born in Dublin, Ireland, Aug. 28, 1814. Having graduated from Trinity College, Dublin, he joined (1837) the staff of the "Dublin University Magazine," at first as contributor, and afterward as editor and proprietor, besides having an interest in the "Evening Mail." He made his literary début while in college, but did not attract attention till the publication of two stirring Irish ballads, "Phaudbrig Crookore" and "Shamus O'Brien." Among modern Irish novelists he stands next in popularity to Charles Lever. "The House by the Churchyard" appeared in 1863, and was succeeded by "Uncle Silas" (1864), his most powerful work; "Guy Deverell" (1865); "The Tenants of Malory" (1867); "The Wyvern Mystery" (1869); "In a Glass Darkly" (1872). He died in Dublin, Feb. 7, 1873.

Lefebvre, François Joseph (luh-fāvr'), a French military officer; born in Ruffach, Alsace, Oct. 25, 1755. He entered the army at the age of 18, and was a sergeant in the French Guards when the Revolution broke out. He was engaged for some time on the Moselle and Rhine, fought at Fleurus, Altenkirchen, and Stockach, and rose in rank with wonderful rapidity. In 1799 he took part with Bonaparte in the overthrow of the Directory, and in 1804 was made a Marshal of the Empire. He also conducted the siege of Danzig, and after its capture was created Duke of Danzig. He distinguished himself in the early part of the Peninsular war, and suppressed the insurrection in Tyrol. During the Russian campaign he had the command of the Imperial Guard, and in 1814 of the left wing of the army which resisted the advance of the allies in France. Submitting to the Bourbons after Napoleon's abdication, he was made a peer, a dignity restored to him in 1819, though he had sided with his old master during the Hundred Days. He died in Paris, Sept. 14, 1820.

Leg, the lower limbs or extremities of the body. Each of these consists of two bones, the tibia or shinbone and the fibula or peroneal bone alongside of the tibia. The two are connected at their upper and lower extremities by synovial articulations, and have their shafts united by an interosseous membrane.

Legacy, anything which is handed or passed down from an ancestor or predecessor. The word has, however, a peculiarly legal sense.

"A legacy is a bequest or gift of goods and chattels by testament, and the person to whom it was given is styled the legatee. This bequest transfers an inchoate property to the legatee; but the right is not perfect without the assent of the executor; for, if I have a general or pecuniary legacy of $500, or a specific one of a piece of plate, I cannot in either case take it without the consent of the executor. For in him all the chattels are vested, and it is his business first of all to see whether there is a sufficient fund left to pay the debts of the testator: the rule of equity being that a man must be just before he is permitted to be generous. And in case of a deficiency of assets, all the general legacies must abate proportionably, in order to pay the debts; but a specific legacy, of a piece of plate, a horse, or the like, is not to abate at all, or allow anything by way of abatement, unless there be not sufficient without it. Upon the same principle, if the legatees have been paid their legacies, they are afterward bound to refund a rateable part, in case debts come in more than sufficient to exhaust the residuum after the legacies paid."— Blackstone.

Le Gallienne, Richard, an English author; born in Liverpool, England, Jan. 20, 1866. He was educated at Liverpool College. He served articles to a firm of chartered accountants for seven years; aban-

doned business for literature; for a few months was private secretary to Wilson Barrett, and later literary critic for the "Star." He finally settled in London. He published "My Ladies' Sonnets" (privately printed) (1887); "Volumes in Folio" (1888); "George Meredith" (1890); "The Book-Bills of Narcissus" (1891); "English Poems" (1892); "The Religion of a Literary Man" (1893); "Prose Fancies" (1st series 1894); "Robert Louis Stevenson and other Poems" (1895); "Retrospective Reviews" (1896); "Prose Fancies" (2d series 1896); "The Quest of the Golden Girl" (1896); "If I were God" (1897). He edited an edition of Isaak Walton, "The Compleat Angler," and a verse translation of Omar Khayyam. "The Romance of Zion Chapel" appeared in 1898.

Legaré, Hugh Swinton (lē-gär-ā′), an American statesman; born in Charleston, S. C., Jan. 2, 1789. He was graduated at the college of South Carolina, in 1814, with the highest honors, and in 1818 proceeded to Europe, where he went through a course of studies at Edinburgh University. After a tour of Europe he returned home, was returned to the South Carolina Assembly in 1820, and two years later entered upon the practice of law. In 1821 he represented his native city in the State Legislature, and in 1830 was elected attorney-general. He shortly afterward established the "Southern Review" in conjunction with Stephen Elliott. He was, in 1832, appointed charge d'affaires at Brussels. In 1836, he returned, and was at once elected to the lower house of Congress, but while there he failed to please his constituents and was not reëlected. In 1840 he was appointed attorney-general of the United States. He died in Boston, Mass., June 20, 1843.

Legate, an ambassador (a cardinal or bishop) sent by the Pope to a foreign prince or state.

Legatine Constitutions, ecclesiastical laws enacted in national synods held under Cardinals Otho and Othobon, legates from Pope Gregory IX. and Pope Clement IV., in the reign of Henry III., about 1230 and 1268.

Legation, the ambassador or envoy sent to any foreign court on a mission, together with his assistants; as, the legation of the United States.

Legato, bound, close, connected. A piece of music so marked is intended to be sung or played in an even, smooth, and gliding manner. It is opposed to staccato. The notes intended to be played legato are frequently tied or joined by signs above or below them.

Legazpe, Miguel Lopez de (leg-äth′-pā), a Spanish military officer; born in Zumarraga, Guipuzcoa, about 1510. In 1564 he was made commander of the Spanish forces sent to the Philippine Islands. He took possession of several of the islands and founded San Miguel in Cebu, in May, 1565. In 1571 he conquered the island of Luzon and established the city of Manila in May of that year. He died in Manila, Aug. 20, 1572.

Legend, a chronicle, biography, or register of the lives of saints, which were formerly read in the refectories of religious houses, and as lessons at matins. From the marvelous stories in some of these biographies the term came to mean a story of an incredible or marvelous character; originally such a one told of a saint, and hence any non-historical or unauthentic story; a tradition, a fable.

Leger Line, or **Ledger Line,** in music, one of a number of short lines drawn above or below the ordinary stave, at the relative distances at which the whole lines would be placed. On and between these lines, notes belonging to passages beyond the extent of the stave are placed. The use of leger lines is comparatively modern in musical notation, for it was anciently supposed that the stave, with a certain clef prefixed, was sufficient for the compass of the voice or instrument using such clef. When the compass was extended the clef was shifted so that the music might be still expressed within the limits of a stave.

Legendre, Adrien Marie (luh-zh*ong*dr′), a French mathematician; born in Paris, France, Sept. 18. 1752. At 22 he was Professor of Mathematics in the Military School at Paris, and in 1783 was elected member of the Academy. He was one of a commission of three in 1787 to measure a degree of latitude between Dunkirk and Boulogne — the basis of the metric system; afterward he held high and honorable posts under the government; and in 1824 was Inspector of the Higher Education. From this office he was dismissed in disgrace because he refused, as member of the Academy, to vote for the admission of government nominees. His principal works are: "Elements of Geometry" (1794); "Theory of Numbers" (1798); "Treatise on Euler's Elliptical and Integral Functions" (3 vols. 1826–1829). He died near Paris in great poverty, Jan. 10, 1833.

Leger, Paul Louis (luh-zhā′), a French scholar and author; born in Toulouse, France, Jan. 13, 1843. He was Professor of the Slav Languages at the College of France, and did much to awaken an interest in the history and philology of the Slav peoples by such works as: "Slav Studies" (1875); "History of Austria-Hungary" (1878), translated into English; "Slav Tales" (1882); "The Save, Danube, and Balkan" (1884); "Bulgaria" (1885);

"Russians and Slavs" (1890); "Russian Literature" (1892).

Legerdemain, sleight of hand; dexterity in deceiving the eye by the quickness or nimbleness of the hand; a trick performed so dexterously and adroitly as to elude discovery by the spectators; trickery, juggling; a juggle.

Legge, James, an English Chinese scholar; born in Huntly, Aberdeenshire, England, Dec. 20, 1815. He was educated at King's College, Aberdeen, where he graduated in 1835. He passed afterward to Highbury Theological College, London and went out to Malacca, arriving in December, 1839, as a missionary to the Chinese in connection with the London Missionary Society. For some time he took charge of Dr. R. Morrison's Anglo-Chinese College there; next labored for 30 years at Hong Kong; and was appointed in 1876 to the newly founded chair of the Chinese Language and Literature at Oxford with a Corpus Christi fellowship. His greatest work has been his edition of the "Chinese Classics," the four "Shu" and the five "King," with text, translation, and commentaries. He died in Oxford, England, Nov. 29, 1897.

Leghorn, a walled city and seaport of Italy, on the Mediterranean Sea. It is, in general, a neat, clean, and well built place; the N. part of the city, called Venezia Nova, is intersected by canals, and comprises wharves, warehouses, and other commercial edifices. Leghorn has an outer and inner harbor and a good roadstead. The outer harbor, protected by a fine mole, is unfit for vessels of more than 400 tons burden, and the inner is only adaptable to still smaller craft. The roadstead outside is suited to the anchorage of large ships, though exposed to heavy seas during winds from the S. A lighthouse, 170 feet above sea-level, commands the harbor. Among the chief articles of manufacturing industry are woolen caps, straw hats, glass, paper, soap, starch, rope, leather, etc. Shipbuilding is extensively engaged in. It has besides a large export and import trade. Leghorn was made a free port about the middle of the 16th century, and owes much of its eminence and prosperity to the fostering care of the Medici family and the subsequent rulers of Tuscany. Pop. (1901) 98,321.

Leghorn, a kind of plait of the straw of bearded wheat cut green and bleached, and used for bonnets and hats. It derives its name from being imported from Leghorn. (A hat made of the plait described is called a Leghorn). The kind of wheat in question is about 18 inches high. It is grown on poor sandy soil on the banks of the Arno, between Leghorn and Florence, expressly for manufacture into hats. It is pulled green and blanched like flax on the gravelly bed of the river.

Leggett, William, an American journalist; born in New York city in 1802. He was on the editorial staff of the New York "Evening Post" (1829–1836); and wrote: "Leisure Hours at Sea" (1825); "Naval Stories" (1834), "Tales of a Country Schoolmaster" (1835). He died in New Rochelle, N. Y., May 29, 1839.

Legion, a division of the ancient Roman army, consisting of a number of men varying at different periods from 2,000 to 6,000. Originally the legion was divided into 15 companies (*manipuli*), each of which contained 60 rank and file, two officers — called centurions — and one standard-bearer (*vexillarius*). Afterward it was divided into 10 cohorts, each cohort into three companies (*manipuli*), and each company into two centuries.

"The legion, as established by Romulus, contained 3,000 foot-soldiers. From the expulsion of the Tarquins till the beginning of the second Punic war, the number varied from 4,000 to 4,200, though on emergencies the strength was raised to 5,000 and even 5,200. From the beginning of the second Punic war till the age of Marius (100 B. C.), the number varied from 4,200 to 5,200, seldom falling below 5,000, and in some cases rising as high as 6,000. From 100 B. C. till the downfall of the empire, the number varied from 5,000 to 6,200. From the accession of Augustus till the time of Hadrian, 6,000 seems to have been regarded as the regular complement" — Ramsay, "Roman Antiquities."

Legion of Honor: A French order of merit founded by Napoleon I., when first consul, as a reward for services or merit, civil or military. It consisted of various grades, as grand crosses, grand officers, commanders, officers, and legionaries. The constitution of the order has been often remodeled since it was established.

Legio Septima Gemina. See LEON.

Legislature, a word which, when applied to the Federal government, refers to the Congress, which is composed of a Senate and a House of Representatives. When the States and Territories are referred to it is used to designate the legislative branch of the government, though in the majority of the States the official title is "general assembly," while in others the terms "general court" and "legislative assembly" are employed. In all the States the Legislature is composed of two houses, though Pennsylvania, up to 1790, and Vermont, up to 1836, had but one house. The upper house is called the Senate in the States, and the Council in the Territories; the lower is called the House of Representatives in the Territories and most of the States, but is known as the House of Delegates, the Assembly, or the General Assembly, in a few of the States.

Legitim, in Scotch law, that part of a father's movable property to which his children are entitled on his death. It amounts to one-half in cases where the father has

left no widow, and to one-third when there is a widow. Legitim cannot be affected or diminished by any testamentary or other deed. Legitim is now payable also on a mother's movable estate. Legitim is also called bairns' part of gear.

Legitimation, the act of making lawful, legal, or legitimate; the act of giving anything the sanction of law. In law, a provision made by canon law and by the civil law of Protestant and Catholic countries, and by statute in some States of the Union, that the marriage of the father and mother of illegitimate children should confer on such offspring the status of children born in wedlock. The only condition is, that at the time of the conception or birth of such offspring both parties should have been free to marry. By the Constitutions of Merton (A. D. 1236) it was decided that no such provision existed in the common law of England.

Legitime, François Denys (luh-zhē-tem′), a Haitian soldier; born in 1842. Becoming minister under President Salomon, he resigned that post because he was accused of aspiring to the presidency, and retired to Kingston, Jamaica, where he remained three years. At the end of that period he returned to Haiti at the invitation of his followers, and on Oct. 7, 1888, was elected president of the provisionary government of Haiti. Thelemaque denounced the election as a job, and raised an army to make himself president, but he was killed in the battle which ensued. Legitime was elected president of Haiti, Dec. 17, 1888, but resigned in 1889, owing to the opposition of General Hippolyte. He lived in retirement in Jamaica till 1896, when President Sam granted a general amnesty, and he returned to Haiti.

Legitimist, one who advocates and supports legitimate authority; one who supports the doctrine of hereditary monarchical government and divine right; or an adherent or supporter of the elder branch of the Bourbon family, driven from the throne of France in 1830.

Legnago (len-yä′nō), one of the four fortified towns of Northern Italy, known as the Quadrilateral. It has a considerable trade in rice, corn, and silk. The fortifications were razed by Napoleon in 1801, but rebuilt 14 years later.

Legros, Alphonse (luh-grō′), a French painter and etcher; born in Dijon, France, May 8, 1837. His parents, who were poor, apprenticed him to a house-painter. He first attracted attention by pictures exhibited in the Paris Salon, 1859–1863. In this last year he settled in London, and becoming a naturalized Englishman was in 1876 appointed Slade Professor of Fine Arts in University College, London. The subjects he painted best were the rural scenes, and the peasants and humble priests, of France. His admirable artistic method and the austere simplicity and reserve of his style, though they secured him warm admirers among artists, did not make him popular.

Legume, a one-celled one or many-seeded two-valved superior fruit, generally dehiscent by a suture along both its face and back, and bearing its seeds on either margin of the ventral suture. In *Astragalus* two spurious cells are formed by the projection inward of either the dorsal or ventral suture, which forms a kind of dissepiment, and in *Cassia* a great number of "phragmata," or transverse diaphragms, are formed by projections of the placentæ. In *Cathartocarpus*, etc., the legume is indehiscent, but the line along which dehiscence would normally be is indicated by the presence of sutures. The "legumen" is placed by Lindley in his class of fruits called Apocarpi. It differs from the follicle only in dehiscing by two valves.

Leguminosæ, leguminous plants, an order of perigynous exogens, alliance Rosales. It consists of herbs, shrubs, or trees, with alternate, generally compound leaves, occasionally dotted; the petiole tumid at the base, with two stipules at the base of the petiole, and two at the base of each leaflet; the pedicles usually articulated; calyx five-parted, inferior, the odd segment anterior; petals five, or by abortion four, three, two, one, or none; stamens definite or indefinite, diadelphous, more rarely monadelphous or polyadelphous; pistil one-celled, generally of one carpel; fruit a legume, or more rarely a drupe; seeds one or more, attached to the upper suture. Known genera 297, species 4,700, diffused, though not equally, all over the globe. It is divided into three sub-orders, *Papilionaceæ*. *Cæsalpinieæ*, and *Mimoseæ*.

Leh, the walled capital of Ladakh, State of Kashmir, India; 3 miles from the bank of the Indus, 11,538 feet above the sea; is one of the chief markets of the trade between Tibet and Chinese Turkestan on the one hand and the Punjab on the other. Pop. estimated at about 4,000.

Lehigh, a river which flows 120 miles through Eastern Pennsylvania to the Delaware river. Some of its scenery is very picturesque, but the valley is more famous for its rich mines of anthracite coal.

Lehigh University, an educational non-sectarian institution in South Bethlehem, Pa.; founded in 1865; has grounds and buildings valued at over $1,600,000; endowment exceeding $1,300,000; scientific apparatus, etc., $390,000; volumes in the library, about 125,000; ordinary income, $250,000; aver-

age number of faculty, 67; average student attendance, 860; graduates, about 2,000.

Lehmann, Rudolf (lā'män), a German painter; born near Hamburg, Aug. 19, 1819. He studied painting in Paris under Henry Lehmann; in Munich under Cornelius and Kaulbach; joined his brother in Rome, in 1839, where he spent, with some interruptions, 16 years. His picture, "The Blessing of the Pontine Marshes by Sixtus V.," was bought by the French government for the Museum of Lille. He died Oct. 27, 1905.

Lehrs, Karl (lārs), a German philoloist; born in Königsberg, Prussia, Jan. 14, 1802. He was appointed instructor in philology in the Königsberg University in 1831, and in 1845 became professor. His works deal for the most part with recondite questions, as "Aristarchus' Studies on Homer" (1833); "Three Writings of Herodianus" (1848); "The Scholia to Pindar" (1873); but he wrote also "Popular Essays on Antiquity, Especially on the Ethics and Religion of the Greeks" (1856; enlarged ed. 1875). He died in Königsberg June 9, 1878.

Leibnitz, or more correctly, **Leibniz, Gottfried Wilhelm, Freiherr von,** one of the most celebrated scholars and philosophers that Germany has ever produced; born in Leipsic July 6, 1646. He attended the school at St. Nicholas, in Leipsic, till he was 15 years old, when he entered the university of his native town, and though his principal study was ostensibly law, he paid particular attention to mathematics and philosophy, at that time taught by Jakob Thomasius. He passed one year at Jena in order to avail himself of the instruction of the celebrated mathematician Ehrhard Weigel. After his return to Leipsic he studied the Grecian philosophy. He gave a splendid proof of his progress in his philosophical dissertation "De Principio Individui," which he defended under Thomasius (1664), and which was followed by several legal treatises, for example, "De Conditionibus" (1665), and by a remarkable philosophico-mathematical treatise, "De Arte combinatoria." In his 20th year he presented himself to the legal faculty as a candidate for a doctorate but was refused on account of his youth and received his degree at Altorf. He was offered the place of professor extraordinary of law in that university, but he preferred going to Nuremberg where there were many distinguished men. The Freiherr von Boyneburg, minister to the Elector of Mainz, having become acquainted with him, withdrew him from a society of alchemists in that city, with which he had connected himself, and promising him a place in the service of the elector induced him to fix himself at Frankfort-on-the-Main. Here appeared in 1667 his "Nova Methodus discendæ docendæque Jurisprudentiæ," which is remarkable for its clear and at the same time profound views, and which at the request of his patron was soon followed by a treatise in which he endeavored to prove to the Poles that it was for their interest to elect the Prince of Neuburg king in preference to any of the other candidates. At the suggestion of Boyneburg he was now named an electoral councillor and chancellor of justice, but this business could not satisfy a mind thirsting for knowledge. He continued his literary labors, and published his "Theoria Motus abstracti," and "Theoria Motus concreti" (1671—two physical inquiries, remarkable only for the boldness of their views), and also his "Sacrosancta Trinitas, per nova Argumenta logica defensa," a work directed against the attacks of the Pole Wissowatius, on the doctrine of the Trinity.

In the meantime the literary splendor of Paris had attracted his attention and he willingly undertook to accompany the young Boyneburg thither (1672). The distractions of this capital did not draw him from his studies. He applied himself particularly to mathematics, and enjoyed the acquaintance of the celebrated Huygens, whose expectations he answered by the invention of an arithmetical machine similar to that of Pascal. His patron, Boyneburg, died in 1673, and Leibnitz, who had nothing to detain him longer in Paris, declined the place of pensioner in the Academy, as it would have been necessary for him to embrace the Catholic religion, and went to England where he became acquainted with Wallis, Bayle, Oldenburg, and Newton, and was elected a member of the Royal Society. He then applied to the Duke of Brunswick-Lüneburg, who gave him the office of councillor and a pension, with permission to extend his residence in foreign countries at his pleasure. Availing himself of this permission he returned to Paris, where he spent 15 months devoted entirely to mathematics, and then returned by the way of England and Holland to Hanover, where he arrived 1676, and immediately entered upon the superintendence of the library, which was his principal duty. Here he soon published his treatise "De Jure Suprematus ac Legationis Principum Germaniæ," and labored with great zeal to effect the publication of the "Acta Eruditorum." On the death of the Duke of Brunswick, his successor commissioned Leibnitz to write the history of his house. In order to consult the documents necessary for that purpose Leibnitz went (1687) to Vienna, and (as the old counts of Liguria, Tuscany, and Este were sprung from the same source as the house of Brunswick) thence to Italy. The three years which he spent in making these tours of investigations supplied him with

Leibnitz

an immense mass of diplomatic and political materials, the smallest portion of which appeared in the work he had undertaken; the remainder was published in 1693 and 1700, under the title "Codex Juris Gentium diplomaticus," and "Mantissa Codicis." At the same time he employed himself in arranging the materials which he had collected for his historical undertaking, and after having published an essay on the connection between the houses of Brunswick and Este, which procured him the appointments of privy-counsellor of justice and historiographer, he gave to the world (1707–1711) "Scriptores Rerum Brunsvicensium" (3 vols.).

But this important work was only a preparatory step. The history itself was never published; the outline only was found among his papers after his death and published in the "Acta Eruditorum" for 1717. According to this plan we should have had a general account of the primitive condition, not only of Germany, but of the whole world, in conformity with the views given by Leibnitz in his "Protogæa." The "Accessiones historicæa," and the "Disquisitio de Origine Francorum," were published in Hanover in 1715. As Leibnitz displayed a profound knowledge of history in the above-mentioned works, so he showed a no less intimate acquaintance with theology in his attempts at forming a plan for reuniting the Protestants and Catholics, in which he spent much fruitless labor in conjunction with Molanus and Bossuet. Among his plans for the good of mankind may be mentioned his exertions to invent a universal character and a common philosophical language (pasigraphy). The Elector of Brandenburg (afterward Frederick I., King of Prussia) requested his advice in the establishment of the Royal Academy of Sciences at Berlin, and when the institution was completed according to his plan the elector made him president of the academy (1700). Leibnitz furnished a great part of the papers in the "Miscellanea Berolinensia," which the new Academy published in 1710. On the death of the king, three years after, his successor having little taste for the sciences, Leibnitz foresaw the fall of the society and therefore hastened to Vienna to obtain for it the protection of the Emperor Charles VI. His efforts were unsuccessful, though he met with a most flattering reception from the emperor, who had already conferred on him the dignities of baron and of aulic counsellor, with a pension of 2,000 florins. He also had an interview with the Czar Peter at Torgau (1711) who, in return for his advice concerning the civilization of his vast empire, conferred on him the title of privy-counsellor, with a pension of 1,000 roubles. Loaded with honors, he crowned his literary fame by his celebrated "Essai de Théodicée" (1710), in which he maintained the doctrines of preëstablished harmony and optimism, and which was followed by his "Nouveaux Essais sur l'Entendement humain." His unfortunate controversy with Newton concerning the discovery of the differential calculus, and the pains of the gout, imbittered the close of his active life. He died in his 70th year, Nov. 14, 1716. He was never married.

The principal metaphysical speculations of Leibnitz, which, however, he never elaborated into a complete system, are contained in his "Théodicée," "Nouveaux Essais," "Système nouveau de la Nature," "De Ipsa Natura," "Monadologie," and in portions of his correspondence. He controverted Locke's rejection of innate ideas. There are, according to Leibnitz, in philosophy as well as in mathematics, necessary truths which cannot be learned from experience, and which rest on principles the proof of which is independent of the senses. Those necessary truths are innate in the soul, not, indeed, actually forming objects of knowledge, but capable of being called forth by circumstances. Whatever is derived from the senses is confused, and distinct knowledge is possessed only by the understanding. In order to attain truth it is necessary to use the rules of logic, as mathematicians also use them, by unfolding, analytically, the simple truths contained in a subject, till the fundamental truth is attained. The Cartesian criterion — clearness and distinctness — is not sufficient. "Our conclusions," says Leibnitz, "rest on two great principles — the principle of contradiction (according to which we deem that false which involves a contradiction, and that true which is opposed to falsehood), and the principle of the sufficient reason (which teaches that no assertion is true if no sufficient reason can be given why it is true rather than false), which leads to an absolute final reason, independent of accidental circumstances. But the final reason of the certainty of innate necessary truths is in God, as the source of all necessary and eternal truth." Monadology forms the central point of the system, and Leibnitz believed that in this he had discovered the fundamental basis of actual knowledge. All experience teaches us that there are compound substances; consequently there must be simple ones. The senses give us only confused, the understanding distinct, knowledge; and the simple, which cannot be recovered by the senses, is the ground of the compound.

These simple substances, from which the compound are formed, and each of which differs in its qualities from all others, since there are no two things exactly alike, Leibnitz calls monads, of which he assumes four sorts — pure monads (or liv-

ing beings), the souls of beasts, the souls of men, and God, who, as the origin of all knowledge, of reality, and of the existence of things, the eternal, original Monad, he calls the *Monas monadum*. All created monads are united with bodies, or, rather, all finite beings are aggregates of monads, some having a central and governing monad. The different classes of monads conceive of the universe with different degrees of distinctiveness; God alone conceives it perfectly. There is no actual influence (*influxus physicus*) of one thing on another, but only an ideal connection; that is, the internal changes of each monad are so arranged as to agree with the changes in the monads immediately connected with it. The cause of this agreement is the infinite wisdom and almighty power of the Deity. The divine understanding is the prototype of all truth, beauty, and absolute good, and by it all the interior changes in the monads were so predetermined that there is a perfect harmony in their succession. This predetermination or established harmony was arranged by the Godhead when the plan of the world was formed. The "Theodicea" is the defense of the supreme wisdom of the Creator of the world, which had been impugned on account of the existence of evil. Such a "Theodicea" Leibnitz attempted, particularly on account of the contrary views brought forward by Bayle. According to the Leibnitzian system, an infinite number of worlds are possible in the divine understanding; but of all possible ones God has chosen and formed the best. Everything which really is is best in connection, even if by itself it is imperfect. This system is therefore denominated optimism. Each being is intended to attain the highest degree of happiness of which it is capable, and is to contribute, as a part, to the perfection of the whole. The existence of evil is no argument against this system, because metaphysical evil is merely a necessary imperfection in the nature of finite things, from which imperfection physical evil (suffering) and moral evil (sin) necessarily proceed. Moral evil is founded in the freedom of finite spirits, which consists in choosing, according to grounds of preference, one among many physically possible actions, for though everything in the world is necessarily determined, still man, being ignorant of the future, must act from the convictions of his reason. The want of a logical and connected statement of the philosophy of Leibnitz was supplied by his disciple Christian Wolff.

Leibnitz early directed his attention to mathematics, and attained great eminence in this science. Authorities seem generally agreed that he discovered the differental calculus indepent of any knowledge of Newton's method of fluxions, so that each of these great men in reality attained the same result for himself. In a letter dated June 21, 1677, he communicated his discovery to Oldenburg for Newton's examination. Leibnitz, however, received no answer from Newton to this remarkable letter and things remained in this state till 1682, when the "Acta Eruditorum" was commenced. Leibnitz was from the beginning one of its most active contributors and in the October number of 1684 he published a complete account of his differential calculus, exactly as he had communicated it to Newton. It is worthy of remark that at this time no one questioned the claims of Leibnitz to the discovery of this new mode of calculation. On the contrary, Newton publicly acknowledged the merit of the German and made the most honorable mention of him in his "Principia." Leibnitz continued with untiring activity to make improvements in his method. The differential calculus, together with its converse, which Leibnitz called summatory, but to which John Bernoulli gave the name of integral calculus, was in high esteem on the Continent, and had been much used and extended, both by Bernoulli and the Marquis de l'Hôpital, when, in 1699, 22 years after the letter of Leibnitz to Newton, and 15 years after the publication of the theory in the manner already mentioned, in the October (1684) number of the "Acta Eruditorum," it was contended for the first time, by Fatio de Duillier, that Newton was the discoverer of this mode of reckoning. This article was written in an offensive tone and Leibnitz answered it in the "Acta Eruditorum." His reply for a time put an end to the dispute; but five years afterward (1704), Newton having published his "Optics," at the close of which he appended an exposition of his method of fluxions, which he claimed to have invented as early as 1666, the "Acta Eruditorum" gave an extract from this work in the next year, and by making a comparison between the method of fluxions and the system of the differential calculus, to the disadvantage of the former, awakened anew the dispute between the parties.. The dispute continued till the death of Leibnitz, and altogether embittered his latter years.

Leicester (les'ter), **Robert Dudley, Earl of,** an English noble and favorite of Queen Elizabeth; born June 24, 1532 or 1533. On the accession of Elizabeth to the throne, Dudley met with rapid preferment, winning the queen's regard by his courtly address and handsome person. In 1560 his first wife, Amy Robsart, died, not without suspicion of violence. In 1564 Dudley became chancellor of Oxford University and Earl of Leicester. In 1575 he entertained Elizabeth at his castle of Kenilworth with almost royal magnificence. In the year fol-

lowing Leicester secretly married the widow of the Earl of Essex, a step never forgiven by Elizabeth. In 1588, on the threatened invasion of the Spanish Armada, Leicester was appointed Lieutenant-General of the kingdom, and died Sept. 4 in the same year.

Leichhardt, Friedrich Wilhelm Ludwig (līh'härt), a German explorer; born in Trebatsch, near Berlin, Prussia, Oct. 23, 1813. In 1841 he proceeded to Australia. There he conducted an expedition (1843–1848) from Moreton Bay, in Queensland, N. W. to the Gulf of Carpentaria, and then, skirting its S. and W. shores, finally reached Port Essington. In the end of 1846 he made an unsuccessful attempt to cross the base of Cape York Peninsula. In November, 1847, he again started from Moreton Bay with the intention of crossing the entire continent from E. to W., but he was lost in the interior. Nothing authentic was heard of him after April 3, 1848. The "Journal" of his first journey was published in London in 1847, and his "Letters" in German in 1881.

Leidy, Joseph, an American naturalist; born in Philadelphia, Pa., Sept. 9, 1823. In 1845 he became prosector to the chair of anatomy in the University of Pennsylvania, and in 1853 professor, and in 1884 director of the department of biology. His published papers on biological subjects number over 800. He died in Philadelphia, April 30, 1891.

Leif Ericsson, a half-mythical Scandinavian voyager who flourished about the year 1000 A. D. He is reported to have sailed from Iceland and to have discovered the American continent, and in 1887 there was erected in Boston, Mass., a statue to "Leif the Discoverer."

Leighton, Sir Frederick, an English artist; born in Scarborough, England, Dec. 3, 1830. At 14 he entered the Academy of Berlin, but a year later went to Frankfort-on-Main to continue his general education. His subsequent art studies were made at Florence (1845–1846), the Academy at Frankfort-on-Main (1846–1848), Brussels (1848–1849), Paris (1850), and Frankfort again (1851–1853). From Rome, where he spent about three winters, he sent to the Academy of 1855 his picture of Cimabue's Madonna carried in procession through the streets of Florence, which called forth general admiration and was purchased by the queen. For four subsequent years he resided at Paris, availing himself of the friendly counsel of Ary Scheffer, Robert Fleury, and other painters, and then finally took up residence in London. In 1864 he was elected an associate of the Royal Academy, and in 1869 an academician. In 1878 he succeeded Sir Francis Grant as president of the Academy, was knighted, and was named an officer of the Legion of Honor. Seven years later he was made a baronet, and received various honors and honorary degrees. From the long list of his works special mention may be made of his "Hercules Wrestling with Death" (1871), "Daphnephoria" (1876), "Music Lesson" (1877), "Sister's Kiss" (1880), "Phryne" (1882), "Cymon and Iphigenia" (1884), "Captive Andromache" (1888), and "Ball Players" (1889); and the large frescoes at the South Kensington Museum, representing the industrial arts applied to war, and the arts of peace. In addition to his pictures he achieved a high place as a sculptor by his "Athlete Strangling a Python" (1876), and his "Sluggard" (1886). The special merit of his work lies in the perfection of his draughtsmanship and design, his coloring, though possessing unfailing charm of harmonious arrangement, being only thoroughly satisfactory from the decorative point of view. He had fine poetic quality, conjoined with elegance in drawing and great refinement in execution. He died in London, Jan. 25, 1896.

Leighton, William, an American poet; born in Cambridge, Mass., in 1833. He was educated at Harvard. He wrote: "The Sons of Godwin" (1876), a tragedy; "Change: the Whisper of the Sphinx" (1878), a philosophical poem; "A Sketch of Shakespeare" (1879); "The Subjection of Hamlet" (1882).

Leiningen (līn'ing-en), a princely house of Germany, dating back to 1096. In 1779 the head of one of the branches into which it had become divided, the Count of Leiningen-Dachsburg-Hardenburg, was raised to the rank of a prince of the empire; but the peace of Lunéville deprived him of his ancient possessions, about 252 square miles in extent, on the left bank of the Rhine. Though no longer an independent prince, the head of the house retains his rank and wealth and owns extensive possessions in Bavaria and Hesse. The mother of Queen Victoria had for her first husband the Prince of Leiningen.

Leipoa (lī-pō'ä), a genus of Rasores birds, family *Megapodidæ*, the only known species of which is *L. Ocellata*, the "native pheasant" of the colonists of Western Australia; which in its habits is very like the domestic fowl. It deposits its eggs in a mound of sand about three feet high, the inside being lined with layers of dried leaves, grasses, etc. The bird never sits on the eggs, but leaves them to be hatched by the heat of the sun's rays. The natives are very fond of the eggs, and rob the mounds twice or thrice in a season. These mounds resemble ant-hills; and, indeed, ants often abound in them. Captain Grey observes

that the nests are at least nine feet in diameter and three feet high. By the natives this bird is named Ngowoo.

Leipsic (līp′sik), a commercial city of Germany, kingdom of Saxony, on the White Elster (a tributary of the Saale). The appearance of the city at a distance is not imposing; it stands in a wide plain, which, though fertile, is unvaried by a single eminence to relieve its sameness. It occupies but a small extent of ground compared with its population, the houses being very lofty; many of them six stories high, independent of three or four additional in the pyramidal roof. Few cities exhibit so much of the carved masonry which characterized the old German style of building, joined with so much stateliness. The streets are narrow, but the various markets and squares are large, clean, and neat. Leipsic is far inferior in elegance and beauty to Dresden; but is better built than Frankfort and has a decided air of comfort and respectability. The great market place, in the center of the city, is rendered one of the most striking squares in Europe by the quaint architecture of its surroundings. Leipsic is preëminently a literary center; besides possessing a noble university and various fine libraries and scientific institutions, it is the grand emporium of the German book trade. It is the custom for every European house dealing in German books to have its agent at Leipsic. The great sale of new works takes place at the Easter fair. Leipsic is the great mart of Central Europe for all kinds of merchandise. Among its chief manufactures are silk goods, stockings, leather, hats, playing-cards, paper hangings, tallow-chandlery, gold and silver wares, liquors, etc. Leipsic and vicinity was, in October, 1813, the scene of one of the most tremendous battles of modern times. Napoleon I. having concentrated at this point an army of about 135,000 men, was attacked on the 16th by the allies under Prince Schwartzenberg, Blücher, and other generals, accompanied by the Emperors of Russia and Austria and the King of Prussia. The allied force amounted to at least 250,000 men. The struggle, which was fierce, obstinate, and bloody, terminated at nightfall without advantage to either party. The next day passed over with the same results. On the 18th, shortly after the renewal of the fighting, a Saxon brigade deserted the French, and went over to the allies, which, combined with their superior force, gave the latter an advantage that all the genius of Napoleon, seconded by the valor and devotion of his troops, could not counteract. Though the French maintained their ground during the day, a retreat became indispensable; and owing to the accidental blowing up of the bridge, a part of the French army was cut off; thus, Napoleon lost 25,000 men, who fell into the hands of the allies as prisoners, exclusive of the far greater number who fell in the previous battles. Prince Poniatowski ("the last of the Poles"), after displaying prodigies of valor, lost his life in the retreat on the 19th, having been drowned in attempting to cross the Elster. This great battle completely emancipated Germany from the French yoke. Pop. (1900) 455,120; (1910) 585,743.

Leisewitz, Johann Anton (lī′zuh-vits), a German poet; born in Hanover, May 9, 1752. His one tragedy, "Julius of Tarentum" (1776), is one of the characteristic dramas of the period of "storm and stress," and was highly admired by the young Schiller. Several other dramatic pieces he left in an unfinished state; after his death they were destroyed; and all that remains is one scene of a comedy. He died in Brunswick, Sept. 10, 1806.

Leitch, William Leighton, a Scotch painter; born in Glasgow, Scotland, in 1804. Commencing his career as a house painter in his native city, he removed to London early in life and practised scene painting successfully. After five years of study in Italy he settled in London, and gained celebrity as an art teacher. Among his pupils were Queen Victoria and all the members of the royal family. While employed in teaching he rarely exhibited, the drawings which he produced being mostly purchased by his pupils or their friends. At the request of a deputation of influential artists he became a member of the New Society of Painters in Water Colors in 1861, and from that time was a regular contributor to the society's exhibitions, and to those of its successor, the Royal Institute of Water Color Painters. Many of his subjects are Italian and Sicilian scenery, but scenes in Scotland and elsewhere are not of infrequent occurrence. His works (mostly in water-colors) are not numerous, but of great merit. He died in London, England, in 1883.

Leith, the 6th largest town in Scotland, an important seaport, on the S. shore of the Firth of Forth, 2 miles N. of EDINBURGH (*q. v.*), with which it is now connected by a continuous line of street. Pop. (1901) 76,667.

Leitha, an Austrian stream rising in Lower Austria, and flowing N. E. to join the Danube nearly along the frontier of Lower Austria and Hungary. Since the reorganization of the empire in 1867, it has become usual to speak of Hungary and the

lands belonging to the Hungarian crown as Trans-leithan, and the rest of the empire as Cis-leithan — thus giving the stream a factitious importance.

Leitner, Karl Gottfried, Ritter von, an Austrian poet; born in Gratz Nov. 18, 1800. By his popular ballads he earned the title of "The Uhland of Styria." He published three volumes of his collected verses: "Poems" (1825); "Autumn Flowers" (1870); "Stories and Poems" (1880). He died in Gratz June 20, 1890.

Leixner, Otto von (līx'ner), a German author; born in Saar, Moravia, April 24, 1847. Among his poetical works are: A volume of "Poems" (1868); the drama "Resurrection of Germany" (1870); "Twilight" (1886); "Proverbs and Satiric Rhymes." He has also written short stories: "The Two Marys"; "Memento Vivere"; "Princess Sunshine" (1882). Among his other works are: "Marginal Notes by a Hermit"; "Gossamer" (1886); "Gossipy Letters to a Young Matron" (1890); "Lay Sermons" (1894). His "History of German Literature" is a notable work.

Lekain, Henri Louis Cain (luh-ka*ng*'), a French tragedian; born in Paris, France, April 14, 1728. He was the son of a goldsmith, and studied in the College Magazin, where he imbibed a taste for the dramatic art. Voltaire aided him liberally with money and advice, and he appeared on tne stage of the Théatre Français, where he secured such a popularity that his death was looked on by the patrons of the drama as a public calamity. His "Mémoirs" were published by his son in 1801, and reprinted in 1825 under the supervision of Talma. He died in Paris, Feb. 8, 1778.

Leland, Charles Godfrey, an American author; born in Philadelphia, Pa., Aug. 15, 1824. He was graduated at Princeton College in 1846, and afterward studied at Heidelberg, Munich, and Paris. He was admitted to the Philadelphia bar in 1851, but turned from law to journalism. From 1869 he resided chiefly in England, and investigated the language and customs of the gipsies, a subject on which between 1873 and 1890 he published four valuable works. Leland is most widely known, however, for his dialect poems in "Pennsylvania Dutch," the famous "Hans Breitmann Ballads" (1871). Other works are "The Poetry and Mystery of Dreams" (1855), "Meister Karl's Sketch Book" (1855), "Legends of Birds" (1864), "Fu-Sang" (1875), and "Algonquin Legends" (1884). In 1885 he edited a series of "Art-work Manuals." He died March 20, 1903.

Leland, John, an English antiquary; born in London, England, about 1506. After a residence in Paris he became chaplain to Henry VIII., who, in 1533, commissioned him as "king's antiquary," with power to search for records of antiquity in the cathedrals, colleges, abbeys, and priories of England. The next six years he devoted to his tour with unresting diligence, and collected "a whole world of things very memorable," to the arrangement of which he gave the remainder of his life. His Church preferments were the rectories of Pofeling, in the marches of Calais, and Haseley in Oxfordshire, a canonry of King's College (now Christ Church), Oxford, and a prebend of Salisbury. His last five years were darkened by insanity, from which he found relief in death, April 18, 1552.

Leland Stanford, Junior, University, a coeducational non-sectarian institution in Palo Alto, Cal.; chartered in 1885; opened in 1891; has endowment of over $24,500,000; grounds and buildings exceeding $7,000,000; scientific apparatus, etc., $260,000; ordinary income, over $800,000; volumes in the library, 120,000; average number of faculty, 200; average student attendance, 1,750; graduates, over 3,000.

Lelewel, Joachim (le'le-vel), a Polish historian; born in Warsaw, March 21, 1786. While a professor at Wilna he delivered a series of popular lectures on Polish history, which provoked interference by the Russian government; and later for his active participation in the revolution of 1830 he was compelled to leave his native country and locate in France and Belgium. Among his various works on Polish history and antiquities are: "Ancient Polish Bibliography" (1823–1826); "History of Poland" (1829); "History of Lithuania and Little Russia" (1830); "Geography of the Arabs" (1851; "Geography of the Middle Ages" (1852–1857). He died in Paris, May 29, 1861.

Lely, Sir Peter, an Anglo-Dutch painter; born in Soest, Westphalia, in 1617. He settled in London in 1641 and took to portrait painting, having hitherto essayed landscapes and historical subjects. He was employed successively by Charles I., Cromwell, and Charles II., the last of whom nominated him court-painter and conferred on him the honor of knighthood. From the death of Vandyck he was the first painter of the day in England down to the arrival of Kneller. His best known pieces, apart from portraits of his royal patrons, are the beauties of the court of Charles II. at Hampton Court. He died in London, England, Nov. 30, 1680.

Lemaitre, François Elie Jules (lemātr′), a French dramatist; born in Vennecy (Loiret), France, April 27, 1853. He was the author of five volumes of literary biographies, "Contemporaries: Being Literary Studies and Portraits" (1885 – 1895). He was for many years dramatic critic of the "Journal des Débats." His début as a dramatist was made at the Odéon with "La Revoltée" (1889), followed by "Deputy Iveau" (1890), an exceedingly clever political satire. Of his other dramatic compositions may be mentioned: "The Kings" (1893), and "The Pardon" (1895). He is the author of two volumes of poems, "Medallions" (1880) and "Petites Orientales" (1882); "Corneille and Aristotle's Poetics" (1888); "Myrrha: Stories" (1894).

FRANÇOIS JULES LEMAÎTRE.

Leman, Lake. See GENEVA, LAKE.

Le Mans. See MANS, LE.

Lemay, Léon Pamphile, a Canadian author; born in Lotbinière, Quebec, Jan. 5, 1837. He published "Essais Poétiques" (1865). "The Discovery of Canada" won him the gold medal of Laval University. He translated Longfellow's "Evangeline" (1870). His best work is said to be found in "L'Affaire Sougraine" (1884).

Lemberg (formerly Löwenburg; Polish name "Lwów"), the capital of the Austrian kingdom of Galicia and Lodomeria; on a tributary of the Bug, in a narrow basin among hills, 212 miles E. of Cracow. It is defended by a citadel, around which the modern town has grown up. Lemberg is the seat of a Roman Catholic, a Greek United, and an Armenian archbishop, and has nearly 30 churches and several monasteries; in the 17th century and earlier it was called the "town of the monks." Several of the churches are fine buildings, as the Dominican, which contains a greatly venerated image of the Virgin; the Greek cathedral, built in the Italian style in 1740–1779; the Gothic Roman Catholic cathedral (1350–1640); and the Armenian cathedral, dating from the 14th century. The university, founded in 1784 and reorganized in 1817, has more than 900 students. Here also is the seat of the national institute founded (1817) by Ossolinski, with a library of over 81,000 volumes and 3,000 MSS., chiefly of Polish literature, and large collections of medals, coins, antiquities, paintings, engravings, etc. There is a considerable trade in flax, hemp, cloth, leather, and agricultural products. The manufactures embrace machinery, earthenware, oil, beer, etc. Founded in 1259, Lemberg was an important city of Poland from 1340. It has been several times besieged, on the last occasion in 1848. It fell to Austria at the first partition of Poland. Pop. (1901) 159,877, of whom about 31,000 are Jews, while 92,000 speak Polish.

Lemercier, Nepomucène (luh-mer-syā′), a French poet; born in Paris, France, April 21, 1771. After many failures he made a brilliant success with his classical tragedy, "Agamemnon" (1795). Elegance of versification, grace of style, and richness of fancy, characterize his "Four Metamorphoses" (1799), and "Pinto" (1800), a mixture of tragedy and comedy, in which he attempts to outdo "Figaro's Wedding." The most notable of his poems is the philosophical satire "The Panhypocrisiad, or Infernal Spectacle of the Sixteenth Century" (in 16 cantos; 4 more added in 1832). He died in Paris, June 7, 1840.

Lemly, Henry Rowan, an American military officer; born in North Carolina, Jan. 12, 1851; was graduated at the United States Military Academy in 1872; promoted captain, March 8, 1898. During the American-Spanish War he commanded Battery C of the 7th United States Artillery in the Porto Rico campaign; and was retired at his own request April 20, 1899. He is the author of "What Was El Dorado?"; "Among the Arapahoes"; "West Point Romance"; "Padre Anselmo"; "A Queen's Thoughts"; etc.

Lemly, Samuel Conrad, an American naval officer; born in Salem, N. C., March 14, 1853; was graduated at the United States Naval Academy in 1873; promoted lieutenant in January, 1886; appointed judge advocate-general of the navy in 1892, 1896 and 1900. In 1901 he represented the navy in the Schley Court of Inquiry. He died Sept. 3, 1909.

Lemma, an auxiliary proposition, demonstrated on account of its immediate application to some other proposition. The conclusion of the lemma becomes requisite to the demonstration of the main proposition, and, rather than encumber that proposition, a separate demonstration is introduced. The idea of a lemma is, that it is introduced out of its natural place, and this serves to distinguish it from ordinary propositions which, entering in their proper places, are of more or less use in demonstrating subsequent ones.

Lemming, or **Leming,** a rodent of the family *Muridæ;* habitat of the mountainous regions of Sweden and Norway. Dark brownish-black, mixed with tawny on the back, fading into yellowish-white on the abdomen. Length about six inches, the tail being only half an inch. The lemming is remarkable for migrating at certain periods, generally at the approach of winter, in immense multitudes, in a straight line, apparently in obedience to some blind mechanical impulse. They move onward in parallel columns, and nothing will induce them to deviate from the straight line, the migration always terminating in the sea, and ending in the drowning of all that have survived the journey. The lemmings are represented by one species in post-Tertiary deposits occurring after the Glacial Period, and being contemporary with palæolithic man.

Lemnian Earth, a kind of astringent medicinal earth, of a fatty consistence and reddish color, used in the same cases as bole. It removes impurities like soap. It was originally found in Lemnos, but occurs also in Bohemia, Russia, and India, resulting from decay of felspathic rocks, like kaolin, to which it is related. Called also sphragide.

Lemniscata, or **Lemniscate,** the name given to a curve of the fourth degree, having the form of the figure 8, both parts being symmetrical, and generated by the point to which a tangent to an equilateral hyperbola meets the perpendicular on it drawn from the center.

Lemnos, a Turkish island in the N. part of the Ægean Sea; 40 miles S. E. of Mount Athos and about the same distance S. W. of the Dardanelles. It is nearly split in two by a large bay on the S. coast and another on the N. coast. The interior consists of an undulating plateau. None of the hills exceed 1,400 feet in height. Area, 180 square miles; pop. about 30,000, all Greeks, except 5,000 Turks. The principal products are corn, wine, and tobacco. In antiquity and all through the Middle Ages the most notable product of the island was the "Lemnian earth" or "sealed earth," which was in general request as an antidote against snake bites, also as a remedy in cases of plague, dysentery, etc. It was extracted only on one day in the year, Aug. 6, with an accompaniment of religious ceremonies, from a spot near the ruined site of the ancient city Hesphæstia, in the N. E. of the island. It has now gone out of repute, and very little is extracted every year. It consisted of silex to the extent of two parts in three, with some alumina, oxide of iron, water, and natron. In ancient times the island is stated to have possessed an active volcano; at the present date there exist no traces of volcanic action. Lesbos was regarded by the Greeks as sacred to Hephæstus. It was conquered by the Persians in the reign of Darius Hystaspes; but Miltiades wrested it from them for the Athenians. In 1657 it passed into the hands of the Turks, from the Venetians. The chief town is Kastro (the ancient Myrina), a fortified place on the W. coast, with 3,000 inhabitants. Lemnos is a place of banishment for Turkish political offenders.

COIN OF LEMNOS.

Lemnos. See PHILOSTRATUS.

Le Moine, James MacPherson (lemwan'), a Canadian historian; born in Quebec, Jan. 24, 1825. His historical works are so fair in spirit and accurate in statement as to disarm adverse criticism. Among his works are: "L'Ornithologie du Canada" (1860); "Étude sur les Navigateurs Arctiques Franklin, McClure, Kane, McClintock" (1862); "The Tourist's Note-Book" (1870); "Quebec: Past and Present" (1876); and "The Scot in New France" (1880). Knighted 1897.

Lemoine, François, a French historical painter; born in Paris in 1688. In 1718 he became a member of the Academy, and on his return from a visit to Italy in 1723 was appointed professor at the Academy. He painted the chapel of the Holy Virgin in the church of St. Sulpice, and subsequently the ceiling in the Hall of Hercules at Versailles, a painting 64 feet long and 54 broad, which occupied him seven years. In a fit of insanity he put an end to his life in Paris, June 4, 1737.

Lemon, the fruit of a small tree (*Citrus Limonum*) belonging to the same natural order as the orange (*Aurantiaceæ*). The general character of the leaves and flowers and fruit of the lemon tree is well illustrated in the accompanying cut. There are many varieties of the lemon, but they may all be included under the following four distinct types: (1) The common or Genoa lemon, which is the most plentiful in the shops. (2) The thin-skinned lemon, which is of large size, having a thin, smooth shining fragrant rind, with an almost entire absence of white spongy matter beneath it. The pulp is very delicate and juicy, with a delicious aroma. (3) The sweet lemon, which, while having the external appearance of the lemon, has the pulp sweet like that of the orange. (4) The citron lemon, or the Ligurian lemon of commerce. It is a large oblong fruit, with a thick, rough warted rind, which is eatable. The

pulp, however, is the least delicate of all lemons. The peculiar and grateful flavor of the juice of the lemon is mainly due to citric acid. It forms, when properly diluted, an agreeable and refreshing drink, and is useful in febrile and inflammatory diseases. The most valuable of its properties, however, is the prevention and cure of scurvy; hence it or the very similar lime juice is an important article in sea stores. The well known uses of the rind, either fresh or preserved, in the cook's and the confectioner's arts for flavoring and ornamenting dishes, cakes, and candies need only be alluded to, to show the importance of the lemon to civilized man. The essential oil is obtained from the rind. The lemon is largely cultivated in all the warmer countries of the S. of Europe and those

LEMON.

bordering on the Mediterranean, and it is naturalized in some parts of South America and in the East and West Indies, and in parts of Australia.

The oil or essence of lemons is extracted from the fresh lemon peel either by pressure or by distillation. The former is the usual method. The peel, removed from the fruit, is bent so as to rupture the oil vesicles, and the oil is collected in sponges, or the peel is sometimes rasped with short needles, and the exuding oil collected. The yield is variable, amounting on the average to 10 ounces of oil from 400 fruits. The oil has the same composition as that of turpentine, but it contains a small quantity of cymene and other oils. While it is often adulterated with turpentine, there is no doubt that the fragrant portion, even in genuine oil, can be removed, leaving about 90 per cent. of liquid having a decided turpentine odor. This fragrant portion, according to some authorities, is an oxygenated substance, and therefore differs distinctly from the bulk of the oil, which has the composition previously stated. Its chief use is as a flavoring agent, the ordinary essence of lemon of the shops consisting of a solution of the oil in alcohol. It also enters into most perfumes, such as eau de Cologne, etc. The so-called salt of lemons, or salt of sorrel, is the binoxalate of potash.

Lemon, Mark, an English humorist; born in London, England, Nov. 30, 1809. About 1825 he wrote a farce, the first of a long series of melodramas, operettas, etc. He produced, moreover, several novels (the best, perhaps, "Falkner Lyle," 1866), children's stories, and essays, and appeared as a lecturer and public reader. In 1841 he helped to establish "Punch," of which for the first two years he was joint-editor with Henry Mayhew, and thereafter sole editor till his death, in Crawley, Sussex, May 23, 1870.

Lemonade, a beverage formed by adding two lemons sliced ,and two ounces of white sugar, to a quart of boiling water, and digesting till cold. It is a useful drink for allaying thirst, and as a refrigerant in febrile and inflammatory complaints, and in hæmorrhage, in which cases it should be given iced. Aërated water flavored with sugar and essence of lemons is also called lemonade.

Lemon Grass (*Andropogon* [*Cymbopogon*] *schœnanthus*), so called from its agreeable smell. The taste is warm, bitterish, and not unpleasant. Formerly it was brought over from Turkey, in bundles about a foot long, and sold as a stomachic and deobstruent. Now but rarely used.

Lemon Kali, an effervescing drink, prepared by mixing lemon juice with dissolved bicarbonate of potash.

Lemonnier, Camille (luh-mo-nyā'), a Belgian novelist; born in Brussels, March 24, 1835. He was a pronounced realist. Among his stories are: "Our Flemings" (1869); "Flemish and Walloon Stories" (1873); "Neither Fish nor Flesh" (1884); "Flemish Christmas Carols" (1887); "Madame Lupar" (1888).

Lemoyne, Camille André (luh-mwän), a French poet; born in Saint-Jean-d'Angély, Charente-Inférieure, France, in 1822. Having suffered financial reverses while studying for the bar, he became a compositor and proofreader in the publishing house of Firmin Didot, and subsequently archivist librarian of the School of Decorative Arts. He belonged to the Parnassian school of French poets, and was the author of: "Last Year's Roses" (1865–1869); "The Charmers" (1867); "Flowers of the Meadows" (1876); "Flowers of the Ruins" (1888); "Flowers of the Evening"

(1893), several of which have been crowned by the French Academy. He was decorated with the Legion of Honor in 1870.

Le Moyne, Charles, a French pioneer; born in Normandy, France, in 1626. Proceeding to Canada in 1641, he lived among the Huron tribe of Indians and fought with the Iroquois. In 1668 Louis XIV. made him Seigneur de Longueuil, and afterward also de Chateauguay. He was for several years captain of Montreal, and died in 1683. Of his 11 sons, nearly all became distinguished. The eldest, CHARLES, Baron de Longueuil, was born in 1656, and in his youth served in the French army. He was made governor of Montreal and baron in 1700, and became commandant-general of the colony. He died at Montreal in 1729. His descendant, CHARLES COLMOR GRANT, had his Canadian title of 7th Baron de Longueuil officially recognized by the queen in 1880. Another son, JOSEPH, became an officer in the French navy, and in 1694–1697 brought vessels to Hudson Bay to coöperate with land forces under his brother Iberville. He subsequently conveyed colonists to Louisiana, surveyed its coast, and aided in capturing Pensacola.

Lempriére, John (lo*ng*-prē-ār′), a British educator; born in Jersey, about 1765. He was educated at Winchester and Oxford. He was in turn head-master of Abingdon and Exeter grammar schools, rector of Meeth in Devonshire and of Newton-Petrock, and died Feb. 1, 1824. His famous "Classical Dictionary" (1792) remained for many years the standard work of reference in England on ancient mythology, biography, and geography. Another work of Lemprière's was "Universal Biography" (1808). He died in London, England, Feb. 1, 1824.

Lemur, the name of the typical genus of the sub-family *Lemurinæ*. Habitat, Madagascar and the adjacent islands. It contains many species, the most important of which are described under their popular names. Generic characteristics: Long snout, small flat skull, long body, with narrow flanks. Hind limbs rather longer than the fore, long furry tail, hands and feet short, with a broad great toe; ears tufted or hairy, and moderate in length. In some kinds the head is surrounded by a ruff of fur; the color varies even in individuals of the same species. The true lemurs are diurnal arboreal animals, principally frugivorous, but feeding occasionally on birds' eggs, and even small birds.

The *Galeopithecidæ* or flying lemurs are represented by a single genus including a few species. The flying membrane or patagium, from which their peculiar characteristics are derived, connects the fore and hind limbs, extending along the sides of the body and of the neck, and also joins the hind limbs and tail. The membrane also unites the digits of the foot, and is hairy on both sides. The fore limbs are longer and more powerful than the hind limbs. Neither the great toes nor thumbs can be opposed to the other digits; and the toes number five on each foot. The dentition is peculiar. There are four incisors in the upper and six in the lower jaw; two canines and ten molars in each jaw. The crowns of the six lower incisors are broad and divided into numerous teeth, so as to exhibit a pectinate or comb-like arrangement. These forms are arboreal in their habits, and make short flying leaps from tree to tree, the membrane acting like a parachute in supporting them during their flight or leap through the air. They are fruit-eaters, but also prey upon insects and birds. They are nocturnal in habits; and when at rest suspend themselves from trees by the limbs, the body and head being pendent. The mammary glands are four in number and are placed on the breast. All other *Quadrumana* possess only two mammæ. The most familiar species is the *Galeopithecus volitans* of Java and the neighboring islands. It measures about 20 inches in length. The flying lemurs possess intimate relationships with the *Insectivora*, and, naturalists regard them as an aberrant genus of this order.

Lemures, the general designation given by the Romans to all spirits of departed persons, of whom the good were honored as Lares, and the bad (*Larvæ*) were feared as capable in their night journeys of exerting a malignant influence upon mortals. The festival called Lemuria was held on the 9th, 11th and 13th of May, and was accompanied with ceremonies of washing hands, throwing black beans over the head, etc., and the pronunciation nine times of these words: "Begone, you spectres of the house!" which deprived the lemures of their power to harm. Ovid describes the Lemuria in the fifth book of his "Fasti."

Lemuria, a hypothetical continent supposed by some to have at one time extended from Madagascar and South Africa across what is now the Indian Ocean to the Asiatic Archipelago; named from its corresponding with the habitat of the lemurs.

Lena, a river of Eastern Siberia, rising amid the mountains on the N. W. shore of Lake Baikal, in the government of Irkutsk, flows first N. E. to the town of Yakutsk, where it is 6½ miles wide, then N. to the Arctic Ocean, into which it falls by several mouths, forming a delta 250 miles wide. Its course is 3,000 miles in length, the area of its basin 772,000 square miles. Its chief affluents are the Vilui (1,300 miles) on the left, and the Vitim (1,400), the Olekma (800), and the Aldan (1,300) on the right. Navigation on the Lena is open from Ya-

kutsk upward from May till October. During spring the waters of the river regularly overflow their banks. The Lena is a principal artery of the trade of Eastern Siberia. The riverine sand of the Vitim and Olekma yields richly in gold; salt, coal, iron, copper, and argentiferous lead exist. Large quantities of mammoth ivory have been found in the delta.

Lenapes, Lenni=Lenapes (len'aps), or **Delawares,** one of the Algonquin tribes of American Indians, which about the early part of the 16th century occupied the valleys of the Delaware and Schuylkill. From a very early date they were, according to tradition, preëminent for wisdom and valor, exerting a powerful influence over the neighboring tribes from the Hudson to the Chesapeake. This influence they upheld till, by the rise of the Iroquois power, they lost their ascendency and in a manner their independence; and at an assembly of the tribes, in 1774, near Lancaster, the Iroquois denied them the right to alienate their lands. They soon after removed to the banks of the Susquehanna. In 1751 they are found at Shamokin and Wyalusing, on the Susquehanna, where they became exposed to the violence both of the Iroquois and the whites. The English disregarded their peaceful attitude (they having been taught the principles of peace and non-resistance by Penn and Zinzendorf), considering them under French influence; and the Iroquois, offended at their neutrality, plundered their crops and devastated their villages. In 1781, nearly 400 Moravian Delawares, being driven from their settlement on the Muskingum by hostile Indians, were permitted to return the following year, when, their movements being considered hostile by the British frontiersmen, about 100 of them were massacred. In 1778 they made a treaty of amity with the United States at Fort Pitt, in which the latter agreed to build a fort for their protection, which is the origin of Fort McIntosh. In 1795 they were parties, with the Wyandots, Shawnees, and other western tribes, in the general pacification of Fort Grenville. These were further strengthened by the treaties of Fort Wayne, in 1803, and Vincennes, in 1804; and the frontiers were unmolested till the movement of Tecumseh in 1811. They gradually continued W., stopping for a time at White river, Indiana, and afterward crossing the Mississippi, finally settled on fertile tracts in Kansas, where they possessed a large tract of land on Kansas river, cultivating the soil, raising horses, cattle, etc., and dressing in many respects in civilized costume, the United States holding in trust for them a considerable fund. Difficulties arising with the immigrants to Kansas, chiefly due to the aggressions of the whites on the Indian lands, they were removed in 1870 to a reservation in the Indian Territory. They were later incorporated with the Cherokees.

Lenartovicz, Teofil (len-art'ō-vēch), a Polish poet; born in Warsaw, Feb. 27, 1822. His popular ballads and songs, "Lirenka" (1855), are reckoned among the choicest pearls of the national poetry. The most noteworthy of his longer poems are: "The Polish Land" (1848); "The Gladiators" (1857); and the "Italian Album" (1870). He wrote in Italian "On the Character of Polono-Slavic Poetry" (1886). He died in Florence, Feb. 3, 1893.

Lenau, Nicolaus (len-ou'), pseudonym of NICOLAUS NIEMBSCH VON STREHLENAU, a German poet; born in Czatad, Hungary, Aug. 13, 1802. Though a man of deep feeling, and with a good deal of the true lyric inspiration, his life was rendered unhappy by his morbid poetic discontent. In 1832 he traveled to the United States, hoping to find there the peace and satisfaction which he could not get in Europe; but he returned in the following year a still further disappointed man. From this time he lived alternately in Vienna and in Stuttgart, in the latter city in close intimacy with the writers of the Swabian school (Schwab, Kerner, Mayer). Lenau's poetic power is shown to best advantage in his short lyric effusions, especially those associated with the land of his birth. His best longer pieces, as "Faust" (1836); "Savonarola" (1837); "The Albigenses" (1842), cannot claim the merits of artistic completeness and unity, in spite of the rich fancy and feeling, and the fiery temper of the poet, displayed in individual passages. On the eve of his marriage in 1844 he was suddenly struck down by insanity; he lived in an asylum at Oberdöbling near Vienna till his death, Aug. 22, 1850.

Lencoran, a Russian seaport on the Caspian Sea, 130 miles S. of Baku. In the vicinity are celebrated sulphur springs. It was surrendered to Russia by Persia in 1813. Excavations carried on here in 1890 yielded important prehistoric remains.

Lend=a=hand Clubs, organizations in the United States, which originated in 1871. They were the outgrowth of Edward Everett Hale's celebrated book, "Ten Times One Is Ten," published in 1870. The only condition imposed upon any society of persons desiring to form a Lend-a-Hand club is that it accept Wadsworth's mottoes from the story, "Ten Times One is Ten." These mottoes are:

"Look up and not down,
Look forward and not back,
Look out and not in,
Lend a Hand."

Each Lend-a-Hand club creates its own constitution and selects its own kind of work without reference to the central office.

Leng, John, Sir, an English journalist; born in Hull, England, in 1828. He began his successful journalistic career in 1847 as sub-editor of the Hull "Advertiser"; in 1851 became editor and general manager of the Dundee "Advertiser," which became one of the most influential papers in Great Britain; and he was the founder of the "People's Journal," "Evening Telegraph," and "People's Friend." He was knighted in 1893. Among a number of his books and pamphlets are: "Impressions of America"; "Scottish Banking Reform"; "Practical Politics"; "Trip to Norway"; "Home Rule All Round"; "Some European Rivers and Cities." He died Dec. 12, 1906.

Lenient, Charles Félix (len-ye*ng'*), a French historian; born in Provins, in 1826. In 1865 he became Professor of Poetry in the Sorbonne. His principal works are: "France in the Middle Ages" (1859); "Satire in France, or the Militant Literature of the Sixteenth Century" (1866); "Comedy in France in the Eighteenth Century" (2 vols. 1888); "Patriotic Poetry in France in the Middle Ages" (1892); and "Patriotic Poetry in France in Modern Times" (2 vols. 1894).

Lennep, Jacob van, a Dutch author; born in Amsterdam, Holland, March 25, 1802. The son of a professor of rhetoric, who was distinguished as a Latinist and as a poet, he was educated for the bar, passed as a barrister, and soon achieved a great reputation for legal knowledge. Yet without neglecting his extensive practice he for more than 30 years cultivated literature with assiduity and success. Lennep first appeared as an author shortly before 1830 in a work on national legends, immediately followed by his comedies. Of his numerous novels several (including "The Rose of Dekama" and "The Adopted Son") have been translated into English, French, and German. He wrote much for the stage, translated from Byron and other English poets, and published a Dutch history for the young. He died Aug. 25, 1868.

Lenngrén, Anna Maria (len'gren), a Swedish poetess; born in Stockholm, June 18, 1754. She received from her father, Professor Malmstedt, a very thorough education. Her poems were originally contributed to the "Stockholmsposten," of which her husband was editor: they were collected after her death and published under the title of "Essays in Poesy" (1819). They consist of humorous satires or epigrams, amusing travesties and idyllic sketches, all distinguished by perfection of form and true poetic sensibility. She died in Stockholm, March 8, 1817.

Lennox, an ancient Scotch territory, comprising the basin of the Leven and Loch Lomond — the whole of Dumbartonshire, great part of Stirlingshire, and portions of Perth and Renfrew shires. It gave name to an earldom (1174–1581), and then to a dukedom, conferred by Charles II. in 1680 on one if his illegitimate sons, Charles, Duke of Richmond and Lennox, who in 1702 sold the Lennox estates to the Marquis of Montrose.

Lennox, Charlotte Ramsay, an American novelist; born in New York city in 1720. Educated in England, she received encouragement in her literary work from Samuel Johnson. Her best achievement is "Shakespeare Illustrated" (2 vols. 1753), and a supplementary volume (1754). She also wrote "Memoirs of Harriet Stewart" (1751); "The Female Quixote" (1752); "Sophia," a novel (1763); "The Sisters," a comedy (1769). She died in London, England, Jan. 4, 1804.

Lennox, William Pitt, Lord, an English biographer; born in 1799. He was son of the 4th Duke of Richmond. He wrote "Fifty Years' Biographical Reminiscences" (2 vols. 1863); "My Recollections from 1806 to 1873" (2 vols.); "Three Years with the Duke of Wellington"; "Life of the Duke of Richmond"; "Recreations of a Sportsman" (1862). He wrote several novels, among them "The Tuft-Hunter" (1843). He died in London, England, Feb. 18, 1881.

Lenormant, Charles (luh-nor-mäⁿ'), a French archæologist; born in Paris, France, June 1, 1802. He was Professor of Egyptian Archæology in the Collège de France from 1848 till his death. Among his writings are: "Thesaurus of Numismatics and Glyptics" (20 vols. 1834–1850); "Introduction to Oriental History" (1838); "Museum of Egyptian Antiquities" (1835-1842); "Selection of Keramographic Monuments" (4 vols. 1837–1861). He died in Athens, Nov. 24, 1859.

Lenormant, François (luh-nor-mä*n'*), a French archæologist and scholar; born in Paris, France, Jan. 17, 1837; son of Charles Lenormant (1802–1859), himself profoundly learned in Egyptology, numismatics, and archæology generally, moreover, a fearless defender of the faith. At 23 he was digging at Eleusis, and his explorations he continued, in the intervals of his work as sub-librarian at the Institute (1862–1872), and Professor of Archæology at the Bibliothèque Nationale (1874–1883), till his robust health finally broke down in Salabria from sheer over-work, together with the effects of a wound received when serving as a volunteer during the siege of Paris. He returned to Paris to die — a true martyr to science — Dec. 9, 1883.

Lenotre, André (luh-nōtr), a French architect; born in 1613. His plans for the decoration of the park of Versailles con-

tributed principally to establish his reputation. He afterward embellished the gardens of Trianon, Chantilly, St. Cloud, Sceaux, the Tuileries, etc. Louis XIV. in 1675 bestowed on him letters of nobility. He died in 1700.

Lenox College, a coeducational institution in Hopkinton, Ia.; founded in 1856, under the auspices of the Presbyterian Church; has grounds and buildings valued at over $65,000; endowment funds, about $120,000; scientific apparatus, etc., $8,000; volumes in the library, about 8,000; ordinary income, $18,000; average number of faculty, 15; average student attendance, 185; graduates, over 350.

Lens, a transparent substance, usually glass, surrounded by curved surfaces so formed that rays of light passing through it are made to change their direction, and to magnify or diminish objects at a certain distance. Lenses are double convex, or convex on both sides; double concave or concave on both sides; plano convex, or plano concave, *i. e.*, with one side plane and the other convex or concave, or convex on one side and concave on the other. If the convexity be greater than the concavity, or if the two surfaces would meet if produced, the lens is called a meniscus; and if the concavity be greater than the convexity, the lens is termed concavo-convex. Every system of lenses, however complicated and whatever be the mutual distances of the lenses, will, if the whole be centered on a common axis, produce a real image somewhere in front of the last refracting surface, or else will appear to produce a virtual image somewhere behind. The rays on being traced through the complex combination — *e. g.*, a telescope — undergo numerous deviations: ultimately there is a deviation which might have been equally produced by an equivalent lens; equivalent in the sense of producing an equal ultimate deviation, for the image is not formed in the same place as the "single equivalent lens" would have formed it in. The system of lenses is approximately equivalent in its action to a simple lens plus a determinate shifting of the focus. Hence a simple lens-diagram, modified so as to represent the shifting, will represent the aggregate effect of the most complex system of lenses. See OBSERVATORY.

Lent, a holy season of the Church, of long observance in some communions.

Roman Church.— A fast — formerly of varying duration, but now of 40 days — observed as a preparation for the Easter festival. The severity of the Lenten fast is now much modified, and the extent (both as to time and quantity) to which lacticinia may be used is made known by the Lenten indults published by the bishops, and read in all the churches of the diocese at the parochial mass.

Greek Church.— The Greek Lent lasts for seven weeks — 35 days, for on all Saturdays (except Holy Saturday), on the Feast of the Annunciation, and on all Sundays, the law of fasting is not in force. Strict abstinence from flesh-meat and lacticinia begins on the Monday in Quinquagesima week.

Anglican Church.— In the "Table of Days of Fasting and Abstinence," the Forty Days of Lent stand first; but from the Reformation till about the middle of the 19th century the practice of fasting gradually fell into desuetude. With the Oxford movement came an endeavor to restore ancient practices and discipline; and the influence of the High Church clergy has been productive of a stricter observance of this penitential season throughout the Church, and of practice, with regard to fasting, more in accordance with the Homily "Of Good Works" than had prevailed for a long time previously.

Lentibulariaceæ, butterworts, an order of perigynous exogens, alliance Bignoniales. It consists of water or marsh herbs, with radical undivided leaves, and scapes of single, spiked, or racemose flowers; calyx divided, persistent, inferior, corolla monopetalous, bilabiate; stamens, two; anthers one-celled; style one, very short. Stigma bilabiate. Fruit a one-celled capsule, with many minute exalbuminous seeds. Found in marshes, rivulets, or fountains over the world. Known genera three; species about 130.

Lentil, a small branching plant, about a foot and a half high; the leaves with 8 to 12 oblong leaflets, and pale blue flowers in twos and threes, and short legumes with two to four seeds. In Egypt and Syria lentils, parched in a frying-pan, are sold as nourishing food, especially for those who are going on long journeys. In France and Germany three varieties are cultivated, the small brown, which is the lightest flavored and the best for haricots and soups; the yellowish one, which is a little larger and the next best, and the lentil of Provence, nearly as large as a pea, with luxuriant straw, and more suited for fodder than for human food. From the seeds of lentils is prepared *Revalenta arabica.* The lentils of Scripture were *Ervum lens,* the red pottage made by Jacob was composed of them (Gen. xxv: 34; II Sam. xvii: 28, xxiii: 11; Ezek. iv: 9).

Lentiscus, or **Lentisk,** the mastich tree (*Pistacia lentiscus*), a tree of the order *Anacardiaceæ,* a native of Arabia, Persia, Syria, and the S. of Europe. The wood is of a pale brown, and resinous and fragrant.

Lenz, Jakob Michael Reinhold (lents), a German poet; born in Sesswegen, in Livonia, Jan. 12, 1751. He was an enthusias-

tic admirer of Shakespeare, and in 1774 published "Remarks on the Stage, with Translation of Parts of Shakespeare's 'Love's Labor's Lost'"; and the influence of Shakespeare is seen in his odd comedies, "The Tutor" (1774); "The New Menoza" (1774); "The Soldiers" (1776). He adapted several "Plays of Plautus for the German Stage" (1774). His finest poem is "Love in the Country." His minor songs and ballads are sometimes admirable for their simple and unaffected poetic feeling. He died in Moscow, May 24, 1792.

Lenz, Oskar, a German traveler; born in Leipsic, April 13, 1848. He visited the W. coast of Africa in the service of the German African Society (1874), and spent three years in exploring the course of the Ogowé; he recounted his observations and experiences in "Sketches from West Africa" (1878). He next visited Morocco and Timbuktu, and wrote "Timbuktu: Journey through Morocco, the Sahara, and Sudan" (1884). He wrote also "Wanderings in Africa" (1895).

Lenz's Law. When a circuit is moved in the presence of a current or magnet, or a magnet is moved in the presence of a current, the induced current is such that it tends to stop the movement.

Leo ("the lion"), in astronomy, the name given to one of the 12 zodiacal constellations in the midnight sky of spring. It is bounded on the N. by Leo Minor, on the E. by Virgo, on the S. by Sextans, and on the W. by Cancer. It contains about 100 stars visible to the naked eye. Its chief star is Regulus; this and Gamma Leonis, with some smaller stars, form a figure like a sickle. From its vicinity the November meteors radiate. The word Leo also denotes the 5th sign of the zodiac, being between 120° and 150° of the ecliptic, reckoning from the vernal equinox. Owing to "precession" it now begins in the constellation Cancer. The sun enters the sign Leo about July 21. In zoölogy, a genus or subgenus of *Felidæ*. In this classification the lion is called *Leo nobilis* instead of *Felis leo*.

Leo, the name of various rulers of the Eastern Empire, as follows:

Leo I., called the Elder, emperor of Constantinople, ascended the throne in 457. He was a Thracian of obscure birth, but attained the highest military rank, and was proclaimed emperor by the soldiers in succession to Marcianus. He confirmed the decrees of the Council of Chalcedon against the Eutychians, and renewed the war against the Vandals; but was unfortunate, through the treachery of his general Aspar, whom he put to death with his family in 471. The Goths, to revenge the fate of Aspar, poured into the empire, which they ravaged to the walls of Constantinople. He died in 474.

Leo II., called the Younger, was the son of Zeno and of Ariadne, daughter of Leo I. He succeeded his grandfather in 474, under the guardianship of the father, who caused himself to be proclaimed emperor a few months afterward. Leo II. is said to have been put to death by his own father after reigning only 10 months.

Leo III., called the Isaurian, from the country of his birth, where his parents were poor mechanics. Leo entered the army, and became general-in-chief of the army of Asia, under Justinian II. In 716 he marched against Theodosius III., who had been proclaimed emperor on the deposition of Justinian II.; and Theodosius resigned his crown to him in the following year. The Saracens, having ravaged Thrace, laid siege to Constantinople, which was bravely defended by Leo, who compelled them to retire. His reign, however, was tyrannical, and he drove the patriarch Germanus from his seat, in which he placed Anastasius. He was also guilty of burning the library at Constantinople, containing a quantity of medals and above 30,000 volumes. The popes Gregory II. and Gregory III. having excommunicated him, he prepared an armament to invade Italy, but the ships were destroyed by a storm. He died in 741.

Leo IV., grandson of Leo III.; born in 751, and succeeded his father in 775. In his time the controversy raged between the Iconoclasts, or image-breakers, and their adversaries, both of whom he protected by turns. He repulsed the Saracens in Asia. He died in 780.

Leo V., called the Armenian, from the country of which he was a native. He rose to the rank of general by his valor; but, being accused of treason, the emperor Nicephorus disgraced him, and imprisoned him in a convent. Michael Rhangabus, on ascending the throne in 811, restored him to his rank; but Leo V., profiting by the misfortunes of his master, headed a military revolt and was elected emperor by the troops in 813. He was one of the most violent of the Iconoclastic princes. He was assassinated in 820.

Leo VI., styled the Philosopher; born in 865, was the son and successor of Basilius, the Macedonian, and ascended the throne in 886. The Hungarians, Saracens, and Bulgarians having united against the empire, he called to his assistance the Turks, who entered Bulgaria, which they ravaged with fire and sword. Leo VI. drove the patriarch Photius from his seat; and Nicholas, one of the successors of Photius, excommunicated the emperor; for which Leo VI. deposed him. He wrote some books, the most interesting of which is a treatise on tactics printed at Leyden in 1612. He died in 911.

Leo, the name of various Popes, as follows:

Leo I., surnamed The Great, Pope, succeeded Sextus III. in 440. He took a very decided part against the Manichæans and other schismatics, held a council at Rome against Eutyches in 449, and presided by his legates at the General Council of Chalcedon two years later. When Attila invaded Italy, Leo I. was sent by the Emperor Valentinian to dissuade him from his threatened march on Rome, and Rome was saved. Leo I. afterward saved the city from being burned by Genseric. He is the first Pope of whom we possess any written works. He died in 461.

Leo II., Pope; born in Sicily, succeeded Agathon in 682. He claimed authority over the Eastern Church and was succeeded by Benedict III. He died in 683.

Leo III., Pope; born in Rome. He succeeded Adrian I. in 795. His first act was to acknowledge the suzerainty of Charles the Great (Charlemagne) by sending him the keys of St. Peter's and the standard of the city of Rome. In 799 a conspiracy was formed against him by two of the Roman clergy, and he was attacked and shamefully treated while assisting at the procession of St. Mark. Through the aid of some faithful attendants he escaped to Paderborn, to seek the protection of Charles, who, the same year, sent him back with a powerful escort to Rome. In the following year, 800, Charles visited Rome, and was there crowned by the Pope, emperor of the Romans. A fresh conspiracy against Leo was discovered in 815, the authors of which were among the leading citizens of Rome and were condemned to death. He died the following year.

Leo IV., Pope, a Roman, succeeded Sergius II. in 847. The Saracens having invaded the Ecclesiastical States, he marched against them and obtained a complete victory; after which he put the city of Rome in a state of defense, and founded the town of Leopolis. He died in 855.

Leo V., Pope, a Benedictine monk who, in 903, succeeded Benedict IV., but was deposed by his chaplain Christopher. The annals of the papacy during the 10th century are very confused, and there is no mention of Leo's subsequent life.

Leo VI., Pope, succeeded John X. in 928. He is said to have been put to death by Marozia.

Leo VII., Pope, was elected in succession to John XI., son of Marozia. He negotiated a peace between Hugo, King of Italy, and Alberic, Duke of Rome, the son of the celebrated Marozia. He is said to have been an irreproachable man and zealous ecclesiastic, and was succeeded by Stephen VIII. He died in 959.

Leo VIII., Pope, was elected to the papal chair on the deposition of John XII., in 963, under the patronage of Otho I. On Otho's withdrawal John reëntered Rome, and drove away Leo, but John dying soon afterward, Benedict V. was chosen Pope. The Emperor Otho subsequently took Rome, and exiling Benedict reinstated Leo, who died about 965.

Leo IX., Pope, previously named Bruno; born in Alsace, 1002. He was cousin to the Emperor Conrad the Salic, and was made Bishop of Toul at the age of 22. Through the influence of the Emperor Henry III., son of Conrad, and also by the counsel of the monk Hildebrand, he was elected at the Diet of Worms, in 1048, to succeed Damasus II. as Pope. Well received at Rome, he applied himself zealously to the reform of discipline in the Church, visiting France, Italy, and Germany, and holding several councils against simony and concubinage. In 1058 he led an army against the Normans in Italy, but was defeated and taken prisoner by their leader, Robert Guiscard, at the battle of Civitella. He was confined at Benevento about 10 months, and falling ill was allowed to return to Rome, where he died in 1064. During his pontificate the schism between the Greek and Latin Churches was widened by the writings of Michael Cerularius, patriarch of Constantinople. The Pope and patriarch excommunicated each other.

Leo X. (Giovanni de Medici) Pope, son of Lorenzo the Magnificent, sovereign of Florence; born in Florence, Italy, in 1475. His father had him dedicated to the Church, and made a cardinal by Innocent VIII. at the age of 13 years. Exiled from Florence, with the rest of his family, in 1494, he spent some years in travel in Germany, France, and Flanders, and made acquaintance with many eminent men. In 1503 he returned to Rome and applied himself to the cultivation of science and the fine arts. He was appointed by Julius II. legate with the papal army, and in 1512, he was taken prisoner by the French at the battle of Ravenna, and only regained his liberty after the evacuation of Milan by the French. The Medici were restored to their supremacy at Florence by the arms of the Spaniards. In the following year, 1513, Cardinal de Medici was elected Pope on the death of Julius II., and made his entry into Rome on April 11, the anniversary of his capture at Ravenna. His pontificate of nine years is one of the most momentous of modern history in relation to great political changes, to the revival of literature and art, and, above all, to the Reformation. Leo X. succeeded in terminating the disputes between Louis XII. and the court of Rome; he continued and brought to a close the Council of the Lateran; and, at a conference held at Bologna, concluded a concordat with Francis I. of France. In 1517 he discovered a con-

Leo

spiracy formed against him by two cardinals, one of whom was hanged, and the other imprisoned for life. The same year, he created the unexampled number of 31 cardinals, among whom were Cajetan, Cam-

LEO X.

peggio, Trivulzio, and other learned and eminent men. He formed the project of a great war against the Turks, and resolved about the same time to complete the church of St. Peter at Rome. To raise the necessary money for these schemes he resorted to the sale of indulgences, the preaching of which in Saxony became the occasion of Luther's great enterprise. Leo published his first bull against Luther in June, 1520; Luther appealed to a general council and publicly burned the bull at Wittenberg. A second bull appeared against the great heretic in January, 1521, and the papal anathema was echoed by the doctors of the Sorbonne. At the same epoch war broke out afresh between the Emperor Charles V. and Francis I., the Pope allying himself first with Francis and soon after with Charles. The patron of literature and the fine arts, he was surrounded with many of the most distinguished men of his time; encouraged the study of Greek and the collection of ancient manuscripts; restored the Roman University and the great Laurentian Library of Florence; and gained the name, universally conceded, of "Restorator of Letters." He died in 1521.

Leo XI., Pope, of the Medici family, elected Pope 1605, at a very advanced age, and died in less than a month.

Leo XII. (Annibale della Genga), Pope; born in Genoa, 1760, succeeded Pius VII. in 1823. He is noted for his benevolent character and his attempts to suppress banditti and the remains of Carbonarism. He died in 1829.

Leo XIII. (Gioacchino Pecci), Pope; born in Carpineto, Italy, March 2, 1810. He was the son of Count Ludovico Pecci. Educated first at the Jesuit College of Viterbo and the schools of the Collegio Romano, he proceeded to the College of Noble Ecclesiastics. He greatly signalized himself in mathematics, physics, and philosophy. In 1830 he sustained a public disputation in the last-named branch of learning, and carried off the first prize. He also frequented the schools of the Roman University to learn canon and civil law. Having become Doctor of Laws, he was appointed by Pope Gregory XVI. a domestic prelate and Referendary of the Segnatura in 1837. He then took holy orders, received from the Pope the title of prothonotary apostolic, and was appointed in succession apostolic delegate at Benevento, Perugia, and Spoleto. He was a vigorous administrator, and while at Benevento put a stop to brigandage. Sent to Belgium as nuncio in 1843, he was created Archbishop of Damietta to qualify him for the office. Three years later he was nominated Bishop of Perugia, and in the consistory of Dec. 19, 1853, he was created a cardinal by Pius IX. He was a member of several of the congregations of cardinals — including those of the Council of Rites and of Bishops and Regulars — and in September, 1877, he was selected by the Pope to fill the office of Cardinal Camerlengo of the Holy Roman Church. In that important capacity he had control of all business except foreign affairs. On the death of Pius IX. in 1878 Cardinal Pecci was elected as the representative of the Moderates. He assumed the title of Leo XIII., and adopted an opposite policy to that of his predecessor. He restored the hierarchy in Scotland, and composed the

POPE LEO XIII.

religious difficulty with Germany, so that when a dispute arose in 1885 between Germany and Spain as to the ownership of the Caroline Islands he was requested by Prince Bismarck to act as arbitrator. In political matters Leo permitted the Irish bishops to indulge their own views. In 1887–1888 there were great rejoicings at Rome to cele-

brate his Jubilee. In May, 1888, the Pope issued a decree denouncing in general terms the methods adopted by some of the Irish leaders in the Plan of Campaign. The following October he received a visit from the German emperor, William II. The Pope interested himself greatly in the suppression of African slavery, and manifested enlightened views in other directions, but on questions affecting the Church and his own status as pontiff he regarded himself as the despoiled sovereign of Rome and as a prisoner at the Vatican; refused the income voted him by the Italian Parliament; and persistently declined to recognize the law of guarantees. He protested against heresy and "godless" schools, and in 1889 issued an allocution against the unveiling of a statue of Giordano Bruno at Rome. In his encyclicals Leo XIII. affirmed that the only solution of the socialistic problem is the influence of the papacy. In 1892–1893 he effected the establishment of a delegation to the Roman Catholic Church in the United States in the face of opposition by certain American prelates. In 1899 he issued a letter condemning Americanism as set forth by Father Hecker. He opened the archives of the Vatican for historical investigations, and made himself personally known as a poet, chiefly in Latin. He died July 20, 1903.

Leo, the name of various kings of the Armenians, as follows:

Leo I., Prince or King of the Armenians, established in Cilicia, began to reign in 1123; taken prisoner by John Comnenus in 1137, he died in prison in 1141. Leo II., called The Great, grandson of the preceding, obtained permission of the emperor, Henry VI., and the Pope, Celestine III., to take the title of king; reigned 1185–1219. Leo III., greatly aggrandized his kingdom; reigned 1269–1289. Leo IV., succeeded 1305, dethroned and slain by a Mongol general, 1308. Leo V.'s reign was devastated by civil wars and the invasion of Mamelukes and Turcomans; reigned 1320–1342. Leo VI., proclaimed king 1361, was driven from his kingdom by the Sultan of Egypt, 1375, retiring to France; died there in 1393.

Leo, Heinrich, a German historian; born in Rudolstadt, March 19, 1799. He was appointed Professor of History in the University of Halle, 1830. In early life he was in religion a rationalist, and in political faith a radical; but later he became a conservative and an "obscurantist." His principal works are: "History of the Italian States" (5 vols. 1829); "History of the Netherlands" (2 vols. 1832); "Natural History of the State" (1833); "Text-Book of Universal History" (6 vols. 1835–1844); "Anglo-Saxon Glossary" (2 vols. 1872). He died in Halle, April 24, 1878.

Leo Africanus (lē′ō af″rē-kā′nus), properly Alhassan ibn Mohammed Alwazzan, a Moorish geographer. About 1517 he was captured by pirates while returning from Egypt after extended travels in Northern and Central Africa, Arabia, Syria, etc. Ultimately he was presented as a slave to Leo X., who assigned him a pension. He wrote a "Description of Africa" which for a long time was almost the only authority, especially on the Sudan. He also wrote a "Tractate on the Lives of Arab Philosophers."

Leochares (lē-ok′ar-ēz), one of the most distinguished sculptors of the Attic school of the 4th century B. C. He was a pupil of Scopas, and Pliny ascribes to him the sculptures on the W. side of the Mausoleum. He was one of the privileged artists who were permitted to make portraits of Alexander the Great. Three statues of Zeus are known to have been executed by him. His "Ganymede carried off by an Eagle" was famous throughout the ancient world. In collaboration with Lysippus he produced a colossal group in bronze, which represented Alexander at a lion-hunt, while he himself was responsible for chryselephantine statues of Alexander and his family. The works of Leochares are all lost, but there is a copy of the Ganymede in the Vatican; and a bust of Alexander may be a copy of one of his.

Leo Minor, the Lesser Lion, a constellation formed by Hevelius, about 1691, out of the part of the heavens between Leo and Ursa Major. It is surrounded by Ursa Major, Lynx, Cancer, and Leo. None of the stars quite reach the fourth magnitude.

Leon, an ancient kingdom of Spain, equivalent generally to the modern provinces of Leon, Palencia, Valladolid, Zamora, and Salamanca. It was the earliest Christian kingdom, next after Asturias, to be formed in Spain after the Moorish wave of conquest began to recede. It dates from the 10th century, and was united with Castile first by Ferdinand the Great in 1037, and finally in 1230. The modern province has an area of 5,936 square miles, and a pop. of 386,083. The country, which is intersected by the Douro and the Minho, is mountainous, being invaded on the N. by the Cantabrian Mountains. The soil is generally fertile. The inhabitants are for the most part uneducated and lazy, but honorable, hospitable, and good-natured; they have many peculiar customs and all the pride of pure Spanish descent. In the high districts S. of Salamanca there are remnants, as is believed, of the old Gothic tribes, and at Astorga the Maragatos are variously supposed to be descendants of the Celtiberi, the Visigoths, or the Moors. Leon is also the name of a part of Brittany.

Leon (the *Legio septima gemina* of the Romans), capital of the former kingdom and of the modern province of the same name, but now a sleepy agricultural town; in a plain, 256 miles N. W. of Madrid. The beautiful cathedral (about 1195–1512), a specimen of the purest Early Pointed, is French in character and probably in origin, but was so much "restored" during 1855–1886 that it is hard to say what is old and what modern; it contains the tombs of many sovereigns of Leon, saints, and martyrs. Leon is the center of the Spanish linen manufacture, and has a celebrated horse fair; it was formerly the chief seat of the Spanish wool trade.

Leon, a city of Nicaragua, on an extensive plain. Once the boast of Spanish America, founded at the head of Lake Managua in 1523, removed hither in 1610, and sacked by Dampier in 1685, it is now partly in ruins, and of its noble buildings only the churches remain. The massive cathedral has been several times employed as a citadel during the civil wars, but has suffered very little. Pop., including the contiguous Indian pueblo of Subtiaba, about 45,000.

Leon, Ponce de. See PONCE DE LEON.

Leonard, James Francis, an American telegrapher; born in Kentucky in 1804. He was noted as the first practical sound-reader and in his day the most rapid operator in the world. He received messages by sound only in the summer of 1848. Soon after he received and wrote in a legible hand 55 words per minute on a trial for Professor Morse, who took the message to Europe to show what could be done with his invention. The old-time telegraphers erected a monument over his grave at Frankfort, Ky. He died in 1862.

Leonardo da Vinci (-vēn'chē), an Italian painter, sculptor, architect, and engineer; born in Vinci, Italy, in 1452. About 1470 he was placed by his father in the studio of Andrea del Verrocchio, by whom he was instructed in painting and modelling, and where he had Perugino and Lorenzo di Credi as fellow pupils. He would appear to have been about 28 when he visited the East, serving as engineer to the Sultan of "Babylon" or Cairo, and visiting Cyprus, Constantinople, and Armenia; and in 1482 he settled in Milan and attached himself to Lodovico Sforza, then guardian of his nephew, the Duke Gian Galeazzo, whom he afterward supplanted.

His famous picture of the "Last Supper," commissioned jointly by the duke and the monks of Santa Maria delle Grazie, was painted on a wall of the refectory of the convent. It was completed in 1498, but its execution probably extended over several previous years. Bandello, in one of his novels, has given us a vivid glimpse of Leonardo at work on this great subject; of the hushed voices of the monks and their visitors as they watched the busy figure painting there from early dawn, wholly absorbed in his pursuit, and for-

LEONARDO DA VINCI.

getting even to eat; and of how the artist would sometimes leave the mounted figure of Francesco which he was modelling in the citadel and return to the convent by the shortest way, merely that he might add to his picture a single touch or two. The moment of his chosen scene on which the painter has seized is that when Christ has just pronounced the words, "One of you shall betray me," and their effect on the disciples is portrayed with the most delicate and subtle truth. There is an elaborate description and criticism of the work from the pen of Goethe. Owing to the dampness of the wall, and to the method of oil-painting—not fresco—on plaster, that had been adopted, the picture soon showed signs of deterioration, and it has repeatedly been found necessary to repaint it. His sketches for various of its parts still exist at Windsor, in the Brera Gallery at Milan, and in the Louvre. It has been very frequently copied, and it was chiefly from a drawing made by Matteini from the copy by Marco d'Oggionno that Raphael Morghen executed his celebrated line-engraving, published in 1800.

Among other paintings done in Milan were portraits of Lucrezia Crivelli and Cecilia Gallerani, mistresses of the duke, works that cannot now be identified, though "La Belle Ferronnière" of the Louvre has been regarded by some as the former likeness. The influence of Leonardo on art in Milan was clearly marked and lasting, for he founded an academy there in which Beltraffio and Andrea Salai, his

favorite pupil, received instruction; and the great Bernardino Luini, whether or not he actually studied under the master, certainly imbibed and turned to his own uses many of the characteristics of his method. Leonardo was also much employed by his patron as an engineer. He devised a system of hydraulic irrigation of the plains of Lombardy, and acted as director of the court festivities and pageants.

After the fall and imprisonment of the Duke Lodovico, in 1500, Leonardo retired to Florence, and by 1502 he had entered the service of Cæsar Borgia, then Duke of Romagna, as architect and engineer, in which capacity he was intrusted with the most ample authority. Records of his work during this period appear in the note books and maps preserved at Windsor. In the following year he returned to Florence, when he commenced a Madonna and Child with St. Anne for the Servite monks, a subject, however, of which only the noble cartoon now in the Diploma Gallery of the Royal Academy, London, was completed.

We now reach the period of Leonardo's famous contest with Michael Angelo, an artist who appears always to have regarded his elder rival with dislike and jealousy. Both painters received commissions to decorate the Sala del Consiglio in the Palazzo della Signoria with important historical compositions. Michael Angelo chose a subject of "Soldiers Surprised While Bathing," an incident from the Florentine wars with the Pisans. Leonardo dealt with "The Battle of Anghiari" (1440), in which the Florentines vanquished the armies of Milan. Two years were spent in the preparation of his cartoon; but, having employed a method of painting on the plaster — probably with wax — which proved a failure, he, in 1506, abandoned the work. The cartoon is now lost, but its general composition may be gathered from Lucensi's engraving (1558), and from "The Battle of the Standard," engraved by Edelinck from a free copy by Rubens of its principal group. About 1504 was completed the most celebrated of Leonardo's easel-pictures, the half-length of Mona Lisa, third wife of Zanobi del Giocondo, on which he had been engaged at intervals during four years — a work purchased by Francis I. for 4,000 gold florins, and now one of the chief treasures of the Louvre. The color here, as not seldom in the artist's work, has darkened with time, but still the picture remains a triumph of subtle and refined portraiture. Another work, now lost, portrayed the celebrated beauty Ginevra Benci; and Pacioli's "On Divine Proportion" (1509), contained 60 geometrical figures from Leonardo's hand. As had been the case in Milan, so here in Florence he powerfully influenced contemporary artists. Fra Bartolommeo, Jacopo da Pontormo, Ghirlandajo, and the sculptor Bandinelli all profited by his example. He also wrote a "Treatise on Painting."

The final period of Leonardo's life was spent in the service of France. In 1506 he visited Milan; and in the same year he was employed by Louis XII., who died in 1515, when Leonardo was in Rome, competing with Michael Angelo for the execution of the façade of San Lorenzo in Florence. The young French king, Francis I., bestowed on him, in 1516, a yearly allowance of 700 scudi, and assigned to his use the Château Cloux, near Amboise; and it was here that the great artist died, May 2, 1519.

Leoncavallo, Ruggiero, an Italian composer; born in Naples, Italy, March 8, 1858. He was friendly with Wagner, and for many years resided as a teacher in Paris, where he composed songs and fugitive pieces. About that time he sketched his trilogy of Italian history, of which "Medici" is the first section. After Mascagni's "Cavalleria Rusticana" had caused short dramatic operas to become popular, he produced, in Milan, in 1892, his "Pagliacci." In November, 1893, his "Medici" was heard in the same city.

Leonidas, a son of Anaxandrides, King of Sparta, succeeded his half-brother, Cleomenes I., about 491 B. C. When the Persian monarch Xerxes approached with an immense army, Leonidas opposed him at the narrow pass of Thermopylæ (480 B. C.) with a force of 300 Spartans and rather more than 5,000 auxiliaries. The Persians attempted in vain to win over Leonidas by the promise of making him ruler of the whole of Greece; and when Xerxes sent a herald calling the Greeks to lay down their arms, the Spartans answered: "Let him come and take them." The treachery of one Ephialtes having made it impossible to bar any longer the progress of the foe, Leonidas and his little band, having sent away the auxiliary force, threw themselves on the swarming myriads, and found a heroic death.

Leonides, or **Leonids,** popularly known as meteors; the finest of the meteoric rings which the earth cuts through in her annual revolution. It is encountered annually on Nov. 14. The magnificent display on Nov. 14, 1866, was from Leonides.

Leonine, a name given to a spurious copper coin of the value of about a cent, introduced into England from abroad during the reign of Edward I., and so called from its bearing the figure of a lion.

Leonine, an epithet used to describe pentameter or hexameter verses, the last syllable of which rhymes with the syllable following the cæsura. The question wheth-

er the rhyming was accidental or intentional has given rise to much controversy among French prosodists: de Faletz having found 912 such rhymes in Vergil supported the latter view, which was attacked by Quicherat, who showed that in the majority of cases — as in those cited above — the rhyme was between a substantive and its epithet. From the exceptional usage of the Latins a rule was developed. Leonine verses were common in the hymns of the mediæval Church; and long poems were composed in leonine measures or in some variant of it. An excellent example is the "Contempt of the World" of Bernard de Morlaix. The meter is "continuous dactylic, except the final trochee or spondee"; the second and fourth feet rhyme, as does the last foot of the first verse with the last foot of the second, and so on. At the time of the Renaissance leonine verses were often used as a kind of *memoria technica*. Many of the precepts of the medical school of Salerno are in leonine pentameters.

Leonists, a name given to the Waldenses from Leon, the German name of the city of Lyons, where they originated, and from which they called themselves the "Poor of Lyons."

Leonowens, Anna Harriette Crawford, an Anglo-American educator; born in Caernarvon, Wales, Nov. 5, 1834. In 1863 she was appointed governess in the family of the King of Siam. She was four years in the king's household at Bangkok, acting as secretary to the king and instructor to the royal family. The King of Siam was educated by her. She came to the United States in 1867; opened a school in New York to prepare teachers in the kindergarten system. She published: "The English Governess at the Court of Siam" (1870); "The Romance of the Harem" (1872); and "Life and Travels in India" (1884).

Leonurus, motherworts, a genus of *Labiates*, family *Lamidæ*. They have a tubular 5 to 10-ribbed calyx; a two-lipped corolla, the upper one flat, entire, and hairy, the lower one patent, trifid; the anther cells nearly parallel. Ten are known. *L. cardiaca*, a pale roseate, mint-like flower, is given in chest complaints.

Leopard, in zoölogy, *Felis pardus*, sometimes called the panther — "the pard" of Elizabethan writers. It has been known from early historical times, and has a wide geographical range, being found throughout the African continent, the whole of the S. of Asia, and in Ceylon, Java, Sumatra, and Borneo. It ranks third in importance in the family *Felidæ*; varying in length from 3½–4½ feet; tail measurement 2½–3 feet, height at shoulder about 30 inches, but larger and smaller specimens have been met with. Color, pale fawn to rufous-buff, thickly studded with dark rosette-shaped spots, which unite and form bands on the medio-dorsal line, the hind-quarters, and legs; the tail is covered with similar spots; white beneath and on the inside of the limbs. The leopard is fierce and bloodthirsty, often killing far more than it can devour, either from love of slaughter or for the sake of the fresh blood, and lies in ambush for or steals stealthily on its prey, which consists of almost any animal it can overcome, though it is said to evince a preference for the flesh of dogs, and, strange to say, for that of persons suffering from smallpox. In India it often attacks women and children, and instances have been known of "man-eating" leopards.

Leopardi, Giacomo, Count (lā-ō-par′-dē), an Italian poet; born in Recanati, Tuscany, Italy, June 29, 1798. His family, though noble, was poor, and he acquired a knowledge of the classics and of literature almost unaided in his father's library. Before he was 18 he had produced a Latin translation (with commentary) of Porphyrius' "Life of Plotinus"; a treatise on "Some Roman Rhetoricians of the 2d century," and a "History of Astronomy," both in Latin; and an "Essay on the Popular Errors of the Ancients," in Italian, citing over 400 authors. He corresponded with Niebuhr, Giordani, Akerblad, Boissonade, and other eminent philologists, who welcomed him as an accession to their ranks. In 1817 he was chosen a member of the Academy of Sciences of Viterbo. In 1822 Niebuhr offered him at Rome the chair of Greek philology in the University of Berlin, which he declined. After traveling through Milan, Bologna, and Pisa he settled at Florence, where some generous friends provided for his wants. In 1831 he removed to Naples, where he passed the closing years of his life. His subsequent works were: "Ode to Italy" (1818); "Ode on the Monument to Dante" (1819); "Ode to Cardinal Mai on the Discovery of Cicero's Tractate on the State" (1820); "Brutus the Younger" (1823), an ode, and 'Comparison of the Sentiments of Brutus the Younger, and of Theophrastus, when in the Face of Death," in which two works his pessimistic views first had formal expression; "Verses," a collection of his miscellaneous poems (1826); "Moral Opuscules" (1827), mostly observations, in dialogue form, on ethical questions. "The Broom-Flower," "Sylvia," and "The Night Song," are his most celebrated poems. He left unpublished at his death a volume of "Thoughts." He died in Naples, June 14, 1837.

Leopard Cat, in zoölogy, *Felis bengalensis*, a beautiful Indian species. Yellowish-gray to bright tawny, white below, longitudinally striped on head, shoulders, and

back, spots on the side. Extreme length from 35 to 39 inches, of which about 12 are made up by the tail. Found in India from the hilly regions to Ceylon, and extends W. to Java and Sumatra. It is extremely fierce, and is said to drop on deer, and eat its way into the neck.

Leopard's Bane, in botany, *Doronicum pardalianches,* natural order *Compositæ,* a robust plant, with large roughish leaves and conspicuous yellow flower-heads

Leopard Wood, the wood of *Brosimum Aublettii,* a tree of Trinidad and Guiana, allied to the cow tree.

Leopold I., Emperor of Germany, son of Ferdinand III.; born in 1640. Destined for the Church, he was educated by the Jesuits, and became well versed in metaphysics

LEOPOLD I. OF GERMANY.

and theology, but not at all in the art of government. At the age of 15 he was crowned King of Hungary, in the following year King of Bohemia, and was elected emperor in 1658. His long reign of 49 years is marked by many events of European importance, but Leopold, personally, had little influence — he was led by his ministers. There were wars with Sweden, with Turkey, with Hungary, and three with France, and

LEOPOLD II. OF GERMANY.

the peace of Oliva, the peace of Nimeguen, the League of Augsburg, the Grand Alliance, the peace of Ryswick, and the peace of Carlowitz, are landmarks of this period. The severities exercised by the emperor occasioned the junction of the Hungarians with the Turks in 1683, and the besieging of Vienna. It was on this occasion that John Sobieski, the heroic King of Poland, interposed, won a great victory over the Turks, and saved the empire, for which Leopold gave him very cold thanks. Sobieski withdrew his army, declaring he would still fight the Turks, but never the insurgent Hungarians. Leopold then adopted more severe and merciless measures in Hungary. The war of the Spanish Succession began in 1700, and while it was still going on Leopold died in 1705.

Leopold II., Emperor of Germany; son of Francis I. and Maria Theresa; born in 1747. He became grand-duke of Tuscany in 1765, and his government was marked by wisdom and moderation, and by the establishment of important reforms, both civil and ecclesiastical. He succeeded his brother Joseph in the Austrian hereditary dominions in 1790, and the same year was chosen emperor. Very grave political difficulties beset him, and the Netherlands were in revolt, disaf-

fection was growing to insurrection in Hungary and Bohemia, and the principal states of Europe were unfriendly. By wise measures he established tranquillity, recovered the Netherlands, and pleased his subjects by restoring with modifications the form of government which had existed before the innovations of his brother. The French Revolution made fresh and greater difficulties. In 1791 he concluded the treaty of Pilnitz with the King of Prussia and died in March 1792.

Leopold I., King of the Belgians; born in Coburg, Dec. 16, 1790. After receiving an excellent literary and scientific education he became a general in the Russian army and was present at the battles of Lützen, Bautzen, and Leipsic. While on a visit to England after the peace of 1815 he won the affections of the Princess Charlotte, the heiress of the throne, married her, and was naturalized by act of Parliament in 1816. The princess died in 1817; and Leopold 12 years later married morganatically Caroline Bauer. He received in February, 1830, the offer of the crown of Greece, but declined it. In June, 1831, he was elected King of the Belgians, and his inauguration took place at Brussels in July of that year. As a monarch he conducted himself with great prudence, firmness, and moderation, with constant regard to the principles of the Belgian constitution. He died Dec. 10, 1865.

Leopold II., King of the Belgians; son of the preceding; born April 9, 1835. He was married in 1853 to Marie, Archduchess of Austria (born 1836), the daughter of Archduke Joseph of Austria. He early manifested an interest in Africa and in 1885 he became sovereign of the KONGO FREE STATE (*q. v.*). During his reign there were an extension of the suffrage and a spread of advanced ideas. He died Dec. 17, 1909.

Leopold, Karl Gustaf af (lē'ō-pōld), a Swedish poet; born in Stockholm, Nov. 23, 1756. He was for a long time a kind of literary dictator, and was chief representative in Sweden of the French school of classicism. He attempted all forms of poetry save the epic. Of his tragedies the best-known are "Odin" (1790), for which Gustavus III. presented him a crown of laurel from Vergil's tomb; and "Virginia" (1802). He died in Stockholm, Nov. 9, 1829.

Lepanto (anciently Naupactus, now called by the Greeks Epakto), a small town of Greece, and the seat of a bishop; on the N. side of the entrance to the Gulf of Corinth. During the Peloponnesian war it was one of the chief naval stations of the Athenians. In the Middle Ages it was given by the Byzantine emperor to the Venetians, who fortified it so strongly that in 1477 it stood a siege of four months by 30,000 Turks and in 1499 was only taken by Bajazet II. at the head of 150,000 men. Near Lepanto took place the celebrated naval battle between the Turks on the one side and the papal galleys and those of the Venetians and the Spaniards on the other, on Oct. 7, 1571, in which the Christians, commanded by Don John of Austria, achieved a decisive victory. Of the Turks 30,000 fell or were taken prisoners, while 130 Turkish vessels were captured, and 12,000 Christian slaves liberated; the Christians lost 8,000 men and 15 galleys. In this battle Cervantes lost an arm. The town became Greek in 1829.

Lepanto, Gulf of. See CORINTH.

Lepas (barnacle), the typical genus of the family *Lepadidæ*. The animal begins life like an entomostracous crustacean, with a broad carapace, a single eye, two pairs of antennæ, three pairs of jointed, branched, and well-bristled legs, and a forked tail. Finally it becomes a stalked cirriped attached to the back of a whale or a turtle, or to the solid rock.

Lepidium (pepperwort), the typical genus of the family *Lepididæ* or the tribe *Lepidineæ*. The pod is dihiscent, two to four-seeded; the petals are short or wanting. It consists of plants generally with small white flowers, and two, four, or six stamens. Sixty or 80 are known. In chemistry, $C_6H_5 \cdot CH_2 \cdot CN$. The volatile oil of garden cress (*Lepidium sativum*). Hofmann has lately shown this to consist of a toluo-nitril.

Lepidodendron, a genus of fossil plants which occurs in Carboniferous and Upper Devonian strata. Several species are recognized, most of which attained a large size — 40 or 50 feet long and more than 4 feet in diameter. They were tree-like lycopods — their living representatives being the low-growing club-mosses of mountains. The stem tapered upward and branched dichotomously, and was either covered with linear one-nerved leaves, or where these had fallen was marked with more or less prominent ovate or lozenge-shaped leaf-scars, arranged in a spiral manner. The fruits, which were either terminal or lateral, were elongated, cylindrical bodies, composed of a conical axis, around which a great quantity of scales were compactly imbricated. The fossils described under the name *Knorria* are now known to be the decorticated stems of *Lepidodendron*. So again the fruiting branches were formerly included under the genus *Halonia*, while the cones were named *Lepidostrobus*. Some of the roots (*Stigmaria*) met with in the underclays of the coal-measures also appear to belong to *Lepidodendron*.

Lepidoganoidei, a sub-order of ganoid fishes, distinguished from the placoganoid fishes by their external covering consisting

of scales, and not, as in the latter, of plates. The best-known living fishes belonging to the Lepidoganoidei are the bony pike and the polypterus.

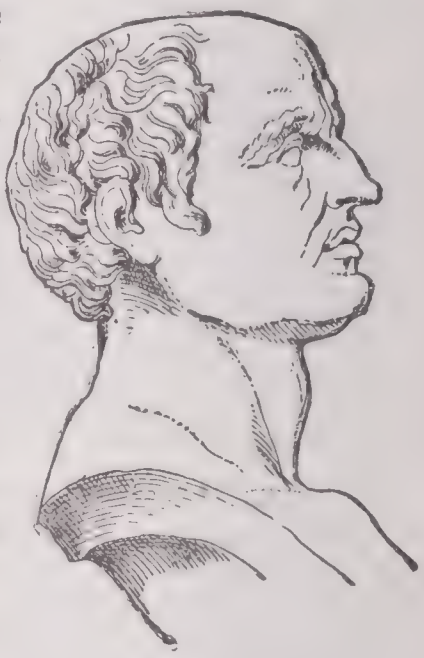
Lepidolite, a variety of muscovite, belonging to the mica group. Crystallization, according to recent investigations of Tschermak and von Kokscharow, monoclinic. Cleavage basal, highly eminent, also coarse or fine scaly granular. Hardness, 2.5–4; sp. gr., 2.84–3; luster, pearly; color, rose-red, violet-gray, lilac, yellowish. Translucent. Optic axial plane perpendicular to the plane of symmetry. Composition: A silicate of alumina and sometimes sesquioxide and protoxide of iron, sesquioxide of manganese with the protoxide bases, potash, lithia, and sometimes rubidia and casia. Fluorine is also present. It is found in granite and gneiss, and sometimes associated with cassiterite, tourmaline, amblygonite, etc .

Lepidoptera, an order of insects having the wings clothed with scales implanted in the wings, with their margins overlapping other scales; it is these, and not the wings themselves, that are so gayly colored. The wings are four. The mouth consists of an antlia, or long spiral proboscis or tongue, by means of which they feed on honey in the nectaries of flowers, which is their appropriate food. They undergo a complete metamorphosis, the parent generally depositing her eggs on some plant; these being hatched as minute caterpillars at once begin to eat voraciously, increasing largely in size, and casting their skin repeatedly. On becoming full grown they pass into the chrysalis state, emerging in due time as full-grown winged insects. Formerly they were divided into three sub-orders or tribes: Butterflies, Sphinxes or Hawk-moths, and Moths, the first having club-shaped antennæ, the second having the thickest part of the antennæ toward the front, and tapering in both directions, and the third having them, if not feathery, then, becoming gradually thinner from the base to the tip. The butterflies are the most brightly colored, and fly by day; the sphinxes of less brilliant tints fly during the twilight; the moths, normally of somber hue, are nocturnal. The last two sub-orders are now combined, and only two primary divisions recognized: (1) Rhopalocera, containing the butterflies; (2) Heterocera, comprising hawk-moths, and moths. More than 50,000 lepidoptera are known.

Lepidosiren, a genus of fishes belonging to the division Palæichthyes, the order *Dipnoi* (mud-fishes), and the family *Sirenoidea*, *L. paradoxa,* the South American mud-fish, above three feet long, is found in the river Amazon. It is closely allied to Protopterus, but has only five branchial arches with four intervening clefts, 55 ribs, small eyes, covered with skin. Sir Richard Owen shows that it is only by the organ of smell that it is proved to be a fish and not a reptile. Darwin believed that the reason why a fish of a pattern so antique has survived is, that it is an inhabitant of fresh water, where the struggle for existence is less severe than in the ocean.

Lepidostrobus, a cone from the coal measures, usually found in seams or nodules of clay-ironstone. They are often compressed, and consist of a central axis surrounded by imbricated scales or bracts, each containing a sporangium (spore-case). They have been found united to the tip of the branches of *Lepidodendron,* proving them to be the fruit of that genus. Type *L. ornatus.*

Lepidus, Marcus Æmilius, a Roman statesman; member of a distinguished patrician family. In 49 B. C. he held the office of prætor, and at the outbreak of the civil war he joined the popular party. He became master of the horse, and in 46 consul with Cæsar; was at Rome at the time of the murder of the latter, and succeeded him as pontifex maximus; had the government of Narbonnese Gaul and Hither Spain; joined Antony and was declared an enemy to the state. In October, 43, the first triumvirate was formed, and the Roman world was divided between Octavianus, Antony, and Lepidus. He was again consul in 42; was made governor of Africa after the defeat of Brutus and Cassius at Philippi; attempted afterward unsuccessfully to make himself independent, and lost his provinces and his office. He died in 13 B. C.



MARCUS LEPIDUS.

Lepismidæ, a family of insects, order *Thysanura genuina* (brittle-tails). The body is spindle-shaped, generally covered with silvery scales, the apex of the abdomen with bristles, the sides with false feet. They approach the *Blattidæ* among *Orthoptera.* They are found under stones, in moist places in houses, etc. They run fast, and some can leap.

Leporidæ, hares and rabbits. A family of *Rodentia.* They have six rootless molars on each side of the upper and five in the lower jaw, each molar being divided into lobes by transverse folds of enamel. The skull is compressed, the ears long, the surface of the cheeks covered with short hair.

the clavicles imperfect, the fore limbs with five and the hind ones with four toes, the soles of the feet hairy throughout. They are diffused throughout the world.

Le Play, Frédéric, a French engineer and economist; born in 1806. He was professor in the School of Mines at Paris, and a senator. He was a commissioner at several exhibitions, and wrote "The Working Men of Europe" (1855); "Social Reform" (1864); "Organization of Labor" (1870); on the family, on the English constitution, etc. He died in 1882.

Leprosy, a disease characterized by the formation of scaly patches on the skin, of different sizes, but having always nearly a circular form. Physicians distinguish three varieties of this disease — *Lepra vulgaris,* or common leprosy; *Lepra alphos,* or white leprosy; and *Lepra nigricans,* or black leprosy. Leprosy first manifests itself in small distinct reddish elevations of the cuticle, which enlarge till they sometimes attain the size of a coin. They are covered with scales, which accumulate and form a thick prominent crust, and are quickly reproduced as they fall off. This disease usually makes its appearance first about the knee or elbow, and extends by degrees along the extremities, till sometimes the whole body becomes affected with it. Its progress is, in general, very slow, and it may continue in the same state for years. The general health of the patient is but little disturbed by this disease. In *lepra alphos* the scaly patches are smaller than in *lepra vulgaris,* and have also their central parts depressed or indented. The *lepra nigricans* differs from the others chiefly in the color of the patches, which are dark and livid. This disease sometimes makes its appearance without any apparent cause, sometimes it may be induced by exposure to cold or damp, and sometimes it is evidently hereditary. It is generally tedious of cure. The diet should be light and moderate, and all heating and stimulating liquors avoided. Externally, warm baths, sulphur baths, and preparations of tar or creosote, are useful. The constitutional treatment will depend upon the condition of the body; if weakly, tonics, as quinine and iron, are to be administered. A solution of arsenic is often of advantage; but of course it can only be used under medical superintendence. This disease appears to have been much more prevalent, and of a severer type, in ancient than in modern times, if, indeed, this is the same disease — many being of opinion that the leprosy of ancient times resembled rather what is now known as elephantiasis. Leprosy originated in Egypt and Arabia at a very early period. It is frequently alluded to in the Scriptures; and special regulations were prescribed concerning those afflicted with it by the Mosaic law, 1491 B. C., (Lev. xiii.). Christ healed a leper in Galilee. It was known to the Greeks and Romans, and is described by Hippocrates (460–357 B. C.) and Galen (130–200). The crusaders introduced the disease into Europe, where it raged with such virulence during the Middle Ages that almost every town had its lazar-house for the reception of lepers. In 1225, during the reign of Louis VIII., there were in France no less than 2,000 of these institutions. Since the commencement of the 17th century the disease has almost entirely disappeared from Europe, where it is now limited to the most northern and southern countries. It was prevalent in the Faroe Isles in 1676, and cases were reported in England in 1736. The last case mentioned was described by Dr. Edmonston in 1809.

Lepsius, Karl Richard (lep'sē-ös), a German Egyptologist; born in Naumburg, Dec. 23, 1810. While pursuing his studies in Paris he wrote three disquisitions, which won prizes of the Academy: "Palæography as a Means of Linguistic Research" (1834); "Kinship of the Semitic, Indian, Ethiopian, Old Persian, and Old Egyptian Alphabets"; "Origin and Relationship of Numerical Terms in the Indo-Germanic, Semitic, and Coptic Languages." In his celebrated "Letter to Mr. Rossellini on the Hieroglyphic Alphabet" (1837), he propounded a scientific theory of hieroglyphic writing. His translation of the "Book of the Dead" was published in 1842. That year he visited Egypt, and for four years studied its monuments; the results of his researches and those of his associates are contained in the magnificent "Monuments of Egypt and Ethiopia" (12 vols. 1849–1860). Besides numerous memoirs addressed to the Academy of Berlin and other learned societies, he wrote for the general public "Letters from Egypt, Ethiopia, and the Sinaitic Peninsula" (1852). He died in Berlin, July 10, 1884.

Leptocardii, or **Leptocardia,** a division of fishes containing those with thin hearts. There is but one order, *Pharyngobranchii,* with two species.

Leptocephaly, a term introduced by Professor Aeby, of Berne, to denote the possession of an extremely narrow type of skull, such as is found, with some exceptions, among the races of the Southern Hemisphere. "It is remarkable that the Greenlanders, though a high northern people, possess the most decidedly narrow skulls which exist."

Leptorhine Rhinoceros, a fossil two-horned rhinoceros, having slender nasal bones and the nostrils separated by a partially ossified septum. It was of more slen-

der make than *R. tichorhinus*. It is found in the post-Pliocene.

Leptospermum, the typical genus of the tribe *Leptospermeæ*. They have small leathery dotted leaves and five-lobed calyx, a corolla with five rounded petals, and a four or five celled ovary. The leaves of *L. lanigerum*, a large tree, is called the tea-plant, the early settlers in Tasmania having used the leaves as a substitute for ordinary tea leaves.

Lepus ("the Hare"), one of the original 48 constellations of the "Almagest," situated just S. of Orion and containing several fairly bright stars, the two brightest, Alpha and Beta Leporis, being of the 2.7 and 2.9 magnitudes respectively. The constellation lies between Orion, Monoceros, Canis Major, Columba, Cœlum, and Eridanus.

Le Queux, William, an English novelist; born in London, July 2, 1864. He studied art in Paris under Spiridion; forsook the Quartier Latin; made a tour through France and Germany on foot; returning to Paris, drifted into journalism, becoming attached to "Galignani" and Paris "Morning News"; went to London; edited "Gossip" and "Piccadilly"; joined staff of "Globe" in gallery of House of Commons, 1890; appointed sub-editor, 1891; resigned to devote time to novel writing, 1895. He published "Guilty Bonds" (1890); "Strange Tales of a Nihilist" (1890); "Sinned Against" (1891); "The Great War in England in 189?" (1892); "Zoraida" (1894); "Stolen Souls" (1894); "The Temptress" (1895); "A Secret Service" (1896); "Devil's Dice" (1896); "The Great White Queen" (1896); "The Eye of Istar" (1897); "Whoso Findeth a Wife" (1897); "A Madonna of the Music Halls" (1897); "If Sinners Entice Thee" (1897); "The Day of Temptation" (1897); etc.

Lerdo de Tejada, Sebastian (lār'dō dā tā-hä'dä), a Mexican statesman; born in Jalapa, Mexico, April 25, 1825; appointed a judge of the supreme court in June, 1857; was minister in June, 1857; was Minister of Foreign Affairs for a short time in the same year; member of Congress in 1861–1862 and in 1862–1863; was a companion of President Juarez in 1863–1867, during which time he was successively Minister of Justice and Minister of Foreign Affairs. He was elected chief-justice of the supreme court in December, 1867, and on the death of Juarez, July 18, 1872, he succeeded to the presidency; was elected to that post in the following November. In 1876 he was again candidate to succeed himself and after the election, which was in doubt, he was declared reëlected by Congress. This action resulted in a revolution and Lerdo was forced to leave the country. He lived in retirement in New York city, till his death, April 21, 1889.

Lerida, a town of Spain, capital of the province of Lerida; area, 4,762 square miles; pop. (1901) est. 290,000; on a tributary of the Ebro, 114 miles W. by N. of Barcelona. The second city of Catalonia, Lerida has a castle and two cathedral churches, one an ancient Byzantino-Moorish edifice, now used as a barracks, the other a modern Græco-Roman building. It carries on manufactures of woolens, cottons, leather, paper, and glass. Near Lerida, the Celtiberian Ilerda, Scipio Africanus defeated Hanno (216 B. C.) and Cæsar, the lieutenants of Pompey (49 B. C.). The Goths made it a bishop's see and held here a council of the Church in the 6th century. In 1300 a university was founded here; it is now extinct. The town has been several times besieged, on the last occasion by the French in 1810. Pop. (1900) 21,352.

Lérins (luh-ra*ng*), a small group of French islands in the Mediterranean, 2½ miles S. E. of Cannes. On Sainte-Marguérite (the ancient Lerona), 4 miles in circumference, stands a fortress in which the Man with the Iron Mask and Marshal Bazaine were at different times confined, and from which Bazaine escaped in 1874. On Saint-Honorat (anciently Lerina), 2 miles in circuit, are the ruins of the once famous monastic school. Vincent Lerinensis, a monk here (died 450), was the author of a famous definition of Catholicism.

Lerma, Francisco Gomez de Sandoval y Rojas, Duke of, a Spanish statesman; born about 1550. He was a Spanish minister under Philip III. from 1598 to 1618. His career was chiefly marked by the unfavorable terms on which he concluded peace with England (1604) and the United Provinces (1608); and by the decree of proscription issued in 1609, which drove thousands of Moorish families from Spain and confiscated much of their property. Under Philip IV. his administration of the treasury was challenged, and he was compelled to refund considerable sums. He died in 1625.

DUKE OF LERMA.

Lermontov, Mikhail Yurevitch, a Russian poet; born in Moscow, Oct. 15, 1814. He was educated at Moscow and in the school of pages at St. Petersburg, and, en-

tering the army, was sent on active service in the Caucasus. The death of Pushkin gave him his first poetic inspiration, which took shape in an impassioned appeal for vengeance on Pushkin's slayer. But it was the sublime scenery of the Caucasus that inspired his best poetic pieces, such as "The Novice," "The Demon," "Ismail Bey," "Valerik," etc. One poem from his pen, "The Song of the Czar Ivan Vasilievitch," is highly praised as a successful attempt to reproduce the spirit of the Little Russian popular poetry. A Byronic note runs through most of Lermontov's poetic work. In 1839 he published a good novel, "A Hero of Our Time"; this is said to have occasioned the duel that cost him his life July 15, 1841.

Lermont, Thomas. See RYMER, THOMAS THE.

Lernæadæ (ler-nē'ä-dē), a family of crustaceans, order *Copepoda*. The females fasten themselves to the eyes and other parts of the bodies of various fishes, some by the footjaws, others by horns, and yet others by a round button formed by two long appendages of the thorax. They are said to deprive the animals on which they are parasitic of vision. They look like worms, while the males more resemble the crustacean type.

Le Roi le Veut (ler wä luh vuh), a form of words employed in English constitutional practice, and meaning "the king wills it." The royal assent is thus intimated by the clerk of Parliament to the passing of public bills. To private bills the royal assent is expressed by *Soit fait comme il est désiré* (let it be done as desired). The dissent of the sovereign to the passing of any measure is signified by the words *Le roi s'avisera* (the king will consider).

Lerona. See LÉRINS.

Leros, a Turkish island in the Ægean, off the coast of Asia Minor, 35 miles S. of Samos; length 6 miles, width 4 miles; pop. 3,000.

Le Roux, Henri, known as HUGUES, a French journalist and author; born in Havre in 1860. In early life he was connected with the "Political and Literary Review," and subsequently succeeded Jules Claretie as writer of the Paris chronique in the "Temps." He is author of a series of popular romances, including "Médéric and Lisée" and "One of Us" (1886); "Souls in Agony" (1888); "The Parisian Inferno" (1888); "All for Honor" (1892). His miscellaneous works are: "In the Sahara" (1891); "On Board a Yacht: Portugal, Spain, etc." (1891); two translations from the Russian; etc.

Leroux, Pierre (luh-rö), a French socialist; born in Paris in 1797. He was for a while an adherent of Saint-Simon, but afterward developed a humanitarian or socialistic system of his own. Its principles are expounded in "Equality" (1838); "Refutation of Eclecticism"; "Humanity" (2 vols. 1840). After the coup d'etat he was proscribed and took up his residence in the island of Jersey; there he pursued agricultural experiments and wrote a philosophical poem, "The Beach of Samarez" (1864). He died in Paris, April 12, 1871.

Leroy=Beaulieu, Anatole (lu-rwä'bō-lyuh), a French historian; born in Lisieux, in 1842. He became Professor of Modern History in the Free School of Political Sciences, 1881. His principal work, written after extensive travels in Russia, is "The Empire of the Tsars and the Russians." Among his other writings are: "A Russian Statesman: Nikolas Milutin"; "France, Russia, and Europe"; "Revolution and Liberalism"; "The Papacy, Socialism, and Democracy."

Leroy=Beaulieu, Pierre Paul, a French economist; born in Saumur, Maine-et-Loire, Dec. 9, 1843. He was opposed to socialism, and was very conservative in his views. His works include "The Labor Question in the Nineteenth Century," "The Modern State and its Functions," and others. He was the founder and editor of "L'Economiste Français."

Le Sage, Alain René (luh-säzh'), a French novelist and dramatist; born in Sarzeau, near Vannes, May 8, 1668. He aban-

ALAIN RENÉ LE SAGE.

doned law for literature, with scant success till 1707, when the comedy "Crispin his Master's Rival" was received with high public favor; as was "Turcaret" the following year. The latter — a satire on the financiers, trading classes, and nobility — is one of the best comedies in French literature; every character is drawn with

sharp individuality. His novels "The Devil on Two Sticks" (1707) and "Gil Blas" (1717) were suggested by Spanish originals; but he owes them nothing beyond suggestion. As author of "Gil Blas" he is the parent and pattern of Fielding and Smollett. Of his other romances in the same general vein may be mentioned "The Bachelor of Salamanca" and "The Life and Adventures of M. de Beauchêne." He died in Boulogne-sur-Mer, Nov. 17, 1747.

Lesbos. See MITYLENE.

Lescure, Mathurin François Adolphe de (lā-kür'), a French littérateur and historian; born in Bretenoux (Lot), in 1833. Successively attached to the Ministry of State and the Senate, he acquired a unique reputation by a series of essays and monographs on the Revolutionary and other periods in French history. Among more than 40 publications are: "Confessions of the Abbess de Chelles" (1863); "Marie Antoinette and her Family" (1865); "Mary Stuart" (1871); "Illustrious Mothers" (1881); "Love under the Terror" (1882); "Rivarol and French Society during the Revolution and Emigration" (1883), his best work, crowned by the Academy; "Châteaubriand" (1892); and numerous memoirs. He died in Clamart (Seine), May 6, 1892.

Lese Majesty. See LEZE MAJESTY.

Lesghians, a Tartar people of the Mohammedan religion, inhabiting the Eastern Caucasus, and forming the chief portion of the inhabitants of Daghestan. They were among the most stubborn of the Caucasian peoples in their resistance to the Russians.

Lesina, or **Lessina,** an island in the Adriatic, on the coast of Dalmatia, consisting of a long and narrow strip, stretching E. to W. for 40 miles, with a breadth of 2 to 6 miles, and presenting a continuous chain of hills, which, on the coast, form lofty and precipitous cliffs. Wine, olive oil, and fruit are produced. The principal town, bearing same name, is on the S. W. coast and has a good natural harbor. Pop. 15,000.

Lesion, any morbid change produced by external or by internal causes in the continuity, the situation, the connective conformation, or structure of any tissue or organ.

Leskov, Nikolai Semyonovitch (les'-kōv), a Russian novelist; born in the government of Orel, Feb. 16, 1831. His first story, "No Way Out" (1865), is a powerful delineation of Russian society, and is tinged with radicalism and nihilism. In the novel "The Clergy" he portrays the life of the priesthood; in "To the Knife" he describes in detail the schisms and factions of the intellectual world of Russia. He died in St. Petersburg, March 5, 1895.

Lesley, John, a Scotch historian; born Sept. 29, 1527. A stanch friend of Mary Queen of Scots, he was implicated in the project of her marriage to the Duke of Norfolk, and in the consequent rebellion in the N. of England, and was imprisoned in the Tower. On his release he crossed to the Continent, and subsequently became Bishop of Coutances in Normandy. His chief production is a history of Scotland (published at Rome, 1578), in 10 books, 7 in Latin and the last 3 in Scotch dialect. He died in Brussels, Belgium, May 31, 1596.

Lesley, John Peter, Jr., an American geologist; born in Philadelphia, Pa., Sept. 17, 1819. He was graduated at the University of Pennsylvania, and spent some years as minister of a Congregational church in Milton, Mass. He afterward left the ministry and devoted his time to geology, which he had previously studied. For a time he was secretary of the American Iron Association; secretary and librarian of the American Philosophical Society; Professor of Geology in the University of Pennsylvania; chief geologist of that State, with charge of a complete survey of the State in 1874. In 1886 he was made emeritus professor. He died June 1, 1903.

Leslie, Charles, an Irish clergyman; born at Raphoe, Ireland, in 1650. He studied at Trinity College, Dublin, and, having taken orders in 1680, became chancellor of the Cathedral of Connor in 1687. Deprived at the Revolution for declining the oath of allegiance, he retired to England and wrote against Papists, Deists, Socinians, Jews, and Quakers, as well as in support of the non-juring interests. He went with the Pretender to Italy after 1715, but returned to Ireland in 1721. His "Short and Easy Method with the Jews" appeared in 1684; his "Short and Easy Method with the Deists" in 1694. He died April 13, 1722.

Leslie, Charles Robert, an American painter; born in London, Oct. 19, 1794, his parents being Americans. He was educated at Philadelphia, to which city his parents took him in 1800. In 1811 he returned to England and entered as a student in the Royal Academy, West, Fuseli, and Allston exercising the earliest influence over him. The first picture that brought him into notice was "Sir Roger de Coverley going to Church" (1819). In 1821 "May-day in the Reign of Queen Elizabeth" secured his election as an Associate of the Academy; and "Sancho Panza and the Duchess," exhibited in 1824, obtained for him the rank of Academician. Leslie's principal pictures are scenes from the works of Shakespeare, Cervantes, Le Sage, Molière, Addison, Swift, Sterne, Fielding, and Smollett. Great power of expression, and a delicate perception of character and of female beauty, are his

strongest points. In 1833 he accepted the appointment of Professor of Drawing at the United States Military Academy; but gave up the post early in the following year and returned to England. From 1848 to 1851 he was Professor of Painting at the Royal Academy. He died in London, May 5, 1859.

Leslie, Eliza, an American prose-writer; born in Philadelphia, Nov. 16, 1787. Her father was a personal friend of Franklin, Jefferson, and other eminent men of his time. Her first successful work was a cookery book; she afterward adopted literature as a profession, and edited "The Gift," which attained great popularity. Her published works include: "Pencil Sketches" (1833–1837); "House Book" (1840); "Ladies' Receipt Book" (1848); and "Behavior Book" (1853). She died in Gloucester, N. J., Jan. 2, 1858.

Leslie, Frank, an American publisher; born in Ipswich, England, in 1821; proper name, Henry Carter. At 17 he was placed in a mercantile house in London. "Frank Leslie" was the name he adopted in sending in sketches to the "Illustrated London News," and the success of these determined him to join the staff of that paper. In 1848 he came to the United States, where he assumed the name of Frank Leslie by a legal process, and in 1854 founded the "Gazette of Fashion" and the New York "Journal." "Frank Leslie's Illustrated Newspaper" was commenced in 1855 (German and Spanish editions later), the "Chimney Corner" in 1865; and afterward the "Boys' and Girls' Weekly," the "Lady's Journal," and a number of other periodicals were published by him. He died Jan. 10, 1880.

Leslie, Sir John, a Scotch physicist; born in Largo, Fifeshire, in 1766. In 1809 he obtained the chair of natural philosophy, on the death of Professor Playfair; and from that period till his death he produced a succession of valuable works on subjects connected with natural philosophy. In 1832 he was knighted. Among his works may be cited "The Elements of Geometry," "Elements of Natural Philosophy," and an "Account of Experiments and Instruments depending on the Relation of Heat to Moisture." He was also the inventor of the differential thermometer. He died in 1832.

Leslie, Thomas Edward Cliffe, an Irish political economist; born in County Down, Ireland, in 1827. He was educated at Trinity College, Dublin. He qualified for the bar, but in 1853 was appointed to the chair of economics and jurisprudence at Belfast. His writings, mostly fragmentary in character, were collected in two books entitled "The Land Systems" (1870), containing studies on the land question in Ireland, Belgium, and France, and "Essays in Political and Moral Philosophy" (1879). He died Jan. 27, 1882.

Lespès, Léo (les-pās′), a French story-teller; born in Bouchain, June 18, 1815. He wrote for the minor Paris newspapers, under the signature "Timothy Trimm," a number of short stories, which were received with extraordinary popular favor. He founded the "Petit Journal" (1862), which immediately reached the then unexampled circulation of 200,000 copies. Among his stories, which were frequently republished, are: "Stories in Pink and Black" (1842); "Mysteries of the Grand Opera" (1843); "A Story to Make You Shudder"; "Physiology of Champagne" (1866); "Walks about Paris" (1867). He died in Paris, April 29, 1875.

Lespinasse (lā-pēn-äs′), **Claire Françoise,** or **Julie Jeanne Eléonore,** a French society woman; born about 1731 in Lyons. At first a teacher, she became in 1752 a companion to Madame du Deffand, whose friends, especially D'Alembert, she quickly attached to herself. She was enabled by the bounty of her friends to maintain a modest salon of her own. The charm she exercised was in no wise due to beauty, for she was plain in face, and, moreover, disfigured by smallpox; yet conversation was brighter and more harmonious, and wit more brilliant in her circle than anywhere else in Paris. Unfortunately for her peace she had a heart sensitive to love, and the passion she was capable of at 40 for the young Spaniard, the Marquis de Mora, and two years later for M. de Guibert, cost her the deepest pangs. The famous D'Alembert had long admired and loved her, but her affection for the philosopher never cost her tears. She died in Paris, May 23, 1776.

Lesseps, Ferdinand, Vicomte de (leseps), a French diplomat and engineer; born in Versailles, Nov. 19, 1805. He was employed several years in the French consular and diplomatic service. In 1854, on the invitation of Saïd Pasha, he visited Egypt to study the problem of canalizing the Isthmus of Suez; the results of his studies were stated in a memoir, "Piercing the Isthmus of Suez." He was made chief director of the works in 1856. The canal was opened to traffic Aug. 15, 1869. He published (1875–1881) five volumes of "Letters, Journals, and Documents Relating to the Suez Canal"; and in 1887, "Recollections of Forty Years." His attempt to pierce the Isthmus of Panama resulted in failure and a great political scandal. He died Dec. 7, 1894.

Lesser Civet, an æluroid mammal, family *Viverridæ*. Habitat: Nepal and Madras, Java and Formosa, and parts of China.

Color yellowish or brownish-gray, with longitudinal bands on the back and regular spots on the side. The tail — from 16 to 17 inches long — has eight or nine complete dark rings. Length of body and head, about 24 inches.

Lessing, Gotthold Ephraim, a German critic, dramatist, and miscellaneous writer; born in Kamenz, Lusace, in 1729. He was educated at the public school of Meissen and the University of Leipsic, and was from the first an ardent and laborious student. He was attracted to the stage; and his first essays in literature were dramatic compositions. After various literary attempts at Berlin he went to Wittenberg, where he graduated; and on his return to Berlin, in 1753, he became the intimate friend and coadjutor of Moses Mendelssohn and the publisher Nicolai. Lessing remained at Berlin, zealously pursuing his chosen tasks, till 1760, when he removed to Breslau, having been named secretary to the Prussian general in command there. After five years he again returned to the capital, and in 1770 was appointed librarian to the Prince of Brunswick at Wolfenbüttel. He made a short visit to Italy two years later, lost his wife in 1776, and later suffered a decline of health, spirits, and mental power. Lessing's great aim was to infuse a new spirit into the literature of his country, and to refine and polish its style; and he succeeded. His writings are among the classics of German literature. Among his dramatic works are, "Miss Sara Samson," "Minna von Barnhelm," "Emilia Galotti," and "Nathan the Wise." Of his prose works may be named, "Fables"; "Literary Letters"; "Dramaturgie" (which first made Shakespeare really known to the Germans), and "Laocoön." He died in 1781.

GOTTHOLD LESSING.

Lesson, a reading, especially a portion of Scripture appointed to be read, as in the Common Prayer-book. The oldest Latin lectionary — a service-book, either containing the lessons for the year in full, or noting their beginning and end — was called the "Comes" ("companion"), and dates from the 5th century. The Roman lectionary was remodeled in the 8th century. The changes in the Anglican calendar of lessons were sanctioned by act of Parliament in 1871. Formerly the lessons consisted invariably of full chapters — a rule that was sometimes embarrassing, as in the case of Acts xxi. — but in the revised lectionary they are frequently shortened and differently arranged; also, nearly all the lessons from the Apocrypha have been left out.

Lester, Charles Edwards, an American writer; born in Griswold, Conn., in 1815. Among his works are: "The Glory and Shame of England" (2 vols. 1841); "Artists in America" (1846); "Life and Public Services of Charles Sumner" (1874); "History of the United States, Considered in Five Great Periods" (2 vols. 1883). He died in Detroit, Mich., 1890.

Lester, John Henry, an American inventor; born in Montville, Conn., Sept. 27, 1815. He was one of the first manufacturers of sewing machines in the United States, and invented a lock-stitch sewing machine, a wood-planing machine, and several other labor-saving devices. In 1859–1860 he established a plant for manufacturing wood-planing machines in Richmond, Va. When the Civil War broke out the Confederate government ordered the company to alter arms for its army. Mr. Lester, being loyal to the North, withdrew from the firm and went to Washington, D. C., where he had an interview with Lincoln. His loyalty, however, was doubted, and he was sentenced to 10 years' imprisonment by a military commission, but was freed after 20 months' confinement. He died in Brooklyn, N. Y., Jan. 10, 1900.

Lestris (skuas, skua gulls), a genus of predaceous natatorial birds, family *Laridæ*. The bill is strong, hard, cylindrical, formed for cutting; compressed, curved, and hooked at point, base of upper mandible covered with a cere. Nostrils toward point of beak, diagonal, narrow, closed behind, pervious. Legs strong, naked above tarsi, which are long; three toes, palmated, in front; hind toe small; claws large, strong, and much curved. Tail slightly rounded; the two middle feathers generally elongated, sometimes considerably. The genus is found in N. regions, rarely further S. than the English Channel; but the common skua (*Lestris cataractes*) has been met with in the Straits of Magellan.

Lesueur, Eustache (luh-sur'), a French painter; born in 1617. He married in 1644, and was compelled for a living to execute vignettes and frontispieces for books. His first works are in the style of his master, Vouet, and distinct from his subsequent ones. His great work was the series of paintings which he executed for

the Carthusian monastery in Paris in 1645–1648, delineating in 22 pictures the principal scenes in the life of St. Bruno. In 1650 he painted for the corporation of goldsmiths the "Preaching of the Apostle

EUSTACHE LESUEUR.

Paul at Ephesus." All of these are large paintings, and are now in the Louvre. Among the most distinguished of his later works are some mythological scenes. He died in 1655.

Leszuo. See LISSA.

Lethargy, a state of unnaturally profound and continuous sleep. It is intermediate between heavy sleep and a state of complete coma, and may result from severe exertion of the body or mind; but it is also frequently produced by congestion of the blood in the vessels of the brain; and hence it is often a symptom of great danger, frequently preceding an attack of apoplexy. It may also be caused by the action of any narcotic substance, or of alcoholic liquors. In general, the cure is effected by the removal of the cause by which it has been brought about. If the result of a determination of blood to the head, then topical bleedings by cupping, and purgatives, are required; but if, on the other hand, it proceeds from nervous weakness then tonics, stimulants, and a generous diet are necessary.

Lethbridge, Sir Roper, an English author; born in 1840. He was for many years prominent in educational and political movements in India, as professor in the Bengal Educational Department, and subsequently as political agent and press commissioner under Lord Lytton's viceroyalty. Among his works are: "A Short Manual of the History of India" (1881); "High Education in India"; "A History of Bengal"; and the articles on "Feudatory States" in the "Imperial Gazetteer of India." In 1890 he was created knight commander of the Indian empire.

Lethe (lē'thē), in Greek mythology, the stream of forgetfulness in the lower world, from which souls drank before passing into the Elysian Fields, that they might lose all recollection of earthly sorrows.

Lethington, Secretary. See MAITLAND, WILLIAM.

Letronne, Jean Antoine (le-trōn'), a French archæologist; born in Paris, Jan. 2, 1787. He is distinguished chiefly for his studies in numismatics and inscriptions. Among his writings are: "Topography of Syracuse" (1813); "Fragments of Hero of Alexandria" (1816); "Valuings of Greek and Roman Coins" (1817) "Materials to Serve for a History of the Christian Religion" (1833); "The Vocal Statue of Memnon" (1833); "Collection of Greek and Latin Inscriptions from Egypt" (1842–1848). He died in Paris, Dec. 14, 1848.

Letter, a character used in printing. Type either of metal or wood. Used collectively to represent type, as "a case of letter," "a font of letter." Fat letter is type with body and face broad in proportion to its height. Lean letter is type thin or narrow in proportion to its height Body letter is type in which the main portion of a book or paper is printed. Body letter is known by different names, according to the size of the type; the sizes in most common use being: Pearl, Agate, Nonpareil, Minion, Brevier, Bourgeois, Long Primer, Small Pica, and Pica. These sizes are also known in terms of the point system, another standard of type measurement. Thus pica is now twelve point, nonpareil is six point, etc.

A letter is, in its nature, altogether familiar; this term may be used for whatever is written by one friend to another in domestic life, or for the public documents of this description which have emanated from the pen of writers, as the letters of Madame de Sevigné, the letters of Pope or of Swift; and even those which were written by the ancients, as the letters of Cicero, Pliny, and Seneca; but in strict propriety the latter are epistles — a term more adapted to whatever has received the sanction of ages; and by the same rule, likewise, whatever is peculiarly solemn in its contents has acquired the same epithet, as the epistles of St. Paul, St. Peter, St. John, St. Jude; and by an analogous rule,

whatever poetry is written in the epistolary form is denominated an epistle rather than a letter, whether of ancient or modern date, as the epistles of Horace, or the epistles of Boileau. Letters and literature signify knowledge derived through the medium of written letters or books, that is, information; learning is confined to that which is communicated, that is, scholastic knowledge. Such an expression as men of letters, or the republic of letters, comprehends all who devote themselves to the cultivation of their minds; literary societies have for their object the diffusion of general information; learned societies propose to themselves the higher object of extending the bounds of science and increasing the sum of human knowledge.

Letter of Marque, the commission authorizing a privateer to make war upon, or seize the property of, another nation. Letters of marque were abolished among European nations by the treaty of Paris in 1856.

Letters of Junius. See JUNIUS.

Lettres de Cachet (let duh käsh-ā), the name given to the warrants of imprisonment issued by the kings of France before the Revolution. All royal letters (*lettres royaux*) were either *lettres patentes* or *lettres de cachet.* The former were open, signed by the king, and countersigned by a minister, and had the great seal of state appended. Of this kind were all ordinances, grants of privilege, etc. But these checks on arbitrary power did not exist with regard to *lettres de cachet,* also called *lettres closes,* or sealed letters, which were folded up and sealed with the king's little seal (*cachet*), and by which the royal pleasure was made known to individuals or to corporations and the administration of justice was often interfered with. The use of *lettres de cachet* became much more frequent after the accession of Louis XIV. than it had been before, and it was very common for persons to be arrested upon such warrant and clapped into the Bastille or some other state prison; where some of them remained for a very long time, and some for life, either because it was so intended, or, in other cases, because they were forgotten. It was not always for political reasons that *lettres de cachet* were obtained; sometimes private persons got troublesome members of their families brought to reason in this way. The lieutenant-general of the police kept forms of *lettres de cachet* ready, in which it was only necessary to insert the name of the individual to be arrested. Sometimes an arrest on *lettres de cachet* was a resource to shield criminals from justice.

Letts, a branch of the Lithuanian race, who in manners, customs, and mode of living do not differ much from the Lithuanians proper. They live in South Livonia, in Courland, and Vitebsk, and in the N. of Kovno in Russia, and number about 1,200,000 persons. Early converted to Christianity by the Teutonic Knights, they are now mostly Lutherans, though some 50,000 have been won over to the Greek Church. All are agriculturists; since the abolition of serfdom they have made remarkable progress, both socially and intellectually.

Lettuce, a smooth, herbaceous, annual plant, containing a milky juice, and in general use as a salad. The stem grows to the height of about two feet, and bears small pale-yellow flowers; the inferior leaves are sessile, and undulate on the margin. The young plant only is eaten, as the lettuce is narcotic and poisonous when in flower. A number of species are known from various parts of the globe. *Lactucarium,* or lettuce opium, the inspissated juice of the lettuce, is used medicinally as an anodyne.

Leucadia. See LEUKAS.

Leucæmia. See LEUCOCYTHEMIA.

Leucine, or **Amido-caproic Acid,** a product of the decomposition of albuminous materials occurring in many of the juices of the animal body; formula $C_6H_{11}O_2NH_2$. A substance isomeric, but not identical, with natural leucine can be prepared artificially.

Leucippus, a Greek philosopher, who lived between the 4th and 5th centuries B. C., and to whom the first idea of the atomic system is attributed, which was afterward perfected by his disciple Democritus. Kepler and Descartes were much indebted to the ancient doctrines of these masters for the explanation of the planetary vortices. Bacon remarks that Democritus and Leucippus were so much taken up with the particles of things as to neglect their structure.

Leuciscus, a genus of *Cyprinidæ,* the typical one of the sub-family *Leuciscina.* The body has imbricated scales; barbels are wanting; the pharyngeal teeth are in a single or double series; the intestine short, with a few convolutions. Nearly 100 species are known.

Leucite, a mineral occurring in trapezohedral crystals in volcanic rocks, and formerly regarded as isometric in crystallization. Von Rath and others refer it to the tetragonal system, and the results of etching the crystal faces seem to confirm their view. Hirschwald maintains its isometric relations, but that it possesses a polysyn-

thetic structure. Mallard regards it as pseudo-isometric, and refers it to the orthorhombic system, and Weisbach has come to the same conclusion. Hardness, 5.5–6; sp. gr. 2.44–2.56; luster, vitreous; color, white and shades of gray. Composition: A silicate of alumina and potash, represented by the formula $KOSiO_2+Al_2O_3 \cdot 3SiO_2$. Found abundantly in the lavas of Vesuvius and in the volcanic breccias of Monte Somma.

Leucocytes, the name given by Robin to the lymph corpuscles, or lymphoid cells in the serous membranes of the body, and occasionally in the Malpighian cells.

Leucocythemia, a disease in which the number of white corpuscles in the blood is greatly increased, while there is a simultaneous diminution of the red corpuscles. The disease was noticed almost at the same time (in 1845) by John Hughes Bennett of Edinburgh and Virchow of Würzburg; the former giving it in 1852 the name leucocythæmia, while the latter gave it in 1847 the less expressive name of leukæmia or white blood. The increase of the white or colorless corpuscles seems to be always accompanied, and probably caused, by changes in some of the lymphatic tissues of the body. Of these by far the most common is enlargement of the spleen, which sometimes attains an enormous size. In many cases this is associated with enlargement of lymphatic glands, and less commonly with a peculiar change in the marrow of the bones; and occasionally one or both of these conditions may be present without enlargement of the spleen.

The first symptom usually noticed by the patient is enlargement of the abdomen, in consequence of the increase in size of the spleen. Weakness, breathlessness, hæmorrhages in various situations, and often enlargement of the liver succeed; and the disease almost always proves fatal in two or three years at most. It may occur at any age; but is most common between 20 and 50, and in the male sex. Nothing is known as to its cause, except that a considerable proportion (one-fifth or more) of those affected have at some previous time suffered from ague. Treatment seems sometimes to have proved effectual in the early stages; cases have been recorded where quinine, phosphorus, cod-liver oil, iodide of iron have arrested what appeared to be commencing leucocythemia. But after the disease is fully established all treatment has as yet proved unavailing.

Leucojum, or **Leucoium** (lu-kō′yum), a name for snowflake, a genus of *Amaryllidaceæ*, tribe *Amarylleæ*. It has a six parted, bell shaped perianth. *L. æstivum*, the summer snowflake, is found in wet meadows. The bulb of *L. vernum* is emetic.

Leucol, $C_{18}H_7N$, an organic base obtained by the distillation of coal-tar; is isomeric with quinoline.

Leucoma, the term applied to a white opacity of the cornea. It is the result of acute inflammation, giving rise to the formation of cicatricial tissue on the ulcerated surface, or between the layers of the cornea. It is sometimes re-absorbed on the cessation of the inflammation, and the cornea recovers its transparency; but in many cases it is persistent and incurable.

Leucopetrians (lu-kō-pet′rē-ans), a fanatical Eastern sect, said to have been founded by one Leucopetrus, toward the end of the 12th century. They professed to believe in a double Trinity, refrained from marriage, rejected the sacraments and all external worship, placing the essence of religion in private prayer. On this they relied as a means of expelling the demon which, they asserted, dwelt in every person's heart.

Leucorrhœa, popularly called "whites," the name applied to an abnormal mucous or mucopurulent discharge from the female generative organs. It is a prominent symptom in many forms of female disease; and the treatment must be directed to the morbid condition on which it depends. Antiseptic or astringent vaginal douches are generally of use in diminishing the excessive secretion and the annoyance caused by it.

Leuctra, a village of Bœotia, in ancient Greece, famous for the great victory which the Thebans under Epaminondas here won over the Spartan King Cleombrotus (371 B. C.).

Leukas, Leucadia, or **Santa Maura,** one of the Ionian Islands, lies close to the W. coast of Greece; about 660 B. C. the Corinthians cut through the peninsula that joined it to the mainland. It resembles the Isle of Man in shape, and is 20 miles long by 8 wide, with an area of 110 square miles. The backbone of the island is a ridge of white limestone; hence the name (*leukos*, "white"). Wine, olive oil, and currants are the principal products. The island is much subject to earthquakes. Pop. 25,000, chiefly Greeks. The W. coast is bold and precipitous, and terminates S. in the abrupt headland (200 feet) known to the ancients as the Leucadian rock, on which stood a temple to Apollo, and from which once a year a criminal was hurled into the sea by way of sacrifice. It was from the same point that Sappho, the poetess, and Artemisia of Halicarnassus threw themselves into the waves. The capital,

Amaxichi or Leukas, on the E. coast, is the seat of an archbishop, and has a population of 3,800. It was nearly destroyed by an earthquake in 1825.

Leukate. See DUCATO.

Leuthen (loi'ten), a village of Prussia, in Lower Silesia, 10 miles W. of Breslau, celebrated for the victory won there, 1757, by Frederick the Great, with 34,000 men, over the Austrians under Prince Charles of Lorraine at the head of 90,000. The Austrians lost 10,000 killed and wounded, 12,000 prisoners, and 116 pieces of artillery; the Prussians, 6,500 killed and wounded. The result was the reconquest of the greater part of Silesia by the Prussians.

Leutz, Emanuel, an American artist; born in Gmünd, Würtemberg, May 24, 1816; was brought to the United States in infancy. In 1840 he began to display a remarkable talent for portrait painting. Subsequently he devoted himself to the painting of historical subjects. His works include "Columbus before the Council of Salamanca"; "Columbus in Chains"; "Columbus before the Queen"; "Landing of the Norsemen in America"; "Washington Crossing the Delaware"; "Washington at Princeton"; "Lafayette in Prison at Olmutz Visited by his Relatives"; etc. In 1860 he was employed by the United States government to make a large mural painting entitled "Westward the Star of Empire takes its Way" on one of the staircases in the National Capitol. He died in Washington, D. C., July 18, 1868.

Levaillant, François (luh-vī-y*ä*ng), a French ornithologist; born in 1753 of French parents living at Paramaribo, in Dutch Guiana. In 1777–1780 he studied natural history in Paris, and then spent more than two years in exploring the S. parts of South Africa (1781–1784). He published accounts of two of these expeditions, not altogether free from imaginative details and exaggerations, under the title "Journeys into Central Africa" (1790–1796). Several books by him on birds are marred by the same faulty tendencies; those on African birds, on the new and rare birds of America and India, and on paroquets are the most valuable. His death occurred in Sézanne, Nov. 22, 1824.

Levant, in geology, a term applied to the 4th series of the Appalachian Palæozoic strata, called in New York, the Medina group, and of equivalent age to the May Hill Sandstone of England. It signifies metaphorically the sunrise period of the Palæozoic day. Maximum thickness, about 2,200 feet. There are few organic remains, chiefly marine shells and fucoids. Also a style of or material for binding books; as, the book is bound in levant.

Levant, a name given to those countries, and more especially to the coasts of those countries lying on the E. part of the Mediterranean and the neighboring seas. as Turkey, Greece, Egypt, Asia Minor, Syria, etc.

Levari facias, a writ of execution at common law, executed by the sheriff upon the goods and lands of a debtor.

Levator, a lever for raising a depressed portion of the skull. It belongs to the trephine case. In anatomy the term is used specially of muscles. There are a *levator anguli oris,* a *levator anguli scapulæ,* a *levator palati,* and 10 others, besides *levatores costarum* and *levatores longiores costarum.*

Levee (lē-vē or lev-ā'), the act or time of rising. In the United States this term is applied to any assemblage of guests, whether held in the morning or in the evening. In England the term is confined to a morning reception held by a sovereign, prince, or personage of high rank; especially the state receptions held by the sovereign, to which are admitted all whose rank, position, or office entitles them to such distinction. It differs from a drawing-room reception in the fact that to the latter ladies, as well as gentlemen, are admitted, while to the former gentlemen only are admitted. In hydraulic engineering an embankment to restrain water, and of a magnitude such as those of the Mississippi, the Ganges, Holland, and the Po.

Level, a horizontal gallery or passage in a mine. The workings at different depths are said to be at the different levels — the 50 or 60 fathoms level, and so on. Also an adit or drift forming a drain for water. A level which opens to the surface at the side of a valley is called a day level, and forms a means of natural drainage without pumping. A drowned or blind level is a drainage gallery which has the form of an inverted siphon. A dip-head level is the one which proceeds from the foot of the engine-shaft right and left, and from which the rooms diverge. In surveying and engineering, an instrument for indicating a horizontal line or determining the position as to horizontality of an object or surface to which it is applied, and then determining the true level, or the difference of rise or fall between two or more places, for various purposes of architecture, engineering, drainage, etc. There are numerous descriptions of levels, varying in form, size, arrangement, or construction, according to the purpose for which each is intended; as, for instance, the carpenter's, mason's, gunner's, or surveyor's levels, the mercurial, water, and spirit levels, etc. All may be divided into three classes.

(1) The simplest, such as the mason's or carpenter's level, in which the vertical

line is determined by a plumb line, and the horizontal by a line perpendicular to it.

(2) Those in which the horizontal line is determined by the surface of a fluid at rest; as in the water and mercurial levels.

(3) Those in which the horizontal line is determined by a bubble of air floating in a fluid contained in a glass tube; as a spirit level.

Leveler. See LILBURNE.

Lever, a bar of wood, metal, or other rigid substance, having a fixed point (or fulcrum), and used to overcome a certain resistance (or weight) at some part of the bar by means of a force (or power) applied at another part. The parts of the lever into which the fulcrum divides it are called the arms of the lever. When the arms are in the same straight line the lever is called a straight lever; in other cases it is called a bent lever. The plane in which the lever can move may be called the plane of the lever. The forces which act on the lever are supposed to act in the plane of the lever. Levers are sometimes divided into three classes, according to the positions of the points of application of the power and the weight with respect to the fulcrum. In the first class the power and the weight act on opposite sides of the fulcrum. In the second class the power and the weight act on the same side of the fulcrum, the weight being the nearer to the fulcrum. In the third class the power and the weight act on the same side of the fulcrum, the power being the nearer to the fulcrum. Thus we may say briefly that the three classes have respectively the fulcrum, the weight, and the power in the middle position. The following are examples of levers of the first class: A crowbar used to raise a heavy weight, a poker used to raise coals in a grate, the handle of a pump. In scissors, shears, nippers, and pincers we have examples of a double lever of the first class. The oar of a boat furnishes an example of a lever of the second class. The fulcrum is at the blade of the oar in the water; the power is applied by the hand; the weight is applied at the row-lock. A pair of nut-crackers is a double lever of the second class. A pair of tongs used to hold a coal is a double lever of the third class. The fulcrum is the pivot on which the two parts of the instrument turn; the power is the pressure applied by the hand; the weight is the resistance of the coal at the end of the tongs. An example of the third class of lever is seen in the human forearm employed to raise an object taken in the hand. The fulcrum is at the elbow; the power is exerted by a muscle which comes from the upper part of the arm, and is inserted in the forearm near the elbow; the weight is the object raised in the hand.

Lever, Charles James, an Irish novelist; born in Dublin, Aug. 31, 1806. He was graduated in arts at Trinity College, Dublin, in 1827, and in medicine in 1831, taking his doctor's degree a little later at Göttingen. He then returned to Ireland to practise. In March, 1834, he contributed his first paper to the newly-started "Dublin University Magazine," of which he became editor in 1842. The first chapter of "Harry Lorrequer" appeared in that magazine in 1837. Meanwhile he was attached as physician to the British legation at Brussels, where he practised for three years. During his three years' editorship of the "Dublin University Magazine" he resided in the neighborhood of the Irish capital, but after his resignation he took up residence on the Continent, mainly occupying himself with fiction. His "Charles O'Malley," "Tom Burke," "Jack Hinton," etc., constituted a literature entirely *sui generis*. His later novels were more thoughtful and artistic. He obtained a diplomatic post at Florence about 1845, was appointed vice-consul at Spezzia in 1858, and in 1867 at Trieste, where he died, June 1, 1872.

CHARLES LEVER.

Leverrier, Urbain Jean Joseph (luh-ver-yā′), a French astronomer; born in St. Lô, in Normandy, March 11, 1811. He was admitted into the Ecolé Polytechnique in 1831, was subsequently employed for some time under the board for the administration of tobaccos, and as early as 1836 distinguished himself by his papers on the combinations of phosphorus with hydrogen and oxygen. Next year the place of teacher of astronomy at the Polytechnique was offered him, and in this way Leverrier was led to become an astronomer. At the instigation of Arago he applied himself to the examination of the disturbances in the motions of the planets from which the existence of an undiscovered planet could be inferred; and, as the result of his laborious calculations, directed the attention of astronomers to the point in the heavens where, a few days afterward, the planet Neptune was actually discovered by Galle at Berlin. For this Leverrier was rewarded with the Grand Cross of the Legion of

Honor, a professorship of astronomy in the Faculty of Sciences at Paris, and various lesser honors. When the revolution of 1848 broke out Leverrier sought distinction as a democratic politician; the department of La Manche chose him in May, 1849, to be a member of the Legislative Assembly, where he at once became counter-revolutionary; and in 1852 Louis Napoleon made him a senator. In 1854 Leverrier succeeded Arago as director of the Observatory of Paris, an office which, save during an interval of three years (1870–1873), he held till his death, Sept. 23, 1877.

Levertin, Oscar, a Swedish poet; born in Stockholm in 1862. He first wrote some stories after the manner of the "realists," but they had little success. Breaking then with realism, he indulged his bent toward romance and mysticism in his poems "Legends and Tales" (1891), and "New Poems" (1894). He was at the head of the younger lyric poets of Sweden. In his work "Gustavus III. as a Dramatist" (1894), he proved himself an acute critic of 18th-century literature.

Levi, the third son of Jacob and Leah, born in Mesopotamia; and father of three sons, and of Jochebed, the mother of Moses (Gen. xxix: 34; Ex. vi: 16–20). For his share in the treacherous massacre of the Shechemites (Gen. xxxiv.), his father, at his death, foreboded evil to his posterity; but as they afterward stood forth on the Lord's side, Moses was charged to bless them. (Ex. xxxii: 26–29; Deut. xxxiii: 8–11). The tribe of Levi was, according to Jacob's prediction, scattered over all Israel, having no share in the division of Canaan, but certain cities in the portions of other tribes. It was not the worse provided for, however, since God chose this tribe for the service of the temple and priesthood, and bestowed on it many privileges above the other tribes.

Levi, Leone, an English political economist; born in Ancona, Italy, July 6, 1821; settled in Liverpool in 1844, and became Professor of the Principles and Practice of Commerce in King's College, London, in 1852. Among his works were "Commercial Law of the World" (1850, republished as "International Commercial Law," 1873); "On Taxation" (1870); "History of British Commerce" (1872); "War and Its Consequences" (1881); "Wages of the Working Classes" (1885); "International Law" (1887). He died May 7, 1888.

Leviathan, a form of the Hebrew word *livyathan*, meaning a long-jointed monster, applied in Job xli. and elsewhere in Scripture to an aquatic animal variously held to be the crocodile, the whale, or some species of serpent.

Levien, Ilse. See FRAPAN, ILSE.

Levirate, the Mosaic law binding the brother of a man dying without issue to marry the widow (Deut. xxv: 5). Where there were several brothers, the lot probably fell to the eldest; failing brothers, the marriage was in honor incumbent on the nearest kinsman (Ruth iii: iv.). The only exception was in the case of the high priest, who was bound to marry a virgin (Levit. xxi: 13, 14). The first-born son of the second marriage was considered the son of the deceased, "that his name be not put out of Israel" (Deut. xxv: 6). This law was not strictly obligatory; but the man who refused to obey it was publicly dishonored (Deut. xxv: 7–10). How ancient the custom was among the Jews may be seen from the case of Tamar (Gen. xxviii: 6–30). It still exists among Jews in the East; in the West they are, of course, bound by the marriage laws of the country in which they reside. The levirate is mentioned by the Synoptists as giving rise to a question proposed to Jesus by the Sadducees concerning the resurrection (Matt. xxii: 23–33; Mark xii: 18–27; Luke xx: 27–38).

Levite, the descendants of Levi, one of the 12 sons of Jacob (Gen. xxix: 34). Moses and Aaron were of Levite extraction (Exod. ii: 1–10, iv: 14), and when the descendants of Aaron were formally set apart to perpetuate the priesthood, the other Levites were designated as a sacred caste to assist in the work of the sanctuary (Num. iii: 5–13, xvii: 2–8). The chief branches of the Levites were the Kohathites, the Gershonites, and the Merarites (Num. iii: iv.). To these separate functions were assigned, the more important being intrusted to the Kohathites, among whom were Moses and Aaron (I Chron. vi: 1–3). The Levites took office at 25 years old (Num. viii: 24, 25), or at 30, and had to resign at 50 (Num. iv: 3, 23, 30–39, 43–47). They were consecrated to their office (Num. viii: 5–26). They were to have no tribal territory; Jehovah was to be their inheritance (Num. xviii: 20, xxvi: 62; Deut. x: 9, xviii: 2; Josh: xviii: 7). But special cities were to be assigned to them, so scattered over the country as to enable them to render ecclesiastical and spiritual service to all the tribes (Josh. xxi.). The six cities of refuge were all Levitical cities (Num. xxxv: 1–8). They were to be supported by tithes, but themselves were to pay tithes to the priesthood (Num. xviii: 21–24, 26–32; Neh. x: 37). The Levites obtained much respect under Moses and Joshua. At the times of the judges their social position greatly declined (Judges xviii.). They revived under Samuel, but declined under Saul; David reorganized them, assigning 24,000 to assist the priests,

4,000 to be musicians, 4,000 to be gatekeepers, and 6,000 for other duties (I Chron. xxiii-xxvi.). The religious schism which followed on the revolt of the 10 tribes superseded the Levites over the whole kingdom of Israel, on which multitudes of them removed to Judah (II Chron. xi: 13, 14, xiii. 9), exerting a great influence, spiritual, social, and political, through every subsequent change, till the destruction of Jerusalem under Titus. The office of the Levites made them the intellectual as well as the spiritual caste. The only mention of Levites in the New Testament is in the Parable of the Good Samaritan (Luke x: 33).

Leviticus, the third book of the Pentateuch, and of the Old Testament, in the Hebrew Bible named (*Vaiyiqra*) = "And called," from its first two words. It prescribes laws regarding sacrifices (ch. i.-vii.), narrates the consecration of Aaron and his sons as priests (viii. ix), with the deaths of Nadab and Abihu (x: 26), draws distinctions between clean and unclean animals (xi.), makes regulations as to purification after childbirth (xii.), from leprosy, etc. (xiii., xiv., xv.), the great day of atonement, etc. (xvi., xvii.), marriages, etc. (xviii.-xx.), and priestly duties (xxi.-xxii.), the great festivals (xxiii.), tabernacle worship, etc. (xxiv.), social arrangements (xxv.), and vows and tithes (xxvii.). Intercalated into these is a chapter which makes Divine promises to the people if they observe the several laws, and denouncing vengeance on them if they disobey (xxvi.; see Deut. xxviii.),

The integrity of the work is admitted by most critics, though rationalists contend that the Levitical legislation did not originate till 1,000 years after Moses, and was not carried out till after the building of the second temple. One of them contends that Ezekiel was the author of Leviticus xxvi., and probably of xviii.-xx., and that xviii.-xxvii. form a section by themselves distinct from the remainder of the book, and written in the same circle, though not by the same hand. The rest of Leviticus is attributed to priests during or after the captivity. A few passages may, it is stated, have been later than the rest, but all must have been in their place before the issue of the Samaritan Pentateuch, about 338 B. C., for it has them just as we find them now.

The best commentary on the book of Leviticus is the Epistle to the Hebrews, and the other New Testament books. Carrying out the teaching of Heb. ix., x., etc., the Christian Church believes that nearly every sacrifice or other ceremony typified the sacrifice of Christ and at his death "waxed old," and was "ready to vanish away" (Heb. viii: 13).

Levkosia. See NICOSIA.

Levulose, a sugar isomeric with dextroglucose, but distinguished from it by turning the plane of polarization to the left, and always occurring along with it in honey, in many fruits, and in other saccha-riferous vegetable organs.

Levy, a term used in Europe for the compulsory raising of a body of troops from any specified class in the community for purposes of general defense or offense when the existing military forces are insufficient to meet the necessities of the case. When a country is in danger of instant invasion a *levée en masse* is sometimes made — *i. e.,* every man capable of bearing arms is required to contribute in person toward the common defense. On less urgent occasions the levy may be restricted to a class, as to men between 18 and 40 years of age.

Levy, Emile, a French genre and portrait painter; born in Paris, Aug. 29, 1826. He studied at the Ecole des Beaux Arts and was also a pupil of Picot and De Pujol; he won the grand prix de Rome in 1854. He was also successful in pastel. Among his works are "The Death of Orpheus"; "The Judgment of Midas"; "Young Mother"; "Circe"; "Silène"; etc. He died in Paris, April 4, 1900.

Lewald, August (le-väld'), a German story-steller; born in Königsberg, Prussia, Oct. 14, 1792. He wrote: "Aquarelles from Life" (1836); "Story of the Theater" (5 vols. 1841), autobiographical; "Clarinette" (3 vols. 1863); "The Insurgent" (2 vols. 1865); "Last Travels" (1870). He died in Munich, March 10, 1871.

Lewald, Fanny, a German novelist; born of Jewish parents in Königsberg, March 24, 1811, but professed Christianity in her 17th year. She began to write when about 30, and from 1840 lived in Berlin; in 1855 she married Adolf Stahr (1805–1876), the literary critic. She was perhaps the most important woman novelist in Germany during the middle of the 19th century. She was possessed of keen powers of observation, and wrote in a sober, matter-of-fact style, which, however, was not incompatible with a strong undercurrent of restrained feeling. She was an especially enthusiastic champion of the emancipation of her sex. Her realistic tendencies brought her into conflict with the Countess von Hahn-Hahn, whose unreal sentimentalism she successfully parodied in "Diogena" (1847). Her best book is perhaps "From Sex to Sex" (1863–1865). An English translation of "Stella" (1884) appeared in the same year. At different times she visited many parts of Europe with her father and her husband; her books on Italy

(1847) and Great Britain (1852) were the most valuable outcome of these journeys. She died in Dresden, Aug. 5, 1889.

Lewes, the county town of Sussex, England, 50 miles S. of London. Race meetings are held three times a year near Mount Harry on the Downs, where, on May 12, 1264, a great battle was fought between Henry III. and the insurgent barons under Simon de Montfort.

Lewes, George Henry, an English critic and man of letters; born in London, April 18, 1817. In 1838 he went to Germany and remained there nearly two years, studying the life, language, and literature of the country. On his return to London he fell to work writing about anything and everything, as a contributor to a dozen journals, reviews, and magazines, and as editor of the "Leader" (1851–1854), and of the "Fortnightly" (1865–1866), which he himself had founded. His works, besides a tragedy and a couple of novels (1841–1848), include the "Biographical History of Philosophy" (1845; recast in the 3d edition of 1867 as "The History of Philosophy from Thales to Comte"); "The Spanish Drama, Lope de Vega and Calderon" (1846)); a "Life of Robespierre (1848); "Comte's Philosophy of the Sciences" (1853), which is much more than a mere translation; the admirable "Life and Works of Goethe" (1855); "Seaside Studies at Ilfracombe" (1858); "Physiology of Common Life" (1859–1860); "Studies in Animal Life" (1862); "Aristotle" (1864); "On Actors and the Art of Acting" (1875); and "Problems of Life and Mind" (1874–1879), its five volumes dealing with "The Foundations of a Creed," "The Physical Basis of Mind," "The Study of Psychology," and "Mind as a Function of the Organism." Lewes was married unhappily and had children, when his connection with George Eliot began in July, 1854; it ended only with his death at their house in Regent's Park, Nov. 30, 1878.

GEORGE HENRY LEWES.

Lewis, or **Lewisson,** a contrivance for lifting stones which was used by the ancient Romans, and the peculiar mortise marks are found in the stones of the Flavian amphitheater. It received its name from a Frenchman who brought it to its present form. He was an architect on the works of Louis XVI., and gave it the name it bears in compliment to his master. It consists of two dovetail tenons, which are expanded by a key in a dovetail mortise in the stone, and shackled to the hoisting chain. The dovetail pieces are first inserted, and then forced apart by the middle key, so as to occupy the undercut portion of the mortise. All three are then shackled to the lifting chain.

Lewis, the largest of the Hebrides, separated from the mainland of Scotland by a sea 30 to 35 miles wide, called the Minch. The S. portion of the island, called Harris, is in Inverness-shire, the N. and largest portion being in Ross-shire. The entire length of the island, S. W. to N. E., is 52 miles; breadth, varying from 30 miles to 5 and 10 miles; area, nearly 700,000 acres.

Lewis, Alonzo, an American poet; known as the "Lynn bard"; born in Lynn, Mass., Aug. 28, 1794. He was the author of "Forest Flowers and Sea Shells," which reached 10 editions, and "History of Lynn." He died in Lynn, Mass., Jan. 21, 1861.

Lewis, Andrew, an American military officer; born in Ulster co., Ireland, in 1730. He came with his father to America in 1732. They settled in Bellefonte, Augusta co., Va., and were the first white residents of that county. Lewis was distinguished for his military ability, and for his great strength and commanding figure. He was an especial favorite of Washington, and his statue is one of the six which surround the Washington monument in Richmond, Va. He died in 1780.

Lewis, Charles Bertrand ("M. Quad."), an American journalist; born in Liverpool, O., 1842. He received his education at the Michigan Agricultural College. During the Civil War he served in the Union army. For many years he was on the staff of the Detroit "Free Press," and after 1891 connected with the New York "World." He published: "Quad's Odds," "Goaks and Tears," "The Lime Kiln Club," "Sawed Off Sketches," etc.

Lewis, Charlton Thomas, an American scholar; born in Westchester, Pa., in 1834. He was Professor of Mathematics and subsequently of Greek at Troy University (1859–1862), revenue commissioner at Washington, D. C., and latterly has practised law in New York. He wrote a "History of Germany," founded on D. Müller's work, and collaborated with Charles Short in the preparation of "Harper's Latin Dictionary," and a "School Latin Dictionary." He achieved notable reforms in penology and served on the platform committee in

the National Democratic convention of 1896. He died May 26, 1904.

Lewis, Dio, an American physician; born in Auburn, N. Y., March 3, 1823. He studied at the Harvard Medical School, and practised for a time at Port Byron, N. Y., but became widely known by his writings advocating a system of higher gymnastics for women. He finally established a school at Boston, in which teachers were trained in his new exercises. A school for young ladies was also founded at Lexington, Mass., which was destroyed by fire in 1868. He wrote many articles for the magazines, as well as "New Gymnastics"; "Weak Lungs"; "Our Girls"; "Chats with Young Women." He died in Yonkers, N. Y., May 21, 1886.

Lewis, Edmonia, an American sculptor of African and Indian descent; born near Albany, N. Y., in 1843. Her first known work was a bust of Colonel Shaw. She went to Rome, Italy, in 1867. Her works include "The Death of Cleopatra" (1876); "The Old Arrow-Maker and His Daughter"; "The Marriage of Hiawatha"; etc.

Lewis, Estelle Anna Blanche Robinson, an American dramatist; born near Baltimore, Md., April, 1824. While a school girl she translated the "Æneid" into English verse; wrote "Forsaken"; and published "Records of the Heart" (1844), and "Hebémah, or the Fall of Montezuma" (1864). Her best dramatic work, "Sappho of Lesbos," a tragedy, ran through seven editions, and was translated into modern Greek and played at Athens. Edgar A. Poe spoke of her as the rival of Sappho; Lamartine called her the "female Petrarch." She died in London, Nov. 24, 1880.

Lewis, Sir George Cornewall, an English statesman; born in London, April 21, 1806. A graduate of Christ Church, Oxford, with high honors, he became a lawyer, and rose almost to the top in politics, filling three Cabinet places in rapid succession, ending with Chancellor of the Exchequer in 1855. His most enduring work is the "Enquiry into the Credibility of Early Roman History" (2 vols. 1855); mainly a criticism of Niebuhr's assumption that there can be reliable intuitive perceptions of historic fact without a sufficiently tangible basis of evidence to support the test of argument. His political writings, as "On the Use and Abuse of Political Terms" (1835), "On the Influence of Authority in Matters of Opinion" (1849), "On the Methods of Observation and Reasoning in Politics" (2 vols. 1852), are clarifying but too prolix. He died in Harpton Court, Radnorshire, April 13, 1863.

Lewis, Matthew Gregory (familiarly styled "Monk" Lewis), an English dramatist; born in London in 1773. He was educated at Westminster school; after which he traveled on the Continent, and imbibed, while in Germany, that taste for the marvellous and romantic which characterizes the most of his writings. His first novel was "The Monk," a work which, however open to the charge of licentiousness, is a production of most extraordinary ability, and attained an immense popularity. He also wrote "Feudal Tyrants," "Romantic Tales," "Tales of Terror," "The Castle-Spectre," a drama; and many others. He was a member of Parliament, but undistinguished by any oratorical powers. He died in 1818.

Lewis, Meriwether, an American soldier and explorer; born near Charlottesville, Va., Aug. 18, 1774. He was employed by the government with Clarke to make discoveries in the N. parts of the American continent, with a view to the extension of commerce to the Pacific Ocean. In 1805 they undertook a journey for the purpose of discovering the source of the Missouri; and they passed the winter in an icy region, 4,000 miles beyond its confluence. Lewis was soon after made governor of Louisiana, and Clarke a general of its militia, and agent of the United States for Indian affairs. He died near Nashville, Tenn, Oct. 8, 1809.

Lewis, Tayler, an American scholar; born in Northumberland, N. Y., in 1802. Was Professor of Greek in the University of New York in 1838, and later of Oriental literature in Union College. He published many volumes. Among these are: "The Six Days of Creation" (1855); "Heroic Periods in a Nation's History" (1866); "The Light by which We See Light" (1875); and many addresses and reviews. He died in Schenectady, N. Y., May 11, 1877.

Lewis, Thomas Hayter, an English architect and author; born in London, July 9, 1818. He was Professor of Architecture at University College (1865–1881), and is the author of "The Holy Places of Jerusalem" (1888), the most important work on the subject issued in recent years. Besides papers relating to architecture and antiquities in the transactions of various societies, he wrote the articles on architecture in the "Encyclopædia Britannica." He died in London, Dec. 10, 1898.

Lewisia, a genus of plants of the natural order *Portulaceæ,* named in honor of the American traveler, MERIWETHER LEWIS (*q. v.*). *L. rediviva* is found in the regions of his explorations, on the W. side of the Rocky Mountains. Its thick, branching roots are gathered and are highly valued by the Indians as nutritive, and also as restorative. It has a showy rose-col-

ored flower. Another species, *L. brachycalyx*, is found in Utah.

Lewiston, a city in Androscoggin co., Me., on the Androscoggin river and the Grand Trunk and the Maine Central railroads, 34 miles N. of Portland. The river is spanned by several bridges. The city is the farming trade center for a region having a population of 26,000; manufactures cotton and woolen goods, boots and shoes, files, trunk, ticking, burlap, furniture and brick. It is the seat of Bates College and Cobb Divinity School; has public library, city park, electric light and street railroad plants, waterworks supplied from the river, National and savings banks, daily, weekly and monthly periodicals and an assessed property valuation of about $10,000,000. Lewiston was founded in 1770; incorporated in 1795, and chartered as a city in 1861, but the city government was not organized till 1863. Pop. (1890) 21,701; (1900) 23,761; (1910) 26,247.

Lexell, Anders Johann, a Finnish mathematician and astronomer; born in Abo, 1740. It was his computations in 1781 that first showed that the object newly discovered by Herschel was a planet and not a comet, as Herschel had announced it, the planet now called Uranus being the object in question. He died in St. Petersburg, in 1784.

Lexicography. See DICTIONARY.

Lexington, a city and county-seat of Fayette co., Ky., on the Cincinnati Southern, Kentucky Central, Chesapeake and Ohio, and Louisville and Nashville railroads; 80 miles S. of Cincinnati, O. It is the trade, social, and political center of the famous "blue grass" region; is a noted horse-breeding, distilling, hemp and tobacco growing region; and manufactures Bourbon whiskey, flour, planing-mill products, saddlery, harness, carriages and wagons. It is the seat of Kentucky University, Alleghan College, State College, Hamilton College; and Sayre Institute; contains a Protestant Infirmary, Colored Industrial Home, St. Joseph's Hospital, National and State banks, public library, and court house. Lexington has wide and well-paved streets, electric light and street railroad plants, Holly system of waterworks, daily and weekly periodicals, and an assessed property valuation of $8,500,000. Pop. (1900) 26,369; (1910) 35,099.

Lexington, a town in Middlesex co., Mass., on the Boston and Maine railroad; 12 miles N. W. of Boston; contains the villages of Lexington, East Lexington, and North Lexington; and is principally engaged in farming, dairying and market-gardening. There are a public high school, Hancock and Adams Grammar Schools, Tidd primary school, Cary Library, electric light plant, savings bank and newspapers; Lexington was settled in 1642 and was long known as Cambridge Farms, and was incorporated as a town in 1713. It was the scene of the first conflict between the colonists and British troops in the Revolutionary War, on April 18, 1775. The British obtained the advantage and destroyed the stores of the colonists, but lost in the action 273 men killed and wounded. Pop. (1900) 3,831; (1910) 4,918.

Lexington, a city and county-seat of Rockridge co., Va.; on James river, and the Baltimore and Ohio, and the Chesapeake and Ohio railroads; 48 miles W. of Lynchburg. It is the seat of Washington and Lee University and the Virginia Military school; is engaged in agriculture and has deposits of sulphur ore, electric light plant, waterworks supplied by mountain streams, National and State banks, several periodicals. Pop. (1890) 3,059; (1900) 3,203.

Lexington, The, an American brig of 14 guns, which, in April, 1776, after a sharp fight, captured the British armed tender "Edward." This was the first capture of any British war vessel by a regular American cruiser.

Lex Talionis, the law of retaliation, common among all ancient and barbarous nations, by which an eye for an eye and a tooth for a tooth was considered the appropriate punishment.

Leybourn, William, an English mathematician, a pioneer in popularizing arithmetic and astronomy; born in 1626. His "Urania Practica" (1648) was the first English treatise on astronomy; his "Panarithmologia" (1693) the first English ready-reckoner. He died about 1700.

Leyden (lī'den), a city on the Rhine, in South Holland; practically composed of small islands, formed by the intersections of the numerous canals which traverse the place, and which are connected by at least 150 bridges. It contains a university, founded by the Prince of Orange in 1575, which was at one time one of the most celebrated in Europe. Among its pupils were Descartes, Arminius, Grotius, Goldsmith, and others. It has a valuable library of over 100,000 volumes, with 14,000 MSS., of which about 2,000 are Arabic, besides many scientific collections. Printing was formerly one of its chief industries. Pop. (1906) 56,722.

Leyden, John, a Scotch Orientalist; born in Denholm, Sept. 8, 1775. Soon after obtaining his medical degree he went to India, where his proficiency in Oriental and especially Indo-Chinese languages led to an appointment as Professor of Hindustani at Fort William College, Calcutta. He is the author of "An Historical Account of Discoveries in Northern and Western Africa"

(1789), an accurate and useful work for that time; an essay on Indo-Chinese literature in "Asiatic Researches"; "Scenes of Infancy," a poem; and a number of Scotch ballads, much admired by Sir Walter Scott and others. He died at Batavia, Java, Aug. 28, 1811.

Leyden Battery, a number of Leyden jars connected externally by resting on a metallic surface, and internally by rods and wires.

Leyden Jar, a glass bottle having its interior coated with tin foil or filled with thin leaves of copper or of gold leaf. The outside is also coated with tin foil up to a certain distance from the neck. The neck has a cork, through which passes a brass rod terminating at one end in a knob, and communicating with the metal in the interior. The inner coating is called the internal, and the outer one the external armature or coating. It is charged by connecting one of the armatures with the ground and the other with the source of electricity. If the hand grasps the external coating while the knob is presented to the conductor of the machine, positive electricity accumulates on the inner, and negative electricity on the outer coating. If, on the contrary, the jar be held by the knob and the outer coating be presented to the machine, positive electricity is accumulated on the outer, and negative on the inner.

Leye. See Lys.

Leys, Henri Jean Auguste (līs), a Belgian painter; born in Antwerp, Feb. 18, 1815. He was created baron by Leopold I. in 1862. Leys is one of the best modern artists in the style of the old Flemish masters. His most valuable and most characteristic pictures are inspired by the private life and stirring history of his native land —"Rembrandt's Studio" (1837), "A Flemish Wedding" (1839), "A Public Worship in Antwerp Cathedral," "A Village Fête," "A Musical Party" (1846), "Rubens Feasted by the Gunsmiths of Antwerp" (1851), "New Year's Day in Flanders," "Luther Singing in the Streets of Eisenach" (1862), "Erasmus in His Study," "Institution of the Golden Fleece," and a series of frescoes in his own dining-room representing the history of a "Flemish Festival." The last years of his life were occupied in painting six scenes from the history of Antwerp in the 16th century on the walls of the great hall in the town house of Antwerp. Alma Tadema studied under Baron Leys. He died Aug. 26, 1869.

Leyte (lā'tā), an island of the Visaya group in the Philippines; between Samar, Dinagat and Mindanao on the S. E., Bohol on the S. W. and Mashete on the N. W.; area, 3,847 square miles; pop. (1903) 388,922; capital, Tacloban on the Bay of San Pedro and San Pablo. It is about 100 miles long and 47 miles wide in its broadest part. The interior of the island is mountainous, containing a number of extinct volcanoes. There are geological indications that it was once joined to the island of Samar. There is only one lake o any size, Lake Bito. The mountains are covered with forests yielding many varieties of useful woods. There are mines of gold, silver, lead and sulphur. The large valleys are cultivated by the natives, the chief agricultural product being hemp in which this province excels, the hemp plantations having been under cultivation for 40 years ,and yielding $5,000,000 annually. Sugar, chocolate, coffee, and corn are also raised, and some live stock. Wax, honey, shells, bird's nests, sponges, and pearls are exported in small quantities. In some of the coast towns the women are very skillful in the manufacture of fabrics and embroidery. There are but four interior towns. Besides the capital, the chief ports are Carrigari on the E. coast and Ormoc, Baybay, Ilongos, Ma-asim, and Malitbog on the W. coast. The E. coast has many good roads.

Leze Majesty, a crime committed or attempted to be committed against the sovereign of a state. Among the Romans, *crimen læsæ majestatis* was a charge of treason, rebellion, or usurpation of office, which were considered as offenses against the majesty of the Roman people. In the United States this form of treason is without constitutional recognition (Const. U. S., Art. III, Sec. iii). Germany gives it very vigorous force in all criticisms of the emperor's official acts.

Lhassa, the capital city of Tibet, and residence of the Grand Lama. The city is circular, 2½ miles in circumference, and occupies an open level plain surrounded by mountains. It has numerous towers, bazaars, and temples. The city is remarkable for the number and size of its monasteries, which are greatly resorted to by the Chinese and Mongols as schools of the Buddhist religion and philosophy. It is the "Rome of Buddhism." Pop. (1901) est. 25,000.

L'hôpital, Michel de (lôp-ē-täl'), a French statesman; born in Aigueperse, in 1504. President of the Court of Accounts in 1554, and chancellor of France in 1560. To him were due the edict of Romorantin, 1560, which prevented the introduction of the Inquisition in France; the edict of pacification, 1562, which authorized the free exercise of Protestant worship; and the ordinance of Moulines, 1566, to reform the administration of justice. Distinguished for his integrity and moral courage, L'hôpital aimed to moderate the parties, and he opposed violence in politics and intolerance in religion. He gave up the seals of office in

1568, and resided in his château of Bellebat, near Etampes, where he died in 1573.

Li, or **Cash,** the only copper coin of China, with a square hole in the middle, and an inscription on one side. Ten lis make one candareen, 100 a mace, 1,000 a liang or tael, the only Chinese silver coin, average value about $1.20. Li is also a Chinese measure of length equal to about one-third of an English mile.

Liability of Employers. An employer is in law responsible in reparation of wrongs or injuries done to strangers by his employes while they are acting within the course and scope of their service. But where an employer has forbidden the doing of a thing from which damage arises, or where an employe wilfully or maliciously does an injurious act to serve his own private ends, the employer will not be liable. When an employe enters upon an employment attended with danger, such as work in mines or on a railway, he is held to accept the risk of accidents that happen without fault on the employer's part. The element of contributory negligence, where present, greatly determines the question of liability. The legislation of the various States is not in harmony on the subject.

Liafail, the fatal chair on which the supreme kings of Ireland were inaugurated in the days of Druidism. From Ireland it was conveyed to Dunstaffnage in Scotland; thence, about the year 842, to Scone, by Kenneth II.; and, lastly, in 1300, by Edward I. to Westminster, where it still remains. How the *liafail* came to Scotland, whether by theft, fraud, or violence, is not ascertained. It is said to have possessed extraordinary virtues till the time of our Saviour's birth. Some time after its arrival in Scotland, a superstitious belief became attached to it — that wherever the stone should be found, some one of the race should reign.

Lianas, a term applied to those climbing and twining plants found in profusion in tropical climates, where in many instances they overtop the heads of the tallest trees, and intertwine the entire forest by their cable-like shoots, forming an impenetrable network, which it is necessary to break through with the hatchet. Vanilla, sarsaparilla, and other medicinal plants are true lianas.

Lias, a formation situated at the base of the Oölite, with which it is sometimes combined. It consists of thin beds of blue or gray limestone, becoming light-brown when weathered. These are separated by dark-colored, narrow, argillaceous partings, so that quarries of the rock seen from a distance look striped and ribbon-like. Most of its fossils are marine, though there is in it an insect-limestone. Huge Enaliosaurians, specially Ichthyosaurs and Plesiosaurs, reach their maximum development in it; they are believed to have been marine. Liassic clays are used for brick-making. They are also burnt for lime and for hydraulic cement; liassic limestones are called cement stones, and are burnt for hydraulic lime.

Liatris, a genus of Composites, sub-tribe *Adenostyleæ*. *Liatris squamosa* has beautiful purple flowers. It is known in the United States, as is *L. scariosa*, as the rattlesnake's master, the bruised bulbs of the plant being applied to the wound, while a decoction of the milk is taken inwardly.

Libation, a sacrifice, by an actual drink offering, by pouring liquids — usually oil or wine — on the ground in honor of a divinity, or by the combination of both methods. In classic times bloody sacrifices were usually accompanied by libations, which always formed part of the religious ceremonies at a treaty of peace; hence the Greek *spondai* = a solemn treaty, from *spendō* = to offer a libation. (See Verg., Æn. v: 77; xii: 174). Sometimes libations were independent acts of worship (Il. xvi: 233); and they found a place in convivial gatherings and banquets (Verg., Æn. i: 734–38; Georg. ii: 101; Hor., Carm. IV. v: 31–34; Ovid, Fasti, ii: 637). Libations were usually of unmixed wine (*enspondos* = *merum*), but sometimes of milk, honey, and other fluids, either pure or diluted with water (Plin., H. N. xiv: 19). The word "libation" does not occur in the Authorized Version, but clear traces of the practice may be found. "Jacob set up . . . a pillar of stone, and he poured a drink offering thereon and he poured oil thereon" (Gen. xxxv: 14). "Strong wine" was ordained "to be poured unto the Lord for a drink offering" (Num. xxviii: 7); and Jeremiah (xix: 13) charges it against the people of Jerusalem and the kings of Judah that they have poured out drink offerings unto other gods, and to "the queen of heaven" (xliv: 17, 19, 25).

Libau, a seaport of Courland, Russia, on the Baltic; 146 miles W. by S. of Riga. It possesses a fine harbor, admitting vessels that draw 17 and 18 feet, and free from ice except for less than 14 days in the year. Its exports, consisting of grain, linseed and linseed oil-cake, petroleum, eggs, spirits, flax, hemp, etc., have an annual value of $15,000,000 or more; its imports, chiefly coals, herrings, artificial manures, cotton, dyewood, and iron, under $10,000,000. In 1890–1895 the Russian government spent $12,500,000 on constructing a first-class naval and commercial harbor. There already existed shipbuilding yards and a school of navigation. The industries include iron founding, brewing, oil pressing, etc.

Libau is much frequented as a seaside resort. One of the churches contains an organ (1886), one of the largest in the world. Pop. (1897) 64,505, mostly of German nationality.

Libel, originally any little book or writing; a declaration, a certificate. A defamatory writing, print, picture, or publication of any kind, containing any statements or representations maliciously made, and tending to bring any person into ridicule or contempt, or expose him to public hatred or obloquy; any obscene, blasphemous, or seditious publication whether in writing, print, signs, or pictures. The act or crime of publishing a libel; as, to be charged with libel.

In United States civil and admiralty laws, a document of the plaintiff setting forth the charges and allegations made against the defendant; and specifically in case of a ship, a statement of the claims held against her by the plaintiff.

Libelt, Karol (lē'belt), a Polish writer; born in Posen, April 8, 1807. His principal work is "Philosophy and Criticism" (5 vols. 1845–1850). He wrote also: "Mathematical Handbook" (2 vols. 1844); a drama, "The Maid of Orleans" (1847); "Humor and Truth" (1848), a volume of brief essays. He died near Gollancz, June 9, 1875.

Liber, the interior lining of the bark in exogenous plants. In this part of the bark only the woody or longitudinal tissue occurs. In many instances it is very abundant, and exceedingly tough and thick-sided, in consequence of which it is of great value for many useful purposes. When freed from the cellular tissue adhering to it, it is often manufactured into cordage, especially in trees and shrubs of the natural order *Malvaceæ*. The useful articles commonly called Russia mats are made from the thin laminæ into which the *endophlæum* of the lime tree (*Tilia Europæa*) readily separates. The lace-bark of Jamaica, remarkable for its beautiful lace-like appearance when pulled gently in a lateral direction, and for its great toughness, is the laminated liber of *Lagetta lintearia;* in consequence of its latter quality, it is twisted into whiplashes. The liber appears to be formed annually, at the same time as the concentric zones of wood, and is intended by nature to convey downward the secretions elaborated in the bark and leaves. The term bass, or bast, is applied by gardeners to the liber of the lime tree, which is used for making packing-mats, and also for binding up bunches of flowers, etc.

In mythology, the name given by the Latins to the Greek Dionysus or Bacchus. Originally, the Latin Liber was a distinct god, presiding over the fertility of fields, and worshiped along with Libera and Ceres. The name seems connected with *li'erare* and *libertas.*

Liberal, a name given to that party in England which is opposed to the Conservative party. The designation "Liberal," applied to a political party in England, is said to have been derived from the "Liberal," a periodical set on foot by Lord Byron and his friends. Both political parties are named with tacit reference to an irresistible movement toward democracy long in progress in Great Britain, as it was in the ancient Roman republic. The Conservatives, dreading the effect of this democratic current on the time-honored institutions of the country, made it their main object to conserve them. With this view they arrest forward movement when they can, and, when this is impracticable, attempt to retard the rate of progress. The Liberal party, on the contrary, little or nothing fearing the results of change, help the movement instead of attempting to stem or to lessen its progress. The Liberal party in English politics consists of two great sections or wings, generally in coöperation though sometimes in antagonism. These are the Whigs and the Radicals, the former seeking to remove the more obnoxious defects in the institutions of the country, with the view of insuring their stability; the latter, on the contrary, desiring to root some of them up instead of increasing their efficiency. For example, the Whigs are in favor of the Established Churches, the House of Lords, and the throne, while the more advanced of the Radicals would abolish all the three. The conversion of Gladstone to the Home Rule cause led to much further division in the Liberal ranks. The strength of the Whig party is in the middle classes, that of the Radicals among the artisans.

Liberal Republican Party, a party organized in 1872 by Republicans who were dissatisfied with General Grant's first administration as President. At a convention held by them in Cincinnati, in that year, Carl Schurz was elected its president, and a platform adopted demanding civil service reform, local self-government, and universal amnesty, recognizing the equality of all men, recommending the resumption of specie payment, etc. Horace Greeley and B. Gratz Brown were named for President and Vice-President. This platform and these nominations were adopted by the regular Democratic convention of that year, but dissensions arose, and other candidates were nominated, the result being that the Republican nominee, General Grant, was elected by an overwhelming majority and the Liberal Republican party was thereafter practically dead.

Liberal Unionist Party, in British politics, a party formed in the summer of 1886 by Liberals (under the leadership of the

Marquis of Hartington), who objected to Gladstone's Irish Government and Land Purchase Bills as being destructive of the integrity of the United Kingdom and dangerous to the empire. They gained their immediate object by coalescing with the Conservatives, and in the election which followed the defeat of the Gladstonian ministry they succeeded in returning some 80 members to Parliament. They have since acted with the Conservatives.

Liberia, a negro republic on the W. coast of Africa, founded in 1820 by liberated American slaves under the auspices of the American Colonization Society, and recognized as an independent State in 1847. It lies between the rivers San Pedro and Manna, has 500 miles of seaboard, and extends some 200 miles inland; area 14,000 to 15,000 square miles. The soil is fertile, well watered, and highly adapted to the cultivation of all tropical products. The chief crop is coffee, increasing quantities of which are grown from year to year and exported, other exports being palm-oil, ground-nuts, caoutchouc, and ivory. The climate is very unhealthy for Europeans. British weights, measures, and moneys are mostly in use. The English language predominates among the governing class, churches and schools are provided, and civilization is making rapid strides among the natives. The population consists of some 20,000 immigrants from the United States and their descendants, and about 1,000,000 natives; Monrovia is the capital. The government of the republic is on the model of the United States.

Liberian Hippopotamus, a small species described by Dr. S. G. Morton from the notes of Dr. Goheen, colonial physician at Monrovia, and from two crania which that gentleman sent to America. In 1850 Dr. Morton proposed to call it *H. liberiensis,* the name by which it is now generally known, though it was proposed to make a new genus of it under the name of Chœropsis. It has but two incisors in the lower jaw; the posterior molars are only partially protruded, and rise obliquely like those of the elephant and mastodon. It varies in weight from 400 to 700 pounds.

Libertas, the goddess of freedom. By the Greeks she was invoked by the synonymous title Eleutheria. At Rome, her most famous temple, built by T. Gracchus, was situated on the Aventine Mount. She was represented under the figure of a woman, holding in one hand a cap, the symbol of Liberty, and two poniards in the other. In modern times, a cap is also used as a symbol of liberty; thus, in France, a red cap formed the badge of the Jacobin Club. In England, a blue cap with a white border is used as a symbol of the constitutional freedom of the nation, and Britannia sometimes bears it on the point of her spear.

Libertine, a Flemish sect of Antinomians, who called themselves "Spirituals." They passed into France, where they were patronized by Margaret of Navarre, sister of Francis I. They held that, as God was the author of all human action, no human action could be evil; that religion consisted in union with God by contemplation, and that any one who had attained to this could act as he pleased. Calvin wrote strongly against them. The word occurs but once in the New Testament — "The synagogue of the Libertines" (Acts vi: 9). Its meaning has given rise to much discussion; but the most probable explanation is that the Libertines were Jews who, having been taken prisoners by Pompey and other Roman generals in the Syrian wars, had been reduced to slavery, but, having been emancipated, returned to Palestine.

Liberty, a state of freedom or liberty, abridged only by the restrictions and regulations established under the form of laws for the protection and interests of the nation, society, or state. It is a state of exemption from the arbitrary will of others, secured by established laws, by which each member is protected against injury on the part of others.

Liberty of the press, the free right and power to publish whatever one pleases, subject only to punishment for abuse of that freedom by publishing anything mischievous, hurtful, or libelous, to the public or to individuals.

After the Reformation, the crown assumed the right, which the church had previously exercised, of prohibiting the printing of all works but such as should be first seen and allowed. The newspaper press, originating in the reign of James I., was subjected to the royal licenser, and, though the fall of the Star Chamber, in 1641, augured well for the liberty of the press, Parliament did not affect a spirit of toleration, and Milton, in his "Areopagitica," branded the suppression of truth by the licenser as the slaying of an immortality rather than a life.

Liberty-pole, a flag-staff surrounded with the symbols of liberty. Moral liberty, that liberty of choice which is essential to moral responsibility. Natural liberty, a state of exemption from the restraint or control of others, and the institutions of civil life. The power to act or do as one pleases, subject only to the laws of nature. Political liberty or freedom of a nation; exemption of a nation from any unjust abridgment of its rights and independence by another nation. Religious liberty, the free right to hold what opinions one pleases in religious matters, and to worship the Deity according to

the dictates of conscience, free from external control.

Liberty, Cap of, a cap used as a symbol of liberty. In ancient times Roman manumitted slaves put on what was termed the Phrygian cap, in token of their freedom. In modern times the name cap of liberty was given to a red cap worn by French and other revolutionaries.

Liberty, Statue of, a colossal statue on Bedloe's Island, N. Y. On Oct. 28, 1886, after more than 12 years of preparation, the colossal statue of Liberty, given by the people of France to the United States, was dedicated and unveiled in New York har-

BARTHOLDI'S STATUE OF LIBERTY.

bor. The statue was the conception of M. Bartholdi, who designed it for the Franco-American Union in 1874. It was built by popular subscriptions of the people of France, and required over five years for its completion. It was mounted in Paris in October, 1881. The American pedestal for the statue was not commenced till April, 1883, and was finally finished in 1886. It was built by a popular subscription under the auspices of the New York "World." The statue was immediately erected on an iron framework bolted firmly to the stone pedestal. The statue itself is of bronze. Some of its dimensions are given as follows:

	Ft.	In.
Water-level to top of pedestal	149	10
Statue proper to top of torch	151	5
Total height from water-level	301	3
Heel to top of head	111	6
Length of hand	16	5
Index-finger	8	6
Circumference at second joint	7	6
Size of finger-nail	13x10in.	
Head from chin to cranium	17	3
Head-thickness from ear to ear	10	0
Distance between the eyes	2	6
Length of nose	4	6
Right arm, length	42	0
Right arm, greatest thickness	12	0
Thickness of waist	35	0
Width of mouth	3	0
Tablet, length	23	7
Tablet, width	13	7
Tablet, thickness	2	0

The statue weighs 450,000 pounds, or 225 tons. The bronze alone weighs 200,000 pounds. Forty persons can stand comfortably in the head, and the torch will hold 12 people. The total number of steps in the temporary staircase which leads from the base of the foundation to the top of the torch is 403; from the ground to the top of the pedestal 195 steps. The number of steps in the statue from the pedestal to the head is 154, and the ladder leading up through the extended right arm to the torch has 54 rounds. The cost of the statue is estimated at $250,000; the cost of the pedestal and the erection of the statue, $350,000; total cost of the work, completed and in place, $600,000.

It is believed to be surpassed in size by but two existing statues in the world — those at Bamian, in Central Asia, which are both rude stone images carved from the rocks and standing where they were carved. Their origin is unknown, but they are believed to be works of great antiquity. There are five colossal statues at Bamian. The largest is said to be 173 feet high from the heel to the top of the head, and the second 120 feet high. The Colossus of Rhodes was said to have been about 105 feet high. That of Nero is said by Suetonius to have been 120 feet high. The statue of Charles Borromeo, which is still standing on the Lake of Geneva, is 66 feet high, and is mounted on a pedestal measuring 46 feet. The celebrated statue of Jupiter carved by Phidias is said to have been 60 feet in height.

Liberty College, an educational institution for women only in Glasgow, Ky.; founded in 1874, under the auspices of the Baptist Church; has grounds and buildings valued at over $60,000; scientific apparatus, etc., $1,500; volumes in the library, about 3,000; ordinary income, about $12,000; average faculty, 20; students, 225; graduates, over 200.

Liberty Party, The, in the United States, grew out of the Anti-slavery Society, and was more widely known for the persistent agitation of its adherents than its numbers. In 1840 it nominated James G. Birney, secretary of the Anti-slavery Society, for president, casting 7,059 votes; and again, in 1844, when he received 62,300 votes. It contained such men as William Lloyd Garrison, Wendell Phillips, Lewis

Tappan, Gerrit Smith, Samuel Lewis, and Salmon P. Chase. It merged into the Free-Soil party in 1848.

Libitina, the Roman goddess of the dead and of funerals.

Libra, one of the 12 ancient zodiacal constellations. It is surrounded by the constellations Scorpio, Ophiuchus, Virgo, Centaurus, and Lupus. It contains no stars of the first magnitude. Also the 7th sign of the zodiac. Owing to the precession of the equinoxes it now contains the constellation Virgo. The sun enters it about Sept. 23.

Library, the name given to a collection of books, and to the building in which it is located. Libraries existed in ancient Egypt and Assyria, and Pisistratus is credited with the honor of introducing a public library at Athens about 337 B. C. Cicero and various wealthy Romans made collections of books, and several Roman emperors established libraries, partly with books obtained as spoils of war. By far the most celebrated library of antiquity was the Alexandrian, In the West, libraries of any note were founded in the second half of the 8th century by the encouragement of Charlemagne. In France one of the most celebrated was that in the abbey St. Germain des Prés, near Paris. In Germany the libraries of Fulda, Corvey, and in the 11th century that of Hirschau, were valuable. In Spain, in the 12th century, the Moors had 70 public libraries, of which that of Cordova contained 250,000 volumes. In Britain and Italy libraries were also founded with great zeal, particularly in the former country, by Richard Aungerville; in the latter by Petrarch, Boccaccio, and others. After the invention of the art of printing this was done more easily and at less expense. The principal libraries of modern times are the national library at Paris, with nearly 2,300,000 of books and 10,000 MSS,. and the British Museum library, London, with over 1,500,000 books and 100,000 MSS. The central court library at Munich the imperial library at St. Petersburg, and the royal library at Berlin have each over 1,000,000 volumes and thousands of MSS. Other large and valuable libraries are the imperial library at Vienna; the royal libraries at Stuttgart, Dresden, and Copenhagen; the university libraries of Genoa, Prague, Göttingen, Upsal, Oxford, Cambridge, and Dublin; also the libraries of Moscow, Venice, Florence, Milan, Bologna, Naples, and the Advocates', Edinburgh. The Vatican library, Rome, and the Bodleian, Oxford, are particularly valuable in rare books and MSS. The spread of education, and the consequent growing taste for knowledge, has called into existence innumerable smaller libraries, ready of access, and providing such literature as the special class of readers demand. This public library system has naturally been most developed in highly-educated countries, such as Germany, France, Great Britain, and the United States.

Libraries, Public. These institutions have attained a remarkable development in the United States since 1890. The more notable American public libraries in 1901 were the Library of Congress at Washington, the New York Public Library (Astor, Lenox, and Tilden Foundations), the Boston Public Library and those of a like character in Chicago, Pittsburg, Newark and other cities. The statistics of public, society and school libraries show (1900) a total of 5,383, containing 44,591,851 volumes and about 6,000,000 pamphlets. Two libraries had in 1896 500,000 volumes or more; 4 had between 300,000 and 500,000; 28 had 100,000 to 300,000; 69 had 50,000 to 100,000; 155 had 25,000 to 50,000; 411 had 10,000 to 25,000; 630 had 5,000 to 10,000; and 2,727 had 1,000 to 5,000. In 1908 the number of public, society, and school libraries was estimated at 5,640, with a total of 62,628,061 volumes, toward which ANDREW CARNEGIE (*q. v.*) had given upward of $30,000,000.

Libration, the act of balancing, or placing or holding in equipoise. In astronomy, a real or apparent motion of a heavenly body like that of a balance when approaching a state of rest. (Used especially of the moon.)

Libration in latitude, a small variation in the precise part of the moon presented to us. The moon always presents the same hemisphere to us, but as her axis varies from the plane of her orbit by an angle of 1° 30′ 10.8″, her two poles lean alternately to and from the earth. When the north pole leans toward the earth we see a little more of the region surrounding it; when turned away we see less; this variation constitutes the libration in latitude.

Libration in longitude, a slight variation at different times in the amount of the E. or W. edge of the moon seen. This arises from the fact that the angular velocity of the moon on her axis is not quite the same as that of her angular velocity in her orbit. This was first discovered by Hevelius in 1647.

Diurnal vibration, a slight variation in the aspect of the moon, arising from the fact that, owing to the diurnal motion of the earth, we view the moon at its rising or setting, in different circumstances, according to the latitude of the earth at the spot where the observer stands. It brings into view at the moon's rising and setting, on the upper limb, or whenever the moon has parallax, a little more than a hemisphere.

Libretto, the book of an opera. In too many cases it is deplorable, from the ab-

sence of any literary quality, plot, or consistency. Among the most noteworthy librettists have been Metastasio, Calzabigi, and Felice Romano in Italy; Quinault, Marmontel, Scribe, Barbier, Meilhac and Halévy, as well as Sardou, in France; the poet Giebel (who wrote "Loreley" for Mendelssohn), and Schikaneder (who wrote the "Zauberflöte," etc., for Mozart) in Germany; and Gay, Alfred Bunn, Edward Fitzball, Theodore Hook, Planché, and Gilbert in England. Wagner stands alone, in that, after the "Flying Dutchman," he himself wrote the librettos of his great music-dramas, becoming, to use his own words, "first of all a poet." Dryden, Addison, Fielding, Chatterton, "Monk" Lewis, Voltaire, and Rousseau, besides Sheridan, Dickens, and Mark Lemon, have attempted libretto-writing: while numerous subjects for operas have been taken from the works of Shakespeare, Goldsmith, Goethe, Scott, Hugo, etc.

Libri-Carrucci, Guillaume Brutus Icilius Timoleon, Count (lē-brē″kar-ö″chē), an Italo-Gallic mathematician and bibliographer; born in Florence, Jan. 2, 1803. When only 20 years of age he was appointed Professor of Mathematics in the University of Pisa. But in 1830, being compromised in the Liberal political movement, he fled to France as a refugee, and there found a patron in Arago (whom he afterward attacked in a most spiteful manner). He was naturalized, and in 1833 elected member of the Academy of Sciences, Professor at the Sorbonne, Chief Inspector of Public Instruction, and Superintendent of the State Libraries. He was, moreover, decorated with the Legion of Honor, and appointed editor of the "Journal des Savants," etc. An enthusiastic bibliomaniac, he found means to collect a magnificent library for himself; but, being accused of abstracting books and valuable MSS. from the public libraries, he fled to England. In his absence he was tried, and condemned, in June 1850, to 10 years' imprisonment. Libri-Carrucci was the author of a learned "History of the Mathematical Sciences in Italy"" (4 vols. 1838–1841), of "Mathematical and Physical Memoirs" (1829), and other works. He died in Fiesole, Italy, Sept. 28, 1869.

Libya, the name given by the oldest geographers to Africa. In Homer and Hesiod it denoted the whole of this quarter of the globe, except Egypt; in Herodotus, occasionally, the entire continent; but it is also applied by others, in a more restricted sense, to the N. part of the country, from Egypt and the Arabian Gulf W. to Mount Atlas. The great sandy tract of which the Sahara forms the principal part was called the Libyan Desert. To what extent it was known to the ancients is not very clearly ascertained.

Lice. See Louse.

License, or **Licence,** authority, leave, or permission to do or forbear any act; liberty, freedom. Leave or permission granted by the proper authority to do any act, or to carry on any business or profession; as, a license to preach, a license to sell intoxicating drinks. A document containing such permission or authority; as, to take out a license for a dog. Excess of liberty; exorbitant or undue freedom; abuse of freedom or liberty; licentiousness. In art, poetry, music, etc., applied to that deviation from the ordinary rules or mode of treatment enforced by a particular school, or adopted as the result of peculiar education; the liberty taken by an artist in deviating from the strict rules of his art.

Lichen, the name of a group of skin diseases, very variously employed by different writers, but now generally restricted to cases characterized by "the development of solid persistent papules which undergo but little change till they gradually disappear." The commoner skin eruptions formerly called lichen, *L. simplex* and *L. tropicus* (or "prickly-heat"), are abortive forms of eczema. None of those retained under this name is common. *L. circumscriptus* occurs in bright red patches on the back or front of the chest in adults, apparently from the irritation of thick woolen garments worn next to the skin. *L. scrofulosorum* is a pale, very chronic papular eruption, sometimes seen in delicate children. *L. planus* or *ruber* is the most characteristic and important of the group; it manifests itself in raised flat patches, of a dull-red color, usually very chronic in their course, often somewhat itchy. It does not usually interfere much with the health; occurs generally in adults, never in young children; and commonly yields to treatment by arsenic.

Lichenin, a starch-like body found in Iceland moss and other lichens, from which it is extracted by digesting the moss in a cold, weak solution of carbonate of soda for some time, and then boiling. In most of its relations it corresponds with ordinary starch.

Lichens (lī′kens), familiar plants which form encrusting growths on rocks and stones, on the stems and branches of trees, on walls and fences, and on the earth itself. They are common in every zone, and at all levels from the seashore to the mountain summit. Usually the first plants to settle on a bare, stony surface, they slowly hide the nakedness of the rock with their flat incrustations or shaggy tufts, generally gray or greenish, yellow, or red in color. Especially familiar are the yellow patches which beautify old walls, the hoary tufts which grace decaying trees, and the gray clumps

which raise their cup-like fructifications on damp rocks. They are hardy, long-lived plants, able to survive prolonged desiccation.

In 1866 De Bary hinted that lichens were not single plants in a class by themselves, but that they were double plants, each made up of an intimate combination of an alga and a fungus. Two years later Schwendener virtually established this so-called "dual hypothesis." "As the result of my researches," he says, "all these growths (lichens) are not simple plants, not individuals in the ordinary sense of the word; they are rather colonies, consisting of hundreds and thousands of individuals, among which, however, one dominates, while the rest in perpetual captivity prepare the nutriment for themselves and their master. This master is a fungus, a parasite which is accustomed to live on others' work; its slaves are green algæ, which it has sought out, or indeed caught hold of and compelled into its service. It surrounds them, as a spider its prey, with a fibrous net of narrow meshes, which is gradually converted into an impenetrable covering; but, while the spider sucks its prey and leaves it dead, the fungus incites the algæ found in its net to more rapid activity, indeed to more vigorous increase." This view has been corroborated by many botanists, especially by Bornet, Treub, Rees, and Stahl, and is accepted by most, though it is only fair to say that it is still denied and resented by some distinguished lichenologists. The proof of the theory is two-fold: the two compound sets of cells have been studied apart and referred to their position among Algæ and Fungi; while, on the other hand, it is possible to manufacture lichens by bringing together the respective algæ and fungi which in nature are wont to grow in partnership. For these reasons lichens are regarded not as single, but as double organisms—as an intimate union of algal and fungal cells, living in mutual helpfulness or "symbiosis." Some at least of the algal cells can live apart, and some become associated with several fungi to form different lichens; but it must be clearly recognized that the customary combinations are of long standing, since the partner fungi do not and cannot live independently. As to the physiological conditions of the partnership, it is enough here to notice that root-like filaments from the fungal cells absorb water and salts from the rain and the substratum and pass this inorganic material to the algæ; that the latter, like all green plants, are able in sunlight to split up the carbonic acid absorbed from the air, and to build up organic compounds like starch; that these organic products pass by osmosis from the algal cells to the fungus, while it is likely enough that the waste products of the fungus are in turn utilized by the alga. It is, however, quite probable that the fungi of some lichens in favorable situations among decomposing vegetable matter absorb this in the usual fungal fashion.) To the curious complementary association of fungi and algæ to form lichens, a parallel has been demonstarted by Geddes, Brandt, and others, in regard to Radiolarians and some other animals, with which "yellow cells," or "symbiotic algæ," live in habitual partnership. Lichens propagate by spores developed in various ways from the component fungus, but with these the partner algæ must be speedily associated. In some cases, indeed, fungal spores and algal cells are liberated together. Another frequent mode of multiplication is by means of brood buds, which consist of a few algal cells plus a separated portion of the fungus.

Most of the lichen-forming fungi are Discomycetes or Pyrenomycetes; the associated algæ are very varied—*e. g.*, Palmellaceæ Chroolepideæ, Nostocaceæ, Confervaceæ, etc. There are about 6,000 species of lichens, for the classification of which reference must be made to botanical literature.

Lichens assist in weathering the surfaces of rocks, into the substance of which the fungi sometimes send numerous filaments, and they are thus the preparers of soil and the forerunners of higher vegetation. "Iceland moss" (*Cetraria islandica*) is used for food and medicine; "Reindeer moss" (*Cladonia rangiferina*) is the fodder of the reindeer, and is also utilized in Scandinavia for the manufacture of a sort of brandy; pigments known as Litmus, Orseille, etc., are procured from *Roccella tinctoria* and *R. fuciformis*, both marine.

Lichgate, in architecture, a sort of open shed or covered gateway at the entrance to a churchyard, beneath which the bearers of the coffin awaited the arrival of the priest, who there commenced to read the burial service, and thence walked before the mourners to the grave.

Lich Owl, or **Litch Owl,** the screech owl, probably *Strix flammea.* White owls also often scream horribly as they fly along; from this screaming probably arose the common people's imaginary species of screech owl, which they superstitiously think attends the windows of dying persons. From the earliest ages the owl has been regarded as uncanny. Ovid speaks of it as announcing coming evil; and in Vergil the owl is one of the evil omens that betoken the sad fate of Dido. Shakespeare, especially in "Macbeth," makes use of the common superstition.

Lichtenberg, Georg Christoph, a German physicist and satirist; born July 1, 1742, in Oberramstädt near Darmstadt, and educated at Göttingen, where he held the chair of mathematics from 1770 till within a few years of his death. Two visits to En-

gland (1769 and 1774) inspired him with a love for things English; he had a great admiration for Garrick, and wrote a witty commentary on the copperplates of Hogarth. In Germany he enjoys a high reputation as a satirist. All his writings were desultory and occasional; they show a keen insight into human nature. He died Feb. 24, 1799.

Lichtenstein (li*ch*'ten-stīn), an independent principality of Europe, separated from Switzerland on the W. by the Rhine; on the E. it is bounded by Vorarlberg; area, 61 square miles; pop. 9,434. It is a mountainous district made up of the lordship of Vaduz and the countship of Schellenberg. The chief town, Liechtenstein, formerly called Vaduz, is 28 miles S. S. W. of Bregenz on Lake Constance. The inhabitants carry on agriculture, rear cattle, and cultivate the vine. They are exempt from military duty. Liechtenstein, with several other small States, formed the 15th member of the German Confederation till its dissolution in 1866; but in the Plenum, or full Council of the Diet, it had a separate vote. The Prince of Liechtenstein, whose family is one of the most ancient in Central Europe, possesses extensive estates in Austria, Prussia, and Saxony. The little State is a constitutional sovereignty, and is ruled by the prince and a legislative assembly of 15 members, 12 elected by the people, and three by the prince. Liechtenstein belongs to the Austrian customs, postal, legal, coinage, judicial, and taxation systems.

Lichtenstein (li*ht*'en-stīn), **Johann Joseph, Prince von,** an Austrian general and diplomatist; born in Vienna in 1760. He entered the army, and made his first campaign in the Turkish war. He was engaged in the principal campaigns of the war with France, was taken prisoner with Mack at Ulm, negotiated the armistice of Austerlitz, and assisted in the treaty of Presburg, and was made, in 1809, governor of Upper and Lower Austria. He greatly distinguished himself by his valor at the battles of Aspern, Essling, and Wagram. He enjoyed the confidence of his sovereign and was employed by him on various occasions. He died in 1836.

Lichtenstein, Joseph Wenceslaus, Prince of, an Austrian general and diplomatist; born in Vienna, 1696. He had the chief command of the Austrian army in Italy, with the title of field-marshal, in 1746, when he gained the victory of Placentia. From that time he was chiefly employed in diplomatic affairs and the duties of his office as director-general of the artillery. He was a patron of the arts and artists, and founder of the Lichtenstein Gallery at Vienna. He died in 1772.

Lichtwer, Magnus Gottfried (li*ht*-vār), a German poet; born in Wurzen, Jan. 30, 1719. His principal work is "Four Books of Æsopic Fables" (1748). His didactic poem "The Right of Reason" (1758) is founded on the philosophy of Wolf. He died in Halberstadt, July 6, 1783.

MAGNUS G. LICHTWER.

Licinius, Caius, a Roman tribune; of a plebeian family, he rose to the rank of tribune, when he attained the surname of Stolo, or Useless Sprout, on account of the law which he enacted forbidding any one to possess more than 500 acres of land; alleging as his reason, that when they cultivated more they could not pull up the useless shoots (*stolones*) which grew from the roots of trees. He also made another law, which allowed the plebeians to share the consular dignity with the patricians; and he himself became one of the first plebeian consuls, 364 B. C.

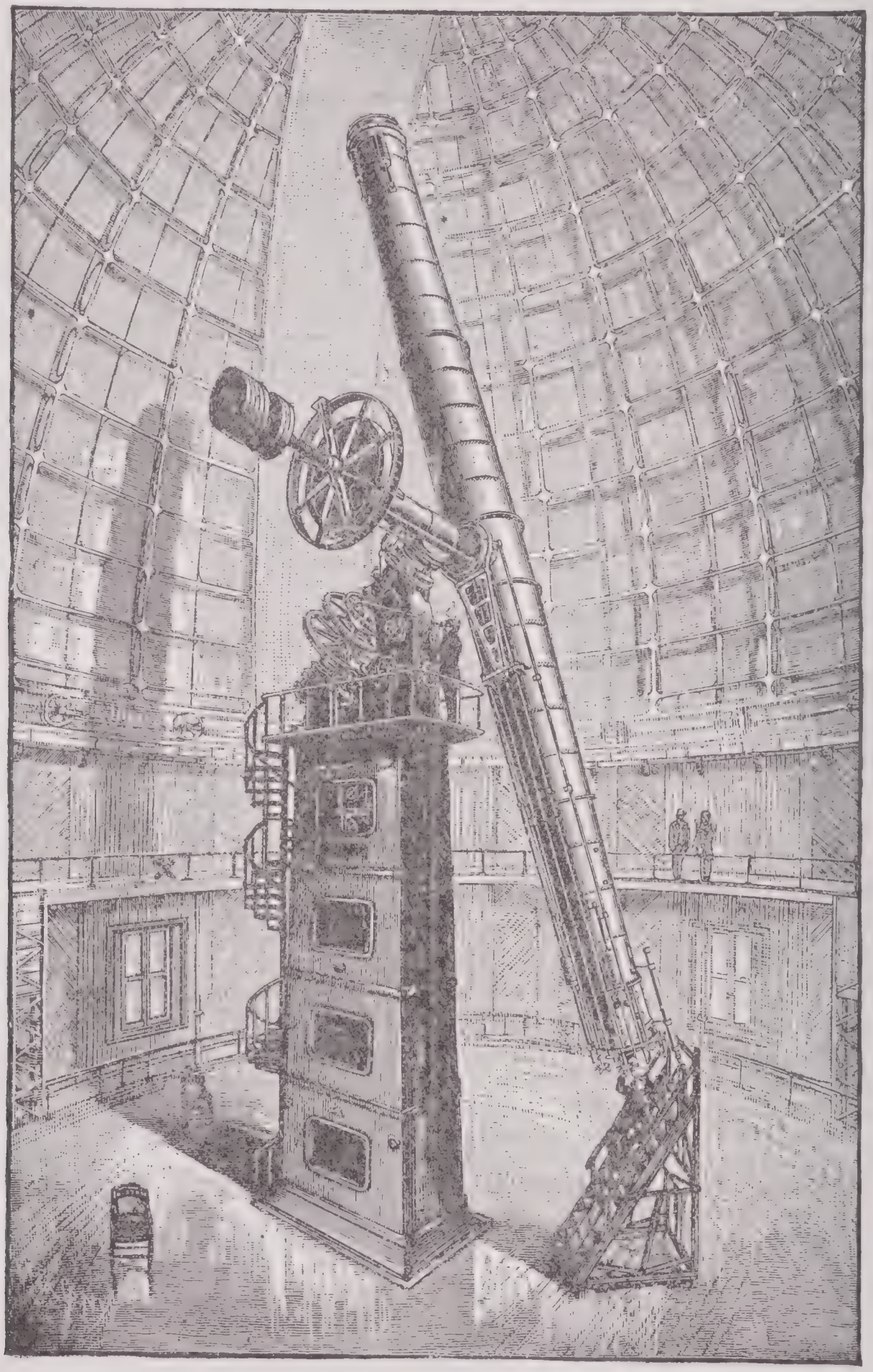
Licinius, Caius Flavius, a Roman emperor; a native of Dacia, of obscure origin, who was born about 263, and became emperor of Rome about 312. He was defeated by Constantine, 323, and put to death the year following. His son, Flavius Valerius, who had been declared Cæsar in 317, was put to death at Constantinople in 326.

Lick, James, an American philanthropist; born in Fredericksburg, Pa., Aug. 25, 1796. In 1819 he was employed in a piano factory in Philadelphia, and a year later started in the same business for himself in New York, and afterward in various parts of South America. In 1847 he emigrated to California, taking with him $30,000, which he invested in real estate in San Francisco, and its rapid advance in value made him wealthy. In 1874 he placed his entire property in the hands of trustees, to be devoted to public and charitable purposes. The bequests he then made he changed in some respects in May, 1875. The total amount thus given was $1,765,000, of which $700,000 was for Lick Observatory (*q. v.*), to be connected with the University of California, $150,000 for free public baths in San Francisco, and $540,000 for an institution to be called the California School of Mechanical Arts. For himself he reserved $500,000, gave his son $150,000, and each of his relatives sums varying from $2,000 to $5,000. He died in San Francisco, Cal., Oct. 1, 1876.

Lick Observatory, an astronomical station; on the summit of Mount Hamilton,

Lick Observatory

Santa Clara co., Cal.; erected through the liberality of James Lick, the testator imposing in the trust-deed the obligation of erecting "a powerful telescope, superior to and more powerful than any telescope yet made." In 1881 the trustees contracted with Alvan Clark and Sons for "an achromatic astronomical object-glass of 36 inches clear aperature," (this being the largest the Clarks would venture to contract for), to be delivered Nov. 1, 1883. The price was $50,000, of which amount $12,000 was paid when the contract was signed. The flint glass disk was successfully cast by Feil & Sons, Paris, France, early in 1882. Its companion, the crown-glass disk, was cast and ready for shipment at the close of 1882, but the material was so brittle that it unfortunately cracked in packing. The difficulties attending the casting of the crown disk



LICK OBSERVATORY : INTERIOR.

Lick Observatory

were extraordinary, and it was not till 1886 that success crowned the efforts of the Messrs. Feil. This monster object-glass safely reached Mount Hamilton, and was mounted early in 1887. James Lick reserved for himself the selection of a suitable site for the observatory destined to bear his name. After considerable deliberation and frequent consultation with good authorities Mr. Lick decided in favor of Mount Hamilton, a little knob in the inner Coast Range. The wisdom of his selection has since been abundantly demonstrated. The telescope was put into use early in 1888. The column is of cast iron, 10x17 feet at the base, and 4x8 feet at the top, and weighs 20 tons. On this rectangular column rests the head, weighing four tons, in which is journaled the polar axis. Around this head is a balcony on which the assistant astronomer is stationed. By a system of wheels he is able to adjust the instrument on any star desired, and read its position by microscopes, illuminated by electric light. Access to the balcony is gained by a spiral staircase on the south side of the column. The polar axis is of steel, 12 inches in diameter, 10 feet long and weighs 2,700 pounds. The declination axis is also of steel, is 10 inches in diameter, 10 feet long, and weighs 2,300 pounds. The tube is of steel, 57 feet long. Its diameter is 4 feet at the center, tapering toward each end to 38 inches. The tube complete, with all its attachments, weighs five tons. This is made to follow the star by means of a driving-clock, weighing one ton, controlled by a double conical pendulum which is placed near the top and within the column, and is reached by a landing from the spiral staircase. At the side of the great tube three small telescopes of 6-inch, 4-inch, and 3-inch apertures are attached, which serve as finders. The magnifying power ranges from 180 to 3,000 diameters. The object-glass is 36 inches clear aperture, and weighs, with its cell, 532 pounds. By special accessories the telescope is adapted to spectroscopic, photographic, and micrometric work. The center of motion is 37 feet above the base and when the telescope is pointed to the zenith the object-glass is 65 feet above the base of the column. When turning the instrument in declination the weight that is put in motion is seven tons, and when turning it in right ascension 14 tons is being

LICK OBSERVATORY : EXTERIOR.

moved. The total weight of the instrument is 40 tons.

Lictor, a civil officer among the Romans, who attended upon the consuls or other chief magistrates when they appeared in public. Lictors executed the orders of the magistrate, especially where force was required, cleared the way before him, and dispersed a crowd when it impeded public business. It was the duty of the lictors to inflict corporal and capital punishment.

Liddell, Henry George, an English lexicographer; born in 1811. He was educated at Charterhouse and Christ Church, Oxford. He was made tutor of his college, and in 1845 Professor of Moral Philosophy in his university. After acting for nine years (1846–1855) as head-master of Westminster School, he returned to Christ Church as dean. From 1870 to 1874 he was vice-chancellor of the university. "Liddell and Scott's Greek Lexicon" (1843; 7th and definite ed. 1883) was based on the German one of Passer. It soon became indispensable to every serious student of Greek, and a smaller edition was issued for the use of schoolboys, an intermediate one in 1890. Dr. Liddell's fellow-worker in this great achievement of English scholarship was Robert Scott, D. D. (1811–1887), master of Balliol College (1854–1870), and then Dean of Rochester. Dr. Liddell was the author of a "History of Rome" (1855), of which there is also an abridged edition, "The Student's Rome." He died Jan. 18, 1898.

Liddon, Henry Parry, an English clergyman; born in Taunton in 1829. Ordained in 1852 as senior student or fellow of Christ Church, from 1854 to 1859 he was vice-principal of Cuddesdon Theological College. He was appointed prebendary of Salisbury Cathedral in 1864, and was select preacher at Oxford in 1863–1865, 1870–1872, 1877–1879, and 1884. Dr. Liddon was a member of the Hebdomadal Council at Oxford from 1866 to 1875. In the former year he delivered his famous Bampton Lectures on the "Divinity of Our Lord" (1867). He died in Weston-super-Mare, Sept. 9, 1890.

Lidner, Bengt, a Swedish poet; born in Gothenburg, March 16, 1757. He published a volume of "Fables" after the manner of Lafontaine (1799). In 1781 he was secretary to the Swedish envoy at Paris, and there wrote the tragedy "Erik the Fjortonde." He was a highly gifted poet. The best of his poems are: "Spastaras Dod" (1783); "Aret," (1783); "Ythersta Domen"; and the opera "Medea." He died in Stockholm, Jan. 4, 1793.

Lie, Jonas Laurits Idemil, a Norwegian novelist, son of a lawyer; born in Eker Nov. 6, 1833; passed many years of his boyhood amid the wild coast scenery of Tromsö and the simple seafaring people of that region. He chose the sea as a profession, but owing to the weakness of his sight he was compelled to give it up. On his father's removal to Bergen to assume the position of magistrate, young Lie was sent to the Latin school of that city, and at Christiania, he completed his school studies. He entered the university in 1851 and obtained his license in law in 1858, and in the following year he settled as a lawyer at Kongsvinger, to the N. E. of Christiania. In consequence of pecuniary embarrassments he went to Christiania in 1868 to support himself by journalism and literary work, and in 1870 he was very successful with a novel entitled "The Visionary." His novels give admirable realistic pictures of life in Norway, especially of the fisher-folk of the W. coast. His popularity is due to the delicate poetry that lights up his books, to the healthy tone of his writing, his fidelity to nature, and his genial humor. His novels include: "The Man With the Second-sight," "The Three-master 'Future'"; "The Pilot and His Wife," of which five editions were exhausted in the first year; "Go On"; "A Prisoner for Life"; "The Family at Gilje," his best novel; "A Whirlpool"; "The Commander's Daughters"; the excellent "Married Life"; and "Maisa Jons," the life of a Christiania seamstress. Jonas Lie, moreover, has published two collections of "Short Stories," a volume of popular "Poems," and a successful comedy, "Grabow's Cat." "The Visionary," "The Pilot and His Wife," "The Little Gray," and "Niobe" have been translated into English.

Lieber, Franz (lē'bĕr), an American publicist; born in Berlin, Germany, March 18, 1800. He volunteered as a soldier at 15, and was in the battles of Ligny, Waterloo, and Namur. He served also in the Greek war of independence, recording his experiences in "Journal in Greece" (1823). He settled in the United States in 1827, and during the next five years was occupied with the compilation of the "Encyclopædia Americana" (13 vols.). While Professor of History and Political Economy in South Carolina College, he wrote the three great works on which his fame mainly rests: "Manual of Political Ethics" (1838); "Legal and Political Hermeneutics" (1839); "Civil Liberty and Self-Government" (1853). In the beginning of the Civil War he drew up by order of President Lincoln the "Code of War for the Government of the Armies of the United States in the Field." He died in New York, Oct. 2, 1872.

Lieber, Oscar Montgomery, an American mineralogist and chemist; born in Boston, Mass., Sept. 8, 1830; son of Francis Lieber. He was educated at the universities of Berlin and Göttingen and the School of Mines of Freiberg, Saxony. In 1850 he became State geologist of Mississippi and was afterward engaged in the survey of Alabama and South Carolina. In 1860 he went to Labrador as geologist of the American astronomical expedition. He wrote: "The Assayer's Guide" (1852) and "The Analytical Chemist's Assistant" (1852). During the early part of the Civil War he served in the Confederate army and was fatally wounded at the battle of Williamsburg. He died in Richmond, Va., June 27, 1862.

Lieber, Thomas. See ERASTUS.

Lieberkühn (lē'ber-kön), an annular reflector attached to the nose of the object-glass of a microscope, and serving to illuminate an object by reflecting the rays which pass around the object through the slip on the stand.

Lieberkühn's Glands, the name given to the minute tubular glands of the small intestine, because first accurately described by Lieberkühn.

Liebig, Justus, Baron von (lē'biG), a German chemist; born in Darmstadt May 12, 1803. In 1826 he was appointed Professor of Chemistry in the University of Giessen, and there set up the first chemical laboratory for experimental instruction. He was a very successful lecturer, and attracted students from all over the world. Such a man could not fail to receive the highest nonors, and in 1845 the Grand-Duke of Hesse made him a hereditary baron. In 1852 he was appointed to a professorship in the University of Munich, and to the charge of the laboratory there. In 1860 the Munich Academy of Sciences elected him to be its president, as the successor of Thiersch. He was foreign fellow of most of the scientific societies of Europe and America that recognize chemistry, and he had frequently been invited to fill chairs of chemistry in England and on the Continent. During the last years of his life Liebig was a frequent visitor to England. To mark the estimation in which his labors were held by scientific men everywhere, a subscription was raised in Europe in 1854 for the purpose of presenting him with a public testimonial. He continued to discharge the duties of his office at Munich till his last illness. His treatises and memoirs on theoretical and practical chemistry are very numerous, and are of exceptional value; and the term "Liebig's Extract" is certainly a "household word." No other chemist of great rank has so sedulously striven to make the science a tender to practical utilities. Among his writings on the chemistry of agriculture are: "Principles of Agricultural Chemistry" (1855); "Theory and Practice of Farming" (1856); "Scientific Letters on Modern Farming" (1859). He died in Munich April 18, 1873.

Liebknecht, Wilhelm (lēb'nec*h*t), a German socialist; born in Giessen March 29, 1826. He was editor-in-chief of the organ of the Social Democratic party, "Vorwärts"; author of "The Fundamental Question" (1876); "A Glance at the New World" (1887), recounting his observations during a visit to the United States; "Robert Blum" (1890); "History of the French Revolution" (1890); "'Robert Owen" (1892). His work on "Woman" is widely known. He sat for years in the Reichstag as a member of the Social-Democratic party and was often arrested and exiled. He died in Charlottenburg Aug. 6, 1900.

Liebrecht, Felix (lēb'rec*h*t), a German mythologist; born in Namslau, Silesia, March 13, 1812. He made a study of the sagas and legends of various countries. Among his writings are: translations, with critical annotations, of Giambattista Basile's "Pentamerone, or the Story of Stories" (1846); of the "Baarlam and Josaphat" of John of Damascus (1847); and of Dunlop's "History of Prose Poems." He died in St. Hubert, France, Aug. 3, 1890.

Liege, the most E. province of Belgium; area, 1,117 square miles. The N. part of the province, called Herveland, is exceedingly fertile and highly cultivated, affording pasturage for cattle and producing large quantities of butter and Limburg cheese. The S. part of the province is hilly and well wooded. It contains rich coal and iron mines.

Liege, a town of Belgium, capital of the province of Liege, on the Maese, 54 miles S. E. of Brussels. It is divided into upper and lower towns. The latter stands at the confluence of the Maese and Ourthe, and is intersected by many branches of the first-named river, which are enclosed by stone walls, and crossed by numerous bridges. Liege has some broad streets, neat squares, quays, and promenades, but in general it is poorly built, and lacks that cleanliness for which most towns of the Netherlands are noted. Liege is one of the largest manufacturing towns of Europe, owing principally to its situation in a district abounding with coal, iron, lead, copper, and marble. Cannons and firearms of every description, steam engines, and machinery, hardware of every kind, watches, jewelry, bronze and other ornaments, woolens, cottons, etc., are made. Pop. (1906) 122,207.

Liegnitz, a town of Prussian Silesia, on the Katzbach, 38 miles W. by N. of Breslau. The town dates from the end of the 10th century. In 1163 it was chosen by the Dukes of Lower Silesia as their place of

residence, and from 1241 to 1675 it was the capital of the principality of Liegnitz. Liegnitz came into the hands of Prussia in 1742. Here in 1760 Frederick the Great routed the Austrians under Loudon, and in 1813 Blücher defeated the French (Katzbach). It is now a place of great and varied industrial activity: iron-foundries, machine-shops, pianoforte-factories, and manufactures of woolens, cloth, hats, and gloves, with turnery, brick-making, and pottery, indicate the chief branches. Pop. (1905) 59,706.

Liegnitz, Battle of. See WAHLSTATT, BATTLE OF.

Lien, a legal claim on or upon property; a legal right in one person to detain the goods of another until some claim of the former against the latter has been satisfied.

"A lien may be either particular or general; the former is where the claim of retainer is made upon the goods themselves, in respect of which the debt arises, a claim which the law favors. The other, or general lien, is where goods are retained in respect of a general balance of account, which is less favored. Thus a trainer who has a horse given him to train has a lien for his charges of keep and training; and in general, when the goods are delivered to a person to be improved or altered in character, this right arises; as when cloth is delivered to a tailor to convert into clothes; or corn to a miller to be returned in the shape of flour. The right may, however, be regulated by special agreement, and then its operation will depend on the particular terms of the contract; but in the absence of express contract the law implies a lien wherever the usage of trade or the previous dealings of the parties give ground for such an implication. Though, as has been said, general liens are not favored by law, yet in some cases they have become allowed and established by usage, as in the case of attorneys upon the title-deeds and documents of their clients; and factors, warehousemen, and others, upon goods confided to them in the ordinary course of business; all of whom have a lien for the amount of the general balance due to them in their several capacities."—Blackstone.

Lieutenant, an officer, civil or military, who supplies the place of another temporarily during absence, illness, etc. In the army, a commissioned officer ranking next below a captain. In the navy, a commissioned officer ranking next below a lieutenant-commander.

Lieutenant=colonel, in the regular army, is the officer next in rank to a colonel, and the senior of a major. He has actual command of a regiment, and is responsible for the discipline and comfort of the troops under his command and for the various details of their organization.

Lieutenant=general, a general officer in the army, ranking above a Major-General and below a general. The office of lieutenant-general was first created by Congress for George Washington in 1798, during the troubles between the United States and France. It then lapsed till renewed by Congress for Gen. Winfield Scott, who was made lieutenant-general by brevet. In 1864 it was again revived for Gen. U. S. Grant, and continued for Generals Sherman and Sheridan. The grade was also conferred on Gen. John M. Schofield, Feb. 5, 1895, who held it till his retirement, Sept. 29, following. An act of Congress of June 6, 1900, provided that "the senior Major-General of the line commanding the army shall have the rank, pay and allowances of a lieutenant-general"; and on the reorganization of the army in February, 1901, the grade was revived and President McKinley appointed Maj.-Gen. Nelson A. Miles its incumbent.

Lieutenant=governor, an officer of several of the States, of rank next below a governor. He performs the duties of a governor in case of the latter's death, absence from the State, or inability to act.

Life, that state of animals and plants in which the natural functions and motions are or may be performed; animation; vitality; also, the time or duration of such state, whether generally or individually; as, the life of a dog or a flower. Life is thus placed in opposition to the term death, which implies the state of a being in which those actions have altogether ceased, and whose structure is subject to no other forces than those of inorganic matter, which speedily effect its decomposition. The class of phenomena to which we apply the term vital, and which differs in its character both from those of physics and chemistry, is only manifested by bodies of that peculiar structure which we term organized. It was long regarded as sufficient to attribute to the vital principle all those actions of a living body which cannot be referred to the laws of chemistry or physics. The laws of vital phenomena, however, are, in fact, as open to investigation as those which comprehend the phenomena of gravitation, electricity, or chemical affinity. A strict examination into their character will show that, although not identical with physical phenomena, they are analogous to them, in so far as they take place according to a regular plan, and present themselves under fixed conditions, a definite acquaintance with which would give to physiological science the same kind of precision and comprehensiveness as it is the aim of the physical philosopher to attain in his branch of study. The intricacy, however, of the combinations under which the vital phenomena are usually presented to our observation renders a knowledge of their laws more difficult of attainment; but the success which has attended the philosophical method of inquiry of late pursued by scientific physiologists, is a most satisfactory proof that they are not beyond the reach of persevering and well-directed search. Life commences with the first production of the germ; it is manifested in the phenomena of growth and reproduction; and it terminates in the death of the organized structure, when its component parts are disintegrated more or less

completely by the operation of the common laws of matter.

Life is thus "the sum of the actions of an organized being." It includes all those phenomena which it is the province of the physiologist to consider. The changes exhibited by any one living being, in its normal condition at least, have one manifest tendency — the preservation of its existence as a perfect structure. By these it is enabled to counteract the ever operating influence of chemical and physical laws, and to resist to a greater or less extent the injurious effects of external agencies. In the investigation of vital phenomena, the fact has been too much overlooked, "that we always find a similarity of action when the organized structure on the one hand, and the stimuli which call its properties into activity on the other, are identical; and a difference in either of these conditions always produces a difference in the result." We do, indeed, occasionally find variations in the result, without being able to detect any change in either of the conditions; but knowing how very imperfect our powers of discovering minute changes at present are, and bearing in mind that every instance of our means of observation has gone to strengthen the force of our rule, we cannot look upon them as exceptions. In attempting to reduce the mass of phenomena presented to us by vital actions to distinct classes, we find that all living beings introduce into their own structure alimentary substances derived from external sources; and likewise that all submit their fluid ingredients to the influence of the element which they inhabit, so as to produce a reciprocal change between them. Thus, the function of respiration is essentially the same throughout the whole organized world. Hence we conclude that the action of each particular organ is dependent upon the excitation of its properties by agents external to it. When these stimuli are withdrawn, vital action ceases. Further, every class of organs in the living body may be said to require its particular stimulus for the display of its properties.

There are also other conditions of a more general nature necessary for the support of vital actions. All vital actions require a certain amount of heat for their performance, and this amount varies in different cases. Light, again, is essential to many others, especially in the vegetable kingdom. Electricity is also an important agent in the vital economy; but our knowledge of its operations is still very imperfect. Many physiologists argue for the existence of a distinct set of vital affinities, from the fact that the tissues and fluids which maintain a certain composition when possessed of vitality rapidly resolve themselves into new combinations when this has become extinct; but there appears to be more reason to infer that the preservation of the normal constitution of organic compounds in the living body is dependent on the continuance of the vital actions of the economy, rather than due to its mere possession of the property of vitality. In fact, it may be reasonably maintained "that the vitality of each tissue, that is to say, its possession of vital properties, is dependent on the perfect condition of its organization; and that, so far from preserving the organism from decay, it merely remains until decay has commenced." There are many organized beings, at particular periods of whose existence all vital action seems to be suspended; and this may result either from the absence of the stimuli necessary to maintain it, or from some change in the organism itself, by which it is, for a time, less capable of responding to these stimuli. The former is manifested in a remarkable manner in the case of seeds of plants, which have been found to preserve their vitality during many centuries; the latter, in the case of certain animals which pass the winter in a state of torpor.

Life Insurance. See INSURANCE, LIFE.

Life-Saving Service, an organization for assisting the shipwrecked from shore. Such organizations exist in most of the maritime countries. In Europe, with the exception of Belgium and Denmark, the service is controlled and supported either wholly or in part by private associations. In the United States it is distinguished as the largest service of its kind in the world, and is under direct management of the government, being a branch of the Treasury Department. Prior to 1871, when the present system was inaugurated, there were life-saving stations along the shores of New Jersey, Long Island, and Massachusetts, but they were inadequately equipped and depended entirely upon volunteer help. The first attempt in this country to render such aid to the shipwrecked was made in 1807, when the Massachusetts Humane Society established a life-boat station at Cohasset. Afterward the society built other stations, carrying on the work practically alone till 1837, when the president of the United States was authorized to employ ships to cruise along the shores and assist distressed navigators. In 1848 William Augustus Newell (*q. v.*), having witnessed a terrible shipwreck off Barnegat Island, introduced in Congress a bill that secured an appropriation of $10,000 for the relief of shipwrecked persons, and the money was used to establish a few life-saving stations between Sandy Hook and Little Egg Harbor, N. J.

The act of April 20, 1871, empowered the secretary of the treasury to erect such stations as were deemed requisite along the coasts of Long Island and New Jersey, and to employ crews of experienced surfmen for the rescue work during certain periods left

to his discretion. By another act, in 1878, the Life-Saving Service was organized into a separate bureau, and from that time it has extended its stations every year. At the close of the fiscal year that ended June 30, 1906, the service embraced 278 stations, 200 being on the Atlantic and Gulf coasts, 60 on the Great Lakes, 17 on the Pacific coast, and one at the falls of the Ohio river, Louisville, Ky. The territory guarded by the service is divided into thirteen districts, fixed with reference to the coast conformation. Besides an inspector at large for the stations, there is an assistant inspector for each district who attends to the buildings, drilling of crews, etc. Each district also has a superintendent. All these officials are officers detailed from the Revenue Cutter Service. To every station is assigned a keeper, who usually has from six to eight surfmen under him, the crew being increased in case of necessity. A surfman must be a citizen of the United States, not under eighteen nor over forty years of age when originally enlisted. He must be physically sound, a good swimmer, capable of managing boats, and able to read and write the English language. The keeper of a station is made an inspector of customs, and so has legal custody of all property washed or brought on shore.

The station buildings are usually two-story wooden structures of six or seven rooms, built at irregular intervals along the shore, from 3 to 20 miles apart according to the frequency with which vessels approach the land in their course. Stations exposed to view from off shore are painted in such a manner that they may be distinguished at a great distance. Each is provided with a lookout tower or platform for the day watch, and with a flagstaff for use in signaling vessels. Wherever practicable, stations are connected by telephones, and the distances between stations are patrolled day and night. Besides a lantern, each man carries an explosive night signal that throws over the waters a red flame to give warning of shore dangers or notice of assistance to vessels in distress. Atlantic and Gulf coast stations, with the exception of the floating station at Boston, are open from Aug. 1 to June 1 of each year. June and July are known as the inactive season. Boston Harbor station is employed from May 1 to Nov. 15 of each year; Pacific coast stations and the station on the Ohio river are manned all the year round; and on the Great Lakes the stations are kept open from the beginning of navigation in April to its close in December.

The Life-Saving Service uses the modern life-boat, scientifically constructed; the improved wreck ordnance for firing a shot-line over a vessel in distress, to establish shore connection; the breeches-buoy, which is drawn to and from a wreck with lines; and the life-car, in which persons and goods can be hauled to land. There are also numerous auxiliary appliances such as boat-wagons, roller boat-skids, hawsers, hauling-lines, cork jackets, etc. The report of the Life-Saving Service for the fiscal year that ended June 30, 1909, showed that there were 1,376 disasters, with property involved valued at $16,106,080, of which property worth $13,810,700 was saved, leaving a loss of $2,295,380. The number of persons involved was 8,900; persons lost, 30; shipwrecked persons succored, 613; vessels totally lost on United States coasts, 72. The cost of maintaining the service for the year was $2,027,870.

Ligament, anything which binds, ties, or unites one thing to another; a bond, a tie. In anatomy, short bands of strong, white glistening fibers by which the bones are bound together. A typical example is the *ligamentum nuchæ,* extending from the spine of the occipital bone to that of the seventh cervical vertebra, binding together the bones of the neck, and analogous to a highly important elastic ligament in the lower animals. The ligaments in the human body are very numerous, and all have distinctive names. In the plural, in zoölogy, two appliances, one external and one internal, for holding together the valves of a conchiferous mollusk. The external ligament, or the ligament properly so called, is a horny substance similar to the epidermis which covers the valves. It is generally attached to the ridges on the posterior hinge-margins, behind the umbones, and is stretched by the closing of the valves. The internal ligament, called also the cartilage, is lodged in furrows formed by the ligamental plates, or in pits along the hinge-line. It is composed of elastic fibers perpendicular to the surfaces between which it is contained, and is slightly iridescent when broken. It is compressed when the valves are shut. The two ligaments are not always equally developed; thus, the external one is large in the *Unionidæ,* as is the internal one in *Mactra* and *Mya.*

Ligan. See FLOTSAM.

Light, the natural agent which, by acting on the retina, excites in us the sensation of vision. Two leading hypotheses regarding its nature have been formed: the one the emission or corpuscular theory, which, though supported by the great name of Sir Isaac Newton, has been abandoned, and the other the undulatory theory, which now obtains. The latter assumes the existence everywhere through the universe, or the portion of it with which we are connected, of an extremely subtle elastic medium, called luminiferous ether, the undulations of which constitute light, and when they impinge on the retina produce vision. The particles agitated are not transmitted but only the disturbance. The movements

are held to be strictly analogous to the undulations of the atmosphere which produce and convey sound; or, as the word undulation imports, those of the ocean in producing waves. Several methods of calculating the velocity with which light is transmitted are known. By one, the size of the minute circle through which the aberration of light makes stars apparently revolve is carefully noted, and the relative proportion of the earth's velocity in her orbit to that of light arriving from the stars ascertained. The result is that light is found to move about a hundred thousand times as fast as the earth, which gives the velocity about 190,000 miles per second. By another, observation is made of the time in which light actually arrives at the eye from one of Jupiter's satellites at the commencement or the close of an occultation as compared with their calculated times. It is found that 8′ 18″ are required for light to travel over half the earth's orbit, which gives, as in the former case, about 190,000 miles per second for its velocity. The velocity is also measured directly by two instrumental methods devised respectively by Foucault and Fizeau, with the same results. The great sources of light are the sun, the fixed stars (other suns), bodies in a state of ignition, electricity, etc. The bodies sending forth rays or pencils of light are called luminous; those through which it passes easily, transparent or diaphanous; those through which it passes less easily, translucent; and those through which it cannot pass at all, opaque. When a ray meets the surface of a body, it may be refracted and decomposed or reflected. When it encounters an opaque body it casts a shadow. Admitted into a dark chamber through a small aperture to fall on a screen, the rays make images of external objects reversed. The illuminating power on any surface is inversely as the square of the distance from the source of light. This may be measured by a photometer. Light may be defracted, it may be polarized. An abundant supply of it is essential to the healthy growth of man, the inferior animals, and plants.

Lighter, a barge for transporting merchandise and stores, on rivers and canals, over bars, and to and from vessels moored in a stream, or where they cannot be laden from or discharged on to a wharf or pier alongside.

Lightfoot, John, an English clergyman and scholar; born in 1602 in Stoke-upon-Trent. He was educated at Christ's College, Cambridge. In 1629 appeared his "Erubhin, or Miscellanies Christian and Judaical," and later his "Handful of Gleanings Out of the Book of Exodus." Lightfoot was one of the most influential members of the Westminster Assembly in 1643, but often stood alone, as in the Erastian controversy. The chief works of this great Rabbinical scholar were the unfinished "Harmony of the Four Evangelists Among Themselves" (1644-1650); "Commentary Upon the Acts of the Apostles" (1645); "The Harmony, Chronicle, and Order of the Old Testament" (1647); of the New (1655); and the "Horæ Hebraicæ et Talmudicæ" (1658-1674; the last part posthumously), the great labor of his life. He died in Ely, Dec. 6, 1675.

Lightfoot, Joseph Barber, Bishop of Durham, England; born in Liverpool April 13, 1828; was educated at King Edward's School, Birmingham, and Trinity College, Cambridge, where he took the degree of B. A. in 1851. He was elected a fellow of his college; gained the M. A. degree in 1854; took orders; became a tutor of Trinity College; was appointed to the see of Durham in 1879, and was signally successful in the administration of the affairs of this large and important diocese. Bishop Lightfoot was a Biblical and classical scholar of the first rank; was especially accomplished in Greek; but he was also well read in English literature, history, and philosophy. He was an important member of the body of scholars who revised the authorized version of the New Testament. He died Dec. 21, 1889.

Light-Horse Harry. See LEE, HENRY.

Lighthouse, a lofty tower or other structure, erected at the entrance of a harbor, or at some important or dangerous part of a coast, and having a strong light at the top, to guide vessels and warn them of danger. Originally they were lighted up with fires, but now oil, gas, and electricity are used, the power of the light being increased by the adoption of glass reflectors, lenses, and prisms.

In the United States these matters are under the supervision of the Lighthouse Board. At the close of the fiscal year 1900 there were under the control of the Lighthouse Establishment 1,243 lighthouses and lighted beacons; 44 light vessels in position; 8 light vessels for relief; 82 electric and gas buoys in position; 172 fog signals operated by steam or hot air; 221 fog signals operated by clockwork; 1,396 post-lights on Western rivers; 475 day or unlighted beacons; 73 whistling buoys in position, and 120 bell buoys in position.

The history of lighthouse construction and illumination may be said to extend over a period of more than 2,000 years; but the regularly organized life preserving system of modern lighthouse engineering goes back very little further than the beginning of the 19th century. None of the early lighthouse buildings now exist. The Pharos of Alexandria (331 B. C.) gave its name to its successors. The Romans built lighthouses at Ostia, Ravenna, Puteoli, and other ports. The Phœnician Pharos

at Coruna was repaired during the reign of the Emperor Trajan, was reëstablished as a lighthouse about 1634, and in 1847 had a dioptric apparatus placed in it. On the cliff at Boulogne there are the remains of a lighthouse ascribed to Caligula (A. D. 40), and at Dover there are remains of another Roman pharos. Corduan, at the mouth of the Garonne, has seen all the improvements, from the open chauffer, in which billets of wood were burned, to the dioptric light combined with a four-wick lamp. Till the end of the 18th century the lighthouses of Great Britain and America were few in number, and of an inferior description in the great essential of a lighthouse — viz., sending the greatest number of rays of light toward the horizon. Many of the public lights in England were private property, as was also the case with the Isle of May in Scotland, the patent for which was ratified in 1641. There were only 25 lighthouse stations and six floating lights in England at the beginning of the 19th century. As an example of a modern lighthouse tower we may take Skerryvore, which is 139 feet in height and 42 feet in diameter at the base, containing a mass of 58,580 cubic feet of granite. (See EDDYSTONE.)

To Augustin Fresnel belongs the honor of inventing and first employing, in 1822, the dioptric system for lighthouse purposes in combination with a central lamp having four concentric wicks. He was apparently ignorant of what had been done by Buffon and Condorcet in proposing, for burning purposes, to build up lenses in separate pieces with the view of reducing the thickness of glass and correcting to a large extent spherical aberration. So he devised the lighthouse lens, which is plano-convex, 3 feet 3 inches in height by 2 feet 6 inches in breadth, composed of a central disk, surrounded by annular rings gradually decreasing in breadth as they recede from the center. If these lenses be assembled on a frame with eight or more sides, having a lamp in their common focus, and be made to revolve, a dioptric revolving light is produced. The electric light was first shown to the mariner in 1858 from the Foreland lighthouse, the generating machine being that of Holmes; but since that date more powerful machines have been devised.

Lightning, the dazzling light emitted by a large spark darting from clouds charged with electricity. In the lower regions of the atmosphere it is white, in the upper one somewhat violet, as is the spark of an electrical machine in a vacuum. It does not uniformly take the zigzag form conventionally represented. The writer has seen it descend to the earth in a bluish stream by a series of curves. Again, he has seen it like a sharp and rugged antler standing upright, and across it a line of gleaming circles like a series of huge golden coins or a string of illuminated beads, and other forms. In the upper regions of the sky, where the air is rarefied, it tends to take the form of sheet-lightning, sometimes called heat lightning; in the lower regions it becomes more concentrated and moves in lines. As a rule lightning strikes objects from above, though occasionally ascending lightning has been seen. The loftiest buildings are most in danger from its effects, and so are tall trees, especially oaks and elms; the resin of pines, interfering with their efficiency as conductors, makes them more safe. When it sinks deeply into the ground it sometimes vitrifies the rocks, producing fulgurites. Light travels with such speed that a flash is seen the instant it occurs. Thunder, which is simply the noise of the explosion, takes about five seconds to travel a mile, hence the distance of any flash, followed by thunder, may be calculated. If a mile distant, the danger is but slight.

Lightning Arrester, a contrivance used in telegraphy for guarding against passage of atmospheric electricity through the instruments. The line wires are attached to a plate of brass, usually serrated on the under side. This plate rests on another plate connected with the ground, the two being separated by a thin layer of insulating material.

Lightning Conductor, an appliance designed to protect a building and its inmates against destruction or damage by lightning. It was invented by Benjamin Franklin in 1755. In general an iron rod rises vertically from the roof of the building which it is designed to protect. Its height is from 6 to 10 feet, its thickness at the base two or three inches. Its top is of platinum or gilded copper. From the rod runs a wire cord, or a bar of iron, or strip of copper, to the ground, terminating in general in ramifications 18 to 21 feet below the surface, in many cases in a well. Contrary to the popular opinion, the electric movement along the lightning conductor and rod is from the ground to the sky, not from the sky to the ground. It tends to neutralize the contrary electricity of passing thunder clouds, and prevent them from flashing their lightning forth; if not potent enough to do this, and the rod is itself struck, it conducts the electricity to the ground. Metallic roofs, gutters, etc., should be connected with the lightning rod, otherwise lateral discharges may occur. A lightning rod protects an area on the roof having a radius of twice its height.

Light of Greece, Corinth; so named by Cicero.

Lights, in Public Worship, a practice which prevailed in the Jewish (Exod. xxv: 31–39) and in most of the ancient religions,

and which is retained both in the Roman and in the Oriental Churches. The use of lights in the night services, and in subterranean churches, such as those of the early Christians in the catacombs, is of course easily intelligible; but the practice, as bearing also a symbolical allusion to the "Light of the Worship" and to the "Light of Faith," was not connned to occasions of necessity, but appears to have been from an early time an accompaniment of Christian worship, especially in connection with the sacraments of baptism and the eucharist. The time of the service in which lights are used has varied very much in different ages; but eventually it was extended to the entire time of the mass. In other services, also, lights have been used from an early period; *e. g.*, lighted tapers were placed in the hand of the newly baptized. Two candles are used at mass, and four at high mass; but the most profuse use of lights is reserved for Benediction, and other services connected with the Exposition of the Host. The material used for lights in churches is either oil or wax; the latter in penitential seasons, and in services for the dead, being of a yellow color. An oil lamp always burns in a Roman Catholic church to indicate the presence of the Host in the tabernacle on the altar. In the Anglican Church candlesticks, and in some instances candles themselves, are retained in many churches, on the communion table, but in the majority of instances they are not lighted. In the Presbyterian and Independent churches the symbolical use of lights is rejected as superstitious.

Lightship, or **Lightboat,** a vessel serving as a lighthouse in positions where a fixed structure is impracticable. Octagonal lanterns, fitted wtih Argand lamps placed in the foci of parabolic reflectors, are usually hoisted on the mast; but they are less efficient and more expensive in maintenance than land lights.

Ligne, Charles Joseph, Prince de (lēn), a Franco-Austrian diplomatist and soldier; born in Brussels, May 23, 1735, and as an Austrian soldier served at Kolin, Leuthen, Hochkirch, etc., in the war of the Bavarian succession, and under Loudon at the siege of Belgrade (1789). Meanwhile he had undertaken various diplomatic missions and received numerous distinctions. The favorite of Maria Theresa and Catharine of Russia, the friend of Frederick the Great, Voltaire, Rousseau, he was always a most welcome guest at the court at Versailles and in the Paris salons. He died Dec. 13, 1814.

Lignite, fossil wood, generally of Tertiary age, converted into a kind of coal. It is usually dull or brownish-black, and has not the glistening luster of Carboniferous coal. Occasionally it is pitch black. As the name lignite implies, it, as a rule, retains the form and aspect of the original wood. It contains a larger proportion of hydrogen than wood does. If decomposition goes on, it discharges carburetted hydrogen and becomes changed into common or bituminous coal. The plants constituting it are mostly exogens, and therefore more highly organized than the cryptogams of the Carboniferous coal.

Lignin, the incrusting matter contained within the cellular tissue, giving hardness to the wood and other parts of plants. At one time it was supposed that lignum was a true chemical principle; but the researches of Payen and others prove that it is not always constant in composition. It is, however, always characterized by being soluble in weak alkalies and insoluble in water.

Lignum Vitæ, the wood of *Guaiccum officinale.* It is a very hard and heavy wood, brought from Cuba and other West Indian Islands. When first cut it is soft and easily worked, but on exposure to the air it becomes much harder. It is cross-grained, and contains gum guaiacum. The wood is used for making machinery and for rollers, presses, mills, pestles, mortars, sheaves for ships' blocks, skittle-balls, etc.

Ligny (lēn'yē), a Belgian village, famous for the defeat of the Prussians under Blücher by the French under Napoleon, June 16, 1815, the same day on which Ney's command was engaged with the British under Wellington at Quatre-Bras. The Prussians lost 12,000 men and 21 cannon; the French, 7,000 men.

Ligula, or **Ligule,** in botany, a strap-shaped petal of flowers of the order *Compositæ;* also the membrane which occurs at the base of the lamina of a grass leaf, as that of millet. Hence the term ligulate, applied especially to the ray florets of *Compositæ.*

Liguori, Alfonso Maria de (lēg-ö'rē), a saint of the Roman Catholic Church, and founder of the congregation of the Most Holy Redeemer; born in Marianella, near Naples, in 1687. He belonged to a noble family, and embraced the profession of the law, which, however, he suddenly relinquished for the purpose of devoting himself entirely to a religious life. He received priest's orders in 1725; and in 1732, in conjunction with 12 companions, founded the association of the Redemptionists. In 1762 he was appointed Bishop of Sant' Agata dei Goti, in the kingdom of Naples; but shrinking from the responsibilities of such an office, he resigned his see in 1775, after which date he returned to his order, and continued to live in the same simple austerity which had characterized his early

life. Having survived his retirement 12 years, he died in Nocera dei Pagani, Aug. 1, 1787, and was solemnly canonized in 1839.

Liguria, a district of ancient Italy, the whole territory of Genoa and Nice, and which, according to the division of Augustus, was bounded N. by the Padus (Po), E. by the Macra (Magra), separating it from Etruria, S. by the Ligurian Sea (Gulf of Genoa), and W. by the Varus (Var) and the Maritime Alps, separating it from Transalpine Gaul. It was inhabited by an ancient people called the Ligures, of whose origin nothing authentic has been recorded. They first came into collision with the Romans, 241 B. C., and P. Lentulus Caudinus celebrated a triumph over them 236 B. C. The Ligurians, allied with the Carthaginians, commenced hostilities by attacking Placentia and Cremona, Roman colonies, 200 B. C. A long series of wars, extending over a period of 80 years, ensued between the Romans and the Ligurians. Several tribes were reduced to subjection before 173 B. C.; others held out, and one tribe in the Maritime Alps was not reduced to obedience till 14 B. C. The Lombards overran the country in 569.

Ligurian Republic. The French created a revolution in Genoa early in 1797, and by a convention signed at Montebello, June 5 and 6, this republic placed itself under the protection of France. Napoleon Bonaparte gave it the name of the Ligurian Republic, June 14, which was incorporated with France by a convention concluded at Milan, June 4, 1805. The Ligurian Republic was dissolved in 1814, and Genoa was annexed to Sardinia. The inhabitants revolted, and proclaimed the restoration of the republic, April 3, 1849. The revolt was suppressed, April 11.

Ligurite, a variety of sphene, a mineral occurring in oblique rhombic prisms, of an apple-green color, occasionally speckled externally; so called on account of its being chiefly found in Liguria. Its color, hardness, and transparency have caused it to be classed as a gem.

Li Hung Chang, a Chinese statesman and diplomatist; born in Ho Fei, province of Anhwei, China, Feb. 16, 1823. He received a university education, taking a degree. In 1850, when the Taiping rebels invaded Anhwei, he joined Tseng Kuo Fan's army as secretary. He was appointed judge of Chekiang province, and in 1861 governor of Kiang-Su. In conjunction with Colonel (afterward General) Gordon, in 1863, he retook Suchow and drove the rebels entirely out of Kiang-Su. For these services he was decorated with the Yellow Jacket and Peacock's Plume, and made a hereditary noble of the third class. In 1865 he was appointed Governor-General of the Liang Kiang provinces, and in 1868 made Grand Chancellor. After the massacres at Tient-sin in 1870 he was degraded and his titles taken away on the charge of not assisting the imperial commander of the troops; but in 1872 he was restored as Grand Chancellor and appointed Governor-General of Chihli, the metropolitan province. He was also Senior Grand Secretary, the highest distinction that can be attained by a Chinese official. When, in 1876, Margory was killed while endeavoring to explore Southwestern China, Li Hung Chang was the commissioner for fixing the indemnity. He negotiated important treaties with Peru and Japan. He was a friend to foreigners and to Western civilization and culture. As a member of the Board of Admiralty he originated the Chinese navy, and was the chief promoter

LI HUNG CHANG.

of the China Merchants' Steam Navigation Company. He was imperial Commissioner of Trade for the N. ports. The emperor intrusted to him supreme charge of the military and naval forces sent to Korea in the late Chino-Japanese War, and, though several times distrusted and disgraced, he bore nearly the whole burden of the War Department, Marine Department, and Financial Department of the Chinese government. During the war with Japan the disasters to the Chinese armies and navy were laid to his blame, and he was degraded and punished, but still retained his office of Prime Minister. He was sent to Japan in 1895 to negotiate the peace treaty, where he barely escaped assassination. In 1896 he made a tour of the world, traveling overland and was everywhere received with éclat as a highly distinguished guest. He played a prominent part in adjusting the relations of China with foreign powers after the suppressing of the uprisings of 1900–1901. He died in Peking, China, Nov. 7, 1901.

Lilac (*Syringa*), a genus of plants belonging to the natural order *Oleaceæ*, and consisting of shrubs and small trees, with four-cleft corolla, two stamens, and a two-celled, two-valvular capsule. The common lilac (*S. vulgaris*) is one of the most common ornamental shrubs cultivated in Europe and North America. It is a native of the N. of Persia, and was first brought to Vienna in the latter half of the 16th century by Busbecq, to whom we also owe the introduction of the tulip into European gardens. From Vienna it soon spread, so that it is now to be found half wild in the hedges of some parts of Europe. There are many varieties. The flowers grow in large conical panicles; are of a bluish "lilac" color, purple or white, and have a very delicious odor. The leaves are a favorite food of cantharides. The bitter extract of the unripe capsules has very marked tonic and febrifugal properties. The wood is fine-grained and is used for inlaying, turning, and the making of small articles. A fragrant oil can be obtained from it by distillation. The Chinese lilac (*S. chinensis*) has large flowers, but with less powerful odor, and the Persian lilac (*S. persica*) has narrower leaves. Both are often planted in gardens and pleasure grounds. There are several other species.

Lilburne, John, an English sectary; born in 1618. For tracts against the Anglican hierarchy he was whipped and imprisoned in 1637, but the Long Parliament released him in 1640. His friends got the conviction declared illegal and tyrannic, and Lilburne received $15,000 indemnity. He then joined the army, and rose to the rank of lieutenant-colonel. He was one of the party known as the "Levellers," and for his attacks on Cromwell and others was oftener than once sent to the Tower. Having been condemned to exile, and having returned without leave, he was put in prison and tried for his life, when he was acquitted but not liberated for some time. Latterly he became a member of the Society of Friends. Hume describes him as "the most turbulent, but also the most upright and courageous of men." He died in 1657.

Liliaceæ, lilyworts; an order of endogens, founded by Linnæus in 1751, and still retained. It is the typical order of the alliance Liliales. It consists of herbaceous plants, shrubs, or trees, with bulbs, tubers, rhizomes, or fibrous roots; leaves generally narrow, with parallel veins; flowers large and showy, to small and green, with all intermediate gradations; calyx and corolla confounded, both colored, sometimes cohering into a tube; stamens six, inverted into the perianth; the anthers opening inward; ovary free, three celled; fruit succulent, dry, or capsular. Seeds one above another, in one or two rows. Many of the species are very beautiful. They are widely diffused, being, however, more common in temperate than in tropical countries; those belonging to the latter region being often arborescent. Some are eaten; many yield fibers capable of being spun; others are used medicinally; some yield resins, some are poisonous. Known genera 170, species about 1,500. Lindley divides the order into 11 tribes: Tulipeæ, Hemerocalleæ, Aloineæ, Scilleæ, Conanthereæ, Anthericeæ, Asphyllantheæ, Wachendorfeæ, Asparageæ, Aspidistreæ, and Ophiopogoneæ.

Lilis, or **Lilith,** a character in Rabbinical mythology. The Talmudists say that Adam had a wife before Eve, whose name was Lilis. Refusing to submit to Adam, she left Paradise for a region of the air. She still haunts the night as a specter, and is especially hostile to new-born infants. Some superstitious Jews still put in the chamber occupied by their wives four coins, with labels on which the names of Adam and Eve are inscribed, with the words "Avaunt thee, Lilith!" Our word "lullaby" is said to be a corruption of "Lilla, abi" (Lilith, avaunt).

Lilium, a genus of *Liliaceæ*, tribe *Tulipeæ*, the typical genus of the tribe *Lilieæ*. Bulb of many imbricated fleshy scales; leaves all cauline, not sheathing, alternate or whorled; flowers few or many, large, solitary, erect, or drooping; perianth-segments free, caducous, erect below, recurved or revolute above; nectary median elongate; stamens hypogynous or in the base of the segments; filaments subulate; anthers versatile, bursting inward; ovary six-grooved; style terete; stigma obtuse. Fruit capsular, erect, seeds many, in two series. Known species 40, all from the N. temperate zone. *Lilium martagon*, the Martagon or Turk's cap lily, which has pale purple or white flowers, is naturalized in Surrey, England; its native country is Continental Europe. *L. pyrenaicum* is a garden escape in Devonshire, England.

Lilium candidum is the white or Bourbon lily, from the Levant; *L. croceum* is the yellow lily, from Germany; *L. japonicum* is the Japan lily; *L. chalcedonicum* is the scarlet Martagon lily, from the Levant; *L. pomponium* is the scarlet pompone lily, from Siberia; *L. bulbiferum* is the bulb-bearing or orange lily, from Italy; *L. superbum* is the superb Martagon lily, of North America; and *L. tigrinum* is the tiger or tiger-spotted lily from China. The finest of all is a Japanese species, *L. auratum*. It is two to five feet high, the flowers, which are white with purple blotches, being sometimes a foot across. The smell is perceived at a distance. The bulbs of *L. wallichianum*, an Indian species, have demulcent

properties, and are used in pectoral complaints. *L. pomponium* is cultivated in Kamchatka for its roots, which are roasted and eaten.

Liliuokalani, Queen of Hawaii; born Sept. 2, 1838. She was a sister of King Kalakaua, whom she succeeded as queen. She married John O. Dominis, an American, who became governor of Oahu. He died in 1891 and in the same year she ascended the throne. In 1893 she was deposed, the islanders adopting a republican form of government. She used every effort to regain her supremacy and endeavored to secure assistance from the United States, visiting Washington in 1896 for that purpose, but was unsuccessful in interesting the government in her behalf. On the annexation of Hawaii to the United States, in 1898, she returned to the island. She revisited the United States several times to press her claims for indemnity for the loss of the crown lands. See CLEVELAND, GROVER: HAWAII.

Lille (Flemish Ryssel), a manufacturing town and fortress of France, chief town of the department of Nord, situated on a subtributary of the Scheldt, in a fertile district. Lille derives its name from the castle around which it originally arose, and which from its position in the midst of marshes was called L'Isle. It was founded early in the 11th century by the the counts of Flanders. From 1305 it was mortgaged to France, but passed to Burgundy in 1365. Louis XIV. conquered the town in 1667, and, though it was recaptured by Marlborough and Prince Eugene in 1708, the Austrians restored it in 1713. In 1792 it successfully resisted the determined attacks of the Austrians. Pop. (1901) 215,431.

Lillibullero, the famous political ballad that "sung James II. out of three kingdoms." A scurrilous attack on the Irish recruits, it is said to have been written by Lord Wharton in 1686, and the setting is ascribed to Henry Purcell.

Lilliput, the name of a fabulous kingdom described by Swift in "Gulliver's Travels," of which the inhabitants are not greater in size than an ordinary man's finger.

Lillo, George, an English dramatist; born in Moorfields, Feb. 4, 1693. The son of a Dutch jeweler, he was brought up to his father's trade, and was for several years in partnership with him. "Silvia, or the Country Burial" (1730), a ballad opera, was his first piece; and was followed (1731) by the famous "London Merchant, or the History of George Barnwell," nowadays better known by its sub-title, which made its author famous, and held the stage for nearly a century. It had a marked influence in its day, and may be regarded as a precursor of the "domestic drama." His other dramatic productions include: "Britannia, or the Royal Lovers" (1734); "Fatal Curiosity" (1736); "Arden of Feversham," an adaptation of an Elizabethan play, revised or completed by John Hoadly after Lillo's death. He died in London, Sept. 3, 1739.

Lilly, William Samuel, an English controversial writer; born in Fifehead, Dorsetshire, in 1840. He is a champion of the Roman Catholic point of view of such works as "Ancient Religion and Modern Thought" and "The Claims of Christianity." He also wrote "First Principles of Politics."

Lily, Gigantic (*Doryanthes excelsa*), of Australia, a plant of the natural order *Amaryllideæ*, with flowering stem 10 or 14, sometimes 20 feet high, bearing at top a cluster of large crimson blossoms. The stem is leafy, but the largest leaves are near the root. This plant is found on both the mountains and the seacoast of New South Wales, and is of splendid beauty. The fiber of its leaves has been found excellent for ropes and for textile fabrics.

Lilybæum, the name given by the ancients to Cape Bœo, the most W. promontory of Sicily. The Carthaginians, about 350 B. C., founded here a town of the same name, which became their principal naval station in Sicily.

Lily of the Valley, in botany, *Convallaria majalis.* Recently this plant has been largely and successfully used in medical practice in cases of heart disease, especially in valvular derangements of that organ.

Lima, a city and county-seat of Allen co., O.; on the Ottawa river and on the Cincinnati, Hamilton, and Dayton, the Erie, the Lake Erie and Western, and several other railroads; 71 miles N. of Dayton. It is the trade center of the Lima oil field, a region embracing six counties; and has several large railroad shops, and manufactories of cars, locomotives, machinery, and petroleum refineries. It is the seat of Lima College (Luth.); has a high school, electric light and street railroad plants, waterworks, several National and State banks, daily and weekly newspapers; and an assessed property valuation of $8,000,000. Pop. (1900) 21,723; (1910) 30,508.

Lima, the capital of Peru; at the foot of granitic hills; 7 miles from Callao, its port on the Pacific, on the Rimac river. It is regularly built, and many of the streets have a stream of water running down the center. The numerous domes and spires give Lima a fine appearance from a distance, but the houses are mostly of unburnt brick. Among the public buildings and institutions the cathedral, the convent of San Francisco, the exhibition palace, and the university with its national library

and museum, deserve special mention. The manufactures are unimportant, but there is a considerable import and export trade through the port of Callao. The climate is very agreeable, but the locality is subject to earthquakes, the most destructive being that of 1746. Lima was founded in 1535 by Pizarro, and called Ciudad de los Reyes (City of the Kings). In January, 1881, Lima capitulated to the Chileans, who occupied it for upward of two years. Pop. (1903) 130,000.

Lima College, a coeducational institution in Lima, O.; founded in 1893 under the auspices of the Lutheran Church, but now non-sectarian in control; has grounds, buildings, endowment, and other property valued at over $100,000; volumes in the library, about 1,500; average number of faculty, 22; average student attendance, 400; ordinary income, about $8,000.

Limasol, the chief seaport of Cyprus. It has no harbor, but there is a large trade, chiefly with France, in wine and carobs. Limasol is the only place in Cyprus where English troops are permanently quartered — some in the town and 300 more three miles inland. Pop. about 10,000.

Lima Wood, the name of the dyewood also called Pernambuco wood and Nicaragua wood.

Limb, Artificial. See ARTIFICIAL LIMBS.

Limber, the detachable part of a gun carriage mounted on the two fore wheels, and to which the horses are attached. The gun is limbered up when the trail of the gun carriage proper is lifted up and looped over the pintle hook of the limber, in order for marching. The term limber is also applied to the fore carriage of the ammunition wagon to which the caisson or tumbril is connected. Limbers differ in construction with the purpose and positions of the guns; as — the casemate limber; the field gun limber, with an ammunition box; the garrison gun limber; the limber with shafts; the pole limber; the siege carriage limber; the battery wagon limber.

Limburg, a territory on the Meuse; between the provinces of Liege and Brabant; was created a countship soon after its annexation by the German king (870). In 1839 it was divided, the lands to the W. of the Meuse remaining with Belgium, while a long narrow strip on the E. side of the river was constituted the Dutch province of Limburg. The well-known Limburg cheese is made at the little town of Limburg, the former capital of the duchy.

Limburg-Brouwer, Petrus van (lēm'-bŏrg-brou'er), a Dutch scholar; born in Dordrecht, Sept. 30, 1795. He wrote "History of the Moral and Religious Civilization of the Greeks" (3 vols. 1833–1842), still highly valued; two fine historical novels with the scene laid in ancient Greece — "Charicles and Euphorion" (1831) and "Diophanes" (1838); and a novel relating to his own time, "The Reading Society" (1847). He died in Groningen, June 21, 1847.

Limbus, in scholastic theology, the edge or utmost limit of hell, the abode of souls to whom the merits of Jesus could not be applied through no fault of their own. Dante's description is quite consonant with scholastic teaching on the matter. Limbus is distinguished, as:

(1) *Limbus Patrum,* said to be the abode of those who died before the coming of Jesus Christ, and consequently before He "opened the kingdom of heaven to all believers." The expression "Abraham's bosom" (Luke xvi: 23) is supposed to designate this place; and some theologians see an allusion to it in the preaching "unto the spirits in prison" (I Pet. iii: 19).

(2) *Limbus Infantium,* defined as the abode of infants to whom the merits of the redemption could not be applied because they died without baptism either of water or of blood, and were too young to supplement the loss of the sacrament by *baptismum in voto,* which is an "ardent desire of receiving baptism of water, joined with perfect charity." Many opinions have been held as to the state of infants in limbus,

Lime, the oxide of the metal calcium, which was discovered by Davy in 1808, who obtained it by the electrolysis of calcium chloride. The metal is difficult to prepare and has only been obtained in small quantities. It combines with oxygen so readily that it can only be preserved with difficulty. In combination with oxygen it is, however, exceedingly abudant in nature. (See CALCIUM).

Lime does not occur free in nature, as it combines very readily with carbon dioxide to form a carbonate, which is therefore the most commonly occurring salt. Lime (quicklime) is the monoxide of calcium, its formula being CaO. It is a white amorphous or crystalline powder which is infusible at any temperature which has yet been attained, but glows brightly when heated. It is a very stable body, but is decomposed when heated to a high temperature with potassium. It absorbs moisture readily, evolving a considerable quantity of heat and becoming hydrated or slaked, but the crystalline form is much less readily acted on. It also readily absorbs carbon dioxide, forming carbonate. It is a powerful base — turns red litmus blue and combines readily with acids forming salts with the elimination of water.

Preparation.— Lime may be prepared by heating any of its salts which contain volatile acids, the carbonate being almost al-

Lime

ways used, as it occurs and can be obtained in a state of purity, but the nitrate is occasionally used. The reaction with the carbonate is $CaCO_3 = CaO + CO_2$, and with the nitrate $Ca(NO_3)_2 = CaO + N_2O_4 + 2O$. A very high temperature is required to insure complete decomposition of the carbonate, and even then it can only be assured if the carbon dioxide is removed as it is liberated. The addition of a little carbon facilitates decomposition by reducing the carbon dioxide to carbon monoxide. When calcium nitrate, $Ca(NO_3)_2$, is strongly heated, the lime is left in the form of minute crystals.

Manufacture.—Lime is prepared on a very large scale for technical purposes by heating the native carbonate almost always in the form of limestone. The process is called lime burning. It is almost always carried out in kilns, though more elaborate arrangements are sometimes used. The arrangement of the kilns is various; some are built up temporarily as required, others are more permanent structures and remain in use some time, the arrangement selected depending on the nature of the work which is to be done. Lime-kilns may in general be divided into two groups: (1) intermittent or occasional kilns, which are charged, burned out, allowed to cool and the contents removed; (2) continuous kilns, in which the burnt material is periodically removed and fresh stone added.

(1) The intermittent kilns are usually of very simple construction and consist of small shaft furnaces which are filled to the top with the limestone to be burned. They are about 12 feet in height and to save hoisting are always, if it is by any means possible, built at the side of a hill. Some of them are provided with fire bars and in others the fire is made on the floor of the kiln. The use of the grate is said to insure quicker and more complete combustion. Over the space where the fire is to be made an arch is built of the larger lumps of stone and the space above is filled with the stone broken into small lumps and mixed with small coal. The fire is lighted and combustion soon spreads to the mass of fuel above, the temperature rising to whiteness. The burning takes about two days, after which the kiln is let cool and the charge is drawn.

(2) The continuous kilns resemble in external form small blast furnaces, but no blast is used. They may be 20 feet or more in height and 6 or 8 feet in diameter. The masonry is cased with iron and is carried on a series of short columns, leaving openings all around by which the burnt charge can be drawn, an iron cone being erected in the center to throw the descending material outward. The limestone mixed with coal is added at the top and the burnt lime is withdrawn at the bottom. Such kilns are much more economical than the intermittent form and are used wherever the demand is sufficient to keep them going. In both these types of kiln the lime is mixed with the ash of the coal used, and to avoid this, which is sometimes objectionable, many kilns have been designed. Such kilns usually consist of a vertical stack provided with a series of fireplaces around it, so that only the gaseous products of combustion pass in among the limestone or in place of fireplaces burning coal, burners for gas may be substituted. Kilns of this type are as yet very little used.

The nature of the lime obtained will of course vary with the composition of the stone used. If a pure limestone has been burnt, the residue will be a pure or "fat" lime. Such a lime absorbs water very readily, slakes quickly, and evolves a large amount of heat. When made into a mortar it sets very slowly, the setting being entirely due to the formation of calcium carbonate by the action of the carbon dioxide of the air. This mortar is weak and friable.

When the limestone contains clay the lime is quite different in character; it slakes slowly, evolves very little heat, and mortar made from it sets independently of the action of the air, in many cases even under water. Such limes are usually called hydraulic limes. When such limestones are burnt chemical changes take place and very basic silicates and aluminates of lime are formed. When these are brought into contact with water they dissolve and much less soluble hydrated silicates and aluminates crystallize out and thus bind the whole into a solid mass. Highly hydraulic limes will set in a few hours; others may take days to solidify, but they yield very much stronger mortars than the fat limes. Silica intermixed in the form of sand does not impart hydraulic power to lime, it must be present in some form of combination which is easily broken up during burning and it is almost invariably present as clay. If the temperature of burning be too high, the lime will be overburnt, the hydraulic silicate broken up, and the resulting silicate may be partially fused, thus fritting the whole into a solid mass.

Lime comes from the kilns in white or, if iron be present, yellowish lumps which fall to pieces on exposure to air and moisture. Hydraulic limes are yellowish or gray in color and do not fall to pieces so readily on exposure to the air. When the amount of hydraulic material is very large the lime is called a cement.

Uses of Lime.—Lime is very largely used as the basis of mortars and cements and for many other purposes in the arts, for many of which it is indispensable. It is used as a flux in iron smelting (usually as carbonate), in the manufacture of bleaching powder, in the basic steel process (see STEEL), as a dressing for soils in agriculture, and for many other purposes.

Lime

Calcium Hydrate.— When lime is treated with water, combination takes place, much heat is evolved and the lime breaks down into a powdery mass of calcium hydrate, $Ca(OH)_2$ or $CaOH_2O$, the sp. gr. of which is 2.078. It is somewhat soluble in water, yielding limewater. The solubility varies with the temperature, decreasing as the temperature rises, the solubility being at 99° only about one-half of what it is at 0° C. If a solution of caustic potash be added to a strong solution of calcium chloride, calcium hydrate is precipitated, and if a saturated solution of the chloride be used the whole becomes solid. At a red heat calcium hydrate is decomposed, water is expelled, and lime is left.

Limewater.— This is a saturated solution of slaked lime (calcium hydrate) in water and is largely used in medicine. It has a distinct alkaline reaction and an astringent taste, and, as seen above, its strength will vary with the temperature. If exposed to the air, carbon dioxide is absorbed, a pellicle of carbonate forms over the surface and ultimately the whole of the lime may be precipitated. In order to avoid this and maintain the limewater at its proper strength, excess of lime should always be left in the vessel. To prepare limewater good lime is slaked, it is then shaken up with excess of water several times; the first two or three waters being thrown away as they contain the soluble salts, baryta, etc., mixed with the lime. It must be kept in closely-stoppered bottles. Milk of lime is limewater containing a large excess of lime.

Calcium Peroxide.— When limewater is treated with hydrogen peroxide or sodium peroxide in acid solution, calcium peroxide is formed, $CaO + H_2O_2 = CaO_2 + H_2O$. It is precipitated in the form of minute white crystals, CaO_28H_2O, isomorphous with hydrated barium peroxide. It is soluble in water, but insoluble in alcohol. On exposure to the air the crystals lose water and effloresce. At 130° C. they lose all their water and at slightly higher temperatures break up, evolving oxygen and leaving lime.

Haloid Compounds.— When lime is treated with one of the haloid acids, *i. e.*, hydrochloric, hydrobromic, hydriodic, hydrofluoric, haloid salts are formed by the replacement of the oxygen by the haloid element, forming calcium chloride, bromide, iodide, or fluoride, as the case may be.

Calcium chloride ($CaCl_2$) is obtained as a white porous mass by passing chlorine over red-hot lime. It melts at a red heat, with partial decomposition if exposed to the air; and on cooling solidifies to a crystalline mass, which, after exposure to sunlight, glows in the dark and is known as "Homberg's phosphorus," after its discoverer. When lime is dissolved in hydrochloric acid a solution of the chloride is obtained, and from saturated solutions crystals of a hydrated salt, $CaCl_26H_2O$, fall, which, heated in a vacuum over sulphurous acid to 200° C., becomes $CaCl_22H_2O$, and the remaining water can be expelled by heating to 200° C. Calcium chloride, whether anhydrous or hydrated, absorbs water very readily whence it is largely used in the laboratory as a dyeing agent. It deliquesces in air, forming an oily liquid once known as *oleum calcis.* It is very soluble in water, 1 part of the salt dissolving in about 1.6 parts of water at 10° and .72 parts of water at 60° C. The anhydrous chloride absorbs ammonia. Calcium chloride is widely distributed. It occurs in sea water and in many mineral waters. It is also obtained as a by-product in many manufacturing processes. When the chloride is fused at a high temperature with access of air it loses chlorine, takes oxygen and forms first an oxychloride and ultimately lime. Calcium bromide and calcium iodide are similar salts, but are of no importance. Calcium fluoride exists in nature as fluorspar.

Bleaching Powder.— When chlorine is passed over moist slaked lime it is absorbed and a body known as bleaching powder, or chloride of lime, $CaOCl_2$, is obtained. Judging from the empirical formula, it would look as if this body were actually a chloride of lime, and the fact that it is made by the direct absorption of chlorine seems to bear this out. It might also be regarded as being a mixture of the chloride, $CaCl_2$, and the hypochlorite, $Ca(OCl)_2$, in atomic proportions, but neither of these constitutions is borne out by the characters of the body or the analogy of similar substances. It is now generally regarded as being a chloro-hypochlorite, both the Cl and the OCl radical being united in the same atom of calcium, and its formula is written CaClOCl. Bleaching powder is a pure white powder sometimes containing lumps of lime which are only partially converted. It has a peculiar smell, somewhat different from that of chlorine. On exposure to the air it absorbs water, ultimately becomes pasty, and is slowly decomposed, evolving chlorine much more rapidly in the light than in the dark and the decomposition takes place rapidly under the influence of even weak acids, chlorine being liberated, *e. g.*, $CaOClCl + 2HCl = CaCl_2 + H_2O + 2ClCaOCl.Cl + H_2O + CO_2 = CaCO_3 + H_2O + 2Cl$.

As the bleaching power of the powder seems to depend on the liberation of chlorine, it is always valued by its amount of available chlorine, that is, the amount of chlorine which is evolved when the sample is treated with acid. When pure it should contain about 43 per cent. of available chlorine, but commercial samples usually contain about 35 per cent.

Bleaching powder is now made on a very large scale, the process consisting of three stages: (1) the preparation of chlorine, (2)

Lime

preparation of the lime, (3) the manufacture of its bleaching powder.

(1) The chlorine is always prepared by the action of hydrochloric acid on manganese dioxide. The dioxide is placed in stone or lead vessels provided with suitable stirrers and the acid is run in, heat being applied either externally or by blowing in steam as the evolution of gas slackens. The reaction is $MnO_2 + 4HCl = MnCl_2 + 2H_2O + 2Cl$. The residual manganese chloride solution is treated for the recovery of the manganese, which is again converted into the dioxide so that it may be used over again, thus reducing the consumption of the manganese oxide to a very small amount.

(2) The lime is made from as pure a limestone as is obtainable and is carefully burned. The presence of impurities reduces the value and tends to produce a poorly-colored bleach. If possible the limestone should be burned in a furnace in which it is not mixed with the fuel so as to become contaminated with the ash and the burning should be as complete as possible. The burnt lime is spread on a floor and slaked, it is then sifted and all unburnt or unslaked pieces are taken out. The finer the lime the more readily it absorbs the chlorine and the better the quality of bleach produced. A sieve of about 25 holes to the inch run is generally used. The slaked lime is allowed to cool and is then ready for use.

(3) The chlorination is carried on in a large chamber of stone or of lead, tarred inside, from 50 to 60 feet long, 25 to 30 feet wide, and 5 or 6 feet high. Three to six tons of lime is spread out on the floor of this chamber and chlorine is sent slowly in, care being taken that the temperature does not rise too high. The lime is left exposed to the chlorine for from 36 to 48 hours. The residue chlorine is then drawn off and the powder is packed in casks. One hundred parts of lime will absorb 64 to 66 parts of chlorine. The dust is excessively irritating, and great care must therefore be taken in handling it.

Carbonate of Lime ($CaCO_3$).— This substance occurs very abundantly in nature as calcite and aragonite forming limestone rocks and in the shells of marine animals. It is colorless or white, dissolves very readily in acids, carbon dioxide being evolved. It is insoluble in water but dissolves readily in water containing carbon dioxide in solution (which, in fact, may be regarded as being weak carbonic acid, H_2CO_3), with the formation of a bicarbonate, $CaH_2(CO_3)_2$, which is soluble in water. This reaction is of the utmost importance in nature. All natural waters contain carbon dioxide in solution, and therefore they are all more or less powerful solvents for the carbonate of lime which is so abundant in the crust of the earth. Natural waters therefore exert a powerful chemical action on limestone rocks, dissolving off all sharp corners, cutting out valleys and sinking into cracks, often dissolving out underground watercourses and leaving caverns which may ultimately become filled with some other deposit. As water which has thus been in contact with limestone rock evaporates, the carbon dioxide is expelled and the carbonate of lime is separated, forming deposits of calcium carbonate as tuff, stalactite, stalagmite, or in other forms. Some springs are so charged with carbonate of lime that the salt separates on any articles over which the water is made to flow, thus forming what are called petrifying or mineralizing springs. Ordinary waters, such as sea water, are not saturated with carbonate of lime, but contain more or less excess of carbon dioxide. The living organisms which secrete carbonate of lime have the power of extracting this from solution, this no doubt accounting to some extent for the free carbon dioxide in the water. When the animal dies the solvent power is no longer held in check and the shells, etc., may be slowly redissolved. Though therefore vast deposits exist, made up almost entirely of the shells of marine animals, these cannot be held to represent the whole of the life of the seas in which they were deposited.

The presence of lime salts in water is of great economic importance since they render the water hard and cause the destruction of soap. Soap is essentially the sodium or potassium salt of certain organic acids, such as stearic, palmitic, oleic. The alkaline or soap salts are soluble in water, but the salts of the alkaline earths or of the heavy metals are insoluble. Therefore when soap is added to water containing lime salts, double exchange takes place; lime soap is formed and separates as an insoluble sticky mass which has no detergent power and soap is therefore wasted. If the hardness be due to carbonate of lime held in solution in carbon dioxide, it can be removed by boiling; the carbon dioxide is then expelled and the carbonate of lime being precipitated the water is softened. Such hardness is therefore called temporary hardness to distinguish it from permanent hardness, which, being due to soluble lime salts, is not removed by boiling. Carbonate of lime thus thrown down by boiling, especially if other salts are present, also tends to form a "fur" or deposit on the inside of the vessel which is often very troublesome to remove.

Since the carbonate of lime is held in solution by the carbon dioxide in the water, if that could be removed the carbonate would precipitate and the water would be softened. This is done, as remarked above, by boiling, but other methods may also be used, the most common being the addition of limewater. The lime of the limewater combines with the carbon dioxide to form carbonate of lime which precipitates, together

Lime

with that which was held in solution by the carbon dioxide. Most of the commercial methods of water softening depend upon this reaction. Obviously any other substance that would combine with and remove the carbon dioxide, such as caustic soda or potash could be used, but in either case great care must be taken not to add excess and the alkaline carbonate formed would remain in solution.

Calcium carbonate is readily decomposed at a red heat, lime being left and carbon dioxide evolved. It is also decomposed by a boiling solution of ammonium chloride, calcium chloride being formed and ammonium and carbon dioxide evolved, $CaCO_3 + 2NH_2Cl = CaCl_2 + 2NH_3 + H_2O + CO_2$. It is also attacked by sulphur, calcium sulphide being formed.

Pure carbonate of lime can be easily prepared. The precipitated carbonate used in medicine is made by adding ammonium carbonate to a solution of calcium chloride. It comes down as white crystalline precipitate, anhydrous if the temperature be above 30° C., but in combination with varying quantities of water at lower temperature. It is also formed by passing carbon dioxide over lime.

Bicarbonate of lime, as mentioned above, exists in solution, but it decomposes so readily that it has never been isolated. A basic carbonate, $CaCO_3CaO$, is known. When treated with water it hardens, a hydrated basic carbonate, $CaCO_3Ca(OH)_2$, being formed.

Calcium Carbide.— Carbon has no action on lime at ordinary furnace temperatures, but at the intense heat of the electric furnace a reaction takes place, carbon monoxide is evolved, and a compound of calcium and carbon (calcium carbide, CaC_2) is left. Thus, $CaO + 3C = CaC_2 + CO$.

Calcium carbide is now made on a large scale for the production of acetylene. A mixture of carbon in the form of powdered charcoal or coke and lime is placed in a carbon-lined vessel and a very powerful electric current is passed through the mixture from carbon electrodes, the decomposition taking place as above. The current used is about 2,000 or more ampères at 100 volts, and the amount of carbide obtained is about .37 pound per horsepower hour of energy expended. The carbide is left in the form of a gray unfused but sintered mass which is broken up and put away in air-tight cans. It is decomposed by water, with the production of acetylene — thus, $CaC_2 + H_2O = Ca + C_2H_2$ — and therefore must be kept perfectly dry. The decomposition evolves a large amount of heat.

Sulphate of Lime ($CaSO_4$).— This occurs widely distributed in nature in the anhydrous form as anhydrite and hydrated as gypsum. It is a white solid, very sparingly soluble in water, the solubility decreasing as the temperature rises. It is slightly more soluble in dilute acids. When the native hydrated sulphate is heated it loses part of its water very readily, but retains the last portions with great tenacity so that dehydration is not complete below a red heat. When the sulphate has been dehydrated in this way it retains the property of solidfying rapidly when mixed with water and is known as plaster of Paris. This setting power is due to the solution of the anhydrous sulphate in water and its almost instant crystallizing out as the hydrate. When the sulphate is heated to strong redness it is completely dehydrated and loses its power of setting with water. Advantage is taken of these properties in the making of plaster casts. The partially dehydrated sulphate is made into a paste with water and poured into the mold where it sets rapidly. When set, the cast is removed and ignited at a red heat so as to expel the water. Plaster of Paris sets more quickly than any other hydraulic material, but it cannot be used in places where it is exposed to the weather on account of its solubility in water.

The sulphate is readily prepared by the addition of a soluble sulphate to a strong solution of any soluble calcium salt. In dilute solutions its precipitate forms very slowly and if they are very dilute not at all.

Calcium sulphate in solution renders water hard. This hardness not being removed by boiling is called permanent hardness to distinguish it from the temporary hardness due to calcium carbonate. If sodium carbonate be added to water containing calcium sulphate the carbonate is formed and is precipitated. Hence the use of sodium carbonate (washing soda) for washing with hard waters.

Calcium sulphate is a very objectionable impurity in water for boiler use, and it is the principal ingredient of most of the scales or deposits which form in boilers. Since it is only sparingly soluble, water is easily saturated with it, and as the water boils away, the salt is therefore precipitated; and further it becomes much less soluble as the temperature rises, and in a high-pressure steam boiler, where the temperature is considerably over 100° C., it may be completely precipitated even without the evaporation of any water.

Phosphate of Lime.— Several phosphates of lime are known. The ordinary tricalcic phosphate, $Ca_3(PO_4)_2$, is insoluble in water. It forms a large proportion (about 60 per cent.) of the mineral portion of the bones of all animals. All plants require phosphate for food and these are usually supplied in the form of phosphate of lime. The ordinary phosphate being insoluble could not be taken up by the plants, or at any rate only very slowly, as it is decomposed by the acids of the soil. When it is acted

Lime

on by acids however, it is converted into a soluble phosphate, the monocalcic phosphate or superphosphate which is very largely used for manurial purposes. It is prepared by mixing ground bones or finely powdered natural phosphates with sulphuric acid, when calcium sulphate and monocalcium phosphate (superphosphate) are produced, thus $Ca_3(PO_4)_2 + 2H_2SO_4 = 2CaH_2PO_4 + 2CaSO_4$. Another phosphate is known — the tetrabasic phosphate of lime — which is more basic than the normal phosphate, and has the formula $Ca_4P_2O_9 = Ca_3P_2O_8.CaO = 4CaO\ P_2O_5$, the formula being usually written in the last way. It is the principal constituent of the slag which is obtained from the basic Bessemer process and which is known as "basic slag" and has a high manurial value.

The other salts of lime are of little importance and are best prepared by dissolving lime in appropriate acids. The nitrate, $Ca(NO_3)_2$, occurs in the forms of colorless crystals, $Ca(NO_3)_2 4H_2O$, which are very soluble in water. This salt is slowly formed wherever lime or carbonate of lime is brought in contact with decaying nitrogenous matter, and therefore it occurs in the floors and walls of stables and similar buildings where organic matters are left to putrefy in presence of lime mortar, and, being soluble, it causes rapid disintegration of the mortar. It is prepared as a stage in the manufacture of niter in warm climates by leaving heaps of lime or chalk or marl mixed with decaying organic matter exposed to the air for some years and repeatedly watering with urine, stable refuse, or similar material. The mass is then washed with water and the calcium nitrate with other salts is dissolved out. When heated to incipient fusion the salt loses water, undergoes partial decomposition and becomes phosphorescent, hence it is called "Baldwin's phosphorus."

Silicates.— Silicates of lime are known, but only a few have been isolated. Slags from the iron smelting blast furnaces consist of a mixture of silicate of lime with silicate of alumina and other bases, having approximately the formula $Ca_2SiO_4 = 2CaO\ SiO_2$, but both more acid and more basic silicates are known. The fusibility of the silicates increases as the quantity of lime increases, the basic silicates being much more fusible than the acid silicates. When silicates containing much more lime than the normal silicate (Ca_2SiO_4) are cooled from fusion there is always a tendency for lime to separate. Slags containing such silicates, therefore, often break up on exposure to the air, owing to the slaking of the intermixed lime. When the normal silicate is gently heated with lime, combination takes place and a more basic silicate is formed. This is one of the principal constituents of Portland and similar hydraulic cements. When it is mixed with water, the anhydrous silicate dissolves and a hydrated silicate at once crystallizes out, thus binding the mass together and enabling it to set under water.

The more basic silicates of lime are decomposed by acids with the separation of silica, but the less basic ones are not acted upon.

Occurrence of Lime in Nature.— Owing to the readiness with which calcium combines with oxygen, and lime with water and acids, neither the metal nor the oxide occurs free in nature, but the lime salts are very widely distributed, many of the minerals being very abundant.

Calcium carbonate occurs forming rock masses and in two distinct mineral forms. As rock masses it constitutes limestone. Limestone is very widely distributed. It occurs in almost all geological ages and varies in character from soft chalk to hard and crystalline marble. Chalk is a soft limestone, so soft that it will mark a hard surface. It forms beds of great thickness among the formations of Cretaceous age and is well developed in the South of England, where the deposits attain great bulk (see GEOLOGY). It is also largely developed in other parts of the world. Chalk was certainly formed at the bottom of the sea and so far from land that it did not become contaminated with mud brought down by the rivers, and there is every reason to believe that exactly similar deposits are now being formed in the depths of the Atlantic and other oceans. Chalk is made up almost entirely of the shells of foraminifera and other minute forms of life, each being so small as to require a microscope for its detection, yet they exist in such quantity that in the aggregate they form vast deposits, The chalk is very frequently associated with flints, the silica of which is probably derived from the numerous minute plant forms which have a siliceous skeleton and which are very abundant in the sea.

As carbonate of lime is readily dissolved by water containing carbon dioxide, and as chalk contains only a minute quantity of earthy impurity, very little soil is left by its disintegration and chalk districts are not therefore very fertile. Also as chalk is very pervious to water, water readily sinks into it and dissolves out channels for itself underground, so that chalk districts are usually lacking in streams.

The older and harder limestones are probably in most cases also of organic origin, though such changes have taken place that the individual organisms can no longer be detected. They are often very fine-grained in structure; sometimes they are made up of minute rounded grains or concretions, so that they look almost like the roe of a fish — hence the name, oölitic limestones — or even larger grains, forming pisolites or pea stones. The hard limestones are often colored by the presence of

impurities, brown by the presence of oxide of iron, or black by bituminous organic matter. Flints are usually absent, but silica is always present in larger or smaller quantity. When the limestone has been acted on by heat or pressure, or heated water, or by these combined, it undergoes a change — the original structure is lost, and it becomes compact and crystalline, the crystals usually being very small. Such a rock is called a marble. It may be colorless or colored by the presence of impurities, or it may contain impurities such as oxide of iron, or organic matter so distributed as to give the marble a characteristic veining or marking, which is sometimes very beautiful. The coarse limestones and marbles are used for burning for lime and other purposes. The well-marked varieties are largely used for ornamental purposes. Carbonate of lime exists in most soils; where much is present the soil becomes a loam.

There are deposits of carbonate of lime which have been formed by purely chemical means, by precipitation, such as the calcareous tufas, etc. The best known forms of precipitated carbonate of lime are probably the stalactites and stalagmites which are found in so many caves in limestone rocks. Calcium carbonate, as already said, occurs in two distinct mineral forms, namely, calcite and aragonite, the former being far the more common form. It occurs massive or crystalline. When pure, the crystals are colorless and glassy, the most transparent form being known as Iceland spar.

Calcium sulphate occurs in two forms, namely, hydrated as gypsum and anhydrous as anhydrite. Gypsum crystallizes in the monoclinic system in flat plates or arrow-head forms. The cleavage is very perfect, parallel to the flat faces of the plate, so that it breaks up quite readily into thin plates with an almost pearly luster. The crystals are often as transparent as glass, and have a luster between glassy and pearly. Crystals of very large size have been obtained. The large transparent crystals are called selenite. It also occurs in white granular masses, when it is known as alabaster, and in finely fibrous masses as fibrous gypsum or satin spar. (See GYPSUM.) A calcium phosphate occurs as apatite. Apatite is widely distributed, occurring mainly in metamorphic rocks and very large crystals have been found. The pale green varieties are used for ornamental purposes under the name of asparagus stone, and the varieties known as mineral phosphate are largely used in the manufacture of manure, by conversion into superphosphate by treatment with sulphuric acid.

Among other lime minerals may be mentioned scheelite, a calcium tungstate of a yellowish color; ulexite, a borate of calcium and sodium, used to a small extent in the manufacture of borax. There are also many minerals containing lime with other oxides, as for instance dolomite, which is a carbonate of lime and magnesia; and there are many silicates in which lime is present.

Detection of Lime.— Lime is usually readily detected. In the first place lime compounds moistened with hydrochloric acid and held in the flame of the Bunsen burner or blowpipe, impart to the flame a brick red color. Secondly, almost all lime compounds are soluble in acids, and in the solution lime can be detected after the removal of metals thrown down by sulphuretted hydrogen, ammonia, and ammonium sulphide. The addition of ammonia in excess, and then ammonium carbonate. throws down a white precipitate of calcium carbonate. The addition of ammonia and then ammonium oxalate throws down a white precipitate of calcium oxalate. If the solution be strong, sulphuric acid throws down on standing a white precipitate of calcium sulphate. As baryta and strontia give similar reactions they must be removed before the tests are applied.

Lime, the genus *Tilia,* and specially the species *T. parviflora.* It is a small tree, generally glabrous, except on the axil of the nerves on the inner side of the leaves; these are ovate-cordate acuminate. The lime tree grows to a great size on the Continent of Europe. The honey made from it is considered very fine. The sap yields a kind of sugar. The bark is made into ropes and mats, and formerly was used for writing tablets. The wood is soft, light, smooth, close-grained, suitable for carving. It is not much attacked by worms. It is made into light bowls, dishes, boxes for apothecaries, and dressers for shoemakers. The twigs are manufactured into baskets and cradles.

Lime, in botany, *citrus limetta,* more fully called the sweet lime. It grows about eight feet high, with a crooked trunk and many-diffused branches armed with prickles. The leaves are ovate-lanceolate, nearly entire. The fruit, which is greenish-yellow, is almost globular, except that there is a protuberance at the top; the surface is regular; shining rind. It is about an inch and a half in diameter. The juice is very acid. There are various cultivated varieties. Some believe it a variety of *Citrus medica,* the citron.

Lime Light, or **Drummond Light,** a light of extreme brilliancy, invented by the English Lieutenant Drummond, consisting of a jet of oxygen and hydrogen, mixed in the proportions to form water, directed upon a cylinder of lime. The lime, which is infusible, becomes white-hot, and emits a pure white brilliant light of such intensity that it has been distinctly seen at a distance of 112 miles.

Limerick, capital of Limerick Co., Ireland, at the head of the estuary of the Shannon; 120 miles S. W. of Dublin. The town consists of English Town, the original English settlement made in the reign of King John, on King's Island; Irish Town, which lies immediately to the S., on the left bank of the river; and Newton-Pery, to the S. of Irish Town, the newest and handsomest part of the city, dating from 1769. There are few objects of interest except the Protestant Cathedral of St. Mary, founded in 1180, and rebuilt in 1490; the Roman Catholic Cathedral, a Gothic structure erected in 1860; and the fine bridge across the Shannon. Pop. (1901) 39,873.

Limestone. See LIME.

Limnæa, or **Limnæus,** a name for the pond snail; the typical genus of the family *Limnæidæ*. The shell is spiral, more or less elongated, thin, and translucent, the body whorl large, the aperture rounded in front, the columella obliquely twisted. Animal with a short, broad head, tentacles compressed, lingual teeth, about 110 rows.

Limited Liability. Liability is said to be limited when the persons liable are bound under clearly-defined conditions. The phrase is chiefly used in connection with stock companies, and in that connection it means that the stockholders shall not be called upon, under any circumstances, to contribuate more than the par value of the shares of stock for which they have subscribed. If the debts of such a company, when wound up, amount to more than the resources of the company can meet, the creditors must bear the loss.

Limited Monarchy, a monarchy in which the power of the sovereign is not absolute, but is constitutionally limited, usually by assemblages of the nobility, clergy, and elected representatives of the people. The sovereignty is a headship more or less real; it is not an autocracy.

Limoges (lē-mōzh'), capital of the French department of Haute-Vienne, and of the former province of Limousin. The staple industry is the manufacture of porcelain, which employs more than 5,000 people. Pop. (1901) 83,569. The enamel work, once famous, is now no longer carried on.

Limon, a port of Costa Rica, founded in 1861, on the Caribbean Sea. The railway begins here, and the place has a landing pier. There are considerable exports from this place of coffee, caoutchouc, cocoanuts, sarsaparilla, vegetables, wood, and hats.

Limonite, hydrous ferric oxide. This mineral occurs most frequently in the form of fibrous aggregates, or earthy and amorphous masses, and never in that of definite crystals. It has a hardness of 5.5, sp. gr. of 3.3–3.9, and a yellowish-brown streak. It is the yellow coloring matter of chalybeate springs. Rocks containing iron are often stained brown or yellow from the conversion of the iron into limonite.

Limosa, a genus of wading birds, suborder *Longirostres*. The bill is very long, either straight or inclining a little upward, flattened and dilated toward the top, tarsus longer than the middle toe, hinder one very small. *L. melanura* is the godwit.

Limousin (lē-mö-sa*ng'*), an ancient province of France, inhabited by the Lomovices, was wrested from the Visigoths by Clovis I., King of the Franks, in 507. It was included in Guienne, and afterward made a separate province for the possession of which the kings of France and England waged frequent war. Richard I. lost his life from a wound received while besieging the castle of Chalus-Chabrol, in Limousin, March 26, 1199. Philip II. seized it in 1203, but Louis IX. restored it to the English in 1259, and it was united to France in 1370. It was united to the French crown by Henry IV. in 1589. It is now distributed into the departments of Corrèze, Creuse, Haute-Vienne, and Dordogne.

Limpet, a popular name for any of the prosobranchiate gasteropods of the family *Patellidæ* and (more properly) of the genus *Patella*. The shell is usually oval and tent-shaped; interior smooth, but not nacreous; the outside rough or with radiating ribs; the margin sometimes spiny. Limpets are world-wide in their distribution. They are vegetable feeders, and inhabit rocks between tidemarks, returning to the same place after feeding, and adhering so firmly that it requires a great effort to detach them from their resting-place, which is worn into a smooth concavity beneath the foot of the animal. It is much used by fishermen for bait, and in times of scarcity, for food. Vast quantities fall a prey to the sea and shore birds. The oyster catcher (*Hæmatopus ostralegus*) is exceedingly dexterous in detaching these mollusks from the rocks, and scooping the animals from their shells.

Limpopo, or **Crocodile River,** a river of Southern Africa, which rises in the Transvaal not far from Pretoria, flows N. W. then N. E., forming for a considerable distance the boundary of the Transvaal, then S. E. into the Indian Ocean, N. of Delagoa Bay; length about 1,100 miles.

Limulus. See KING-CRAB.

Linacre, or **Lynaker, Thomas,** an English physician and scholar; born in Canterbury about 1460. Henry VII. made him tutor to Prince Arthur and king's physician. This latter office he continued to fill during the reign of Henry VIII. At the same time he practised in London; he also founded the Royal College of Physicians. Late in life he took orders and held several benefices. He died in London, Oct. 20, 1524.

Linares, a town of Southern Spain, 90 miles by rail E. N. E. of Cordova, is celebrated for its mines of lead and copper, which produce about 80,000 tons of argentiferous ore annually. There are in the town lead and iron foundries, and gunpowder and dynamite factories. Pop. (1900) 38,245.

Lincoln, a city of England and a county in itself; capital of Lincolnshire; 120 miles N. of London; on the Witham, and at the junction of several railroads. It has been identified with the Roman Lindum Colonia, and at the time of William the Conqueror was a place of considerable strength and importance. The principal edifice is the cathedral, situated on a height (dating from the eleventh century), chiefly in the Early English, but partly also in later styles, with a tower over 260 feet high, in which is the famous bell known as "Great Tom of Lincoln," cast in 1610, cracked in 1827, and since recast into a new bell. The other most conspicuous buildings are the Guild-hall or Stone-bow (of the time of Richard III.), the remains of the castle which was founded by William the Conqueror, the old episcopal palace, and the fine old Roman arch spanning Hermin street, a theological college, a school of art, etc. The manufacture of agricultural implements and machinery forms the chief branch of industry. Pop. (1901) 51,751.

Lincoln, a city of Illinois, county-seat of Logan co.; on the Illinois Central, the Chicago and Alton, and the Peoria, Decatur and Evansville railroads; 28 miles N. E. of Springfield. It is in an agricultural, mining, and stock-raising region; and has four coal mines, grain elevators, planing mills, roller mills, and casket factories. It is the seat of Lincoln University (Presb.), and of the State Asylum for Feeble Minded Children, and Odd Fellows' Orphans' Home; and has a high school, electric and street railroad plants, water works, National banks, daily and weekly papers, and an assessed property valuation of $750,000. Pop. (1890) 6,725; (1900) 8,962; (1910) 10,892.

Lincoln, a city of Nebraska, capital of the State and its second city in population; county-seat of Lancaster co. It is situated in the S. E. part of the State, 54 miles S. W. of Omaha, and about 70 miles from the Kansas border, covers an area of about 7⅓ square miles, and had a population estimated in 1908 at nearly 60,000. The city is surrounded by numerous suburbs, including Havelock, University Place, Bethany Heights, and College View.

Topography and Buildings.—Lincoln occupies an almost level site, rising gradually to the S. E. Farm-studded hills of moderate height surround it on all sides except the W., where the land is level and is drained by the Salt creek in its winding course from S. W. to N. E. To the E. the city is traversed from S. to N. by the meandering Antelope, an affluent of Salt creek. The streets, of which about 30 miles are well paved, are regularly laid out, crossing each other at right angles. They generally have a width of 100 to 120 feet, are bordered with trees, and the houses are surrounded with lawns. Small detached homes are the rule. The more fashionable quarters are in the S. and S. E. The most prominent public buildings are the State Capitol, of white limestone, with a dome 250 feet high; the Federal building (post office, court house, etc.), completed in 1906, at a cost of $350,000; the county court house, with a dome supporting a statue of Abraham Lincoln; the city hall, formerly the post office; the Carnegie Library; and the Auditorium, with nearly 5,000 seats, used for conventions, agricultural and food exhibitions, etc. The State penitentiary is S. of the city. There are 4 theaters and several large hotels.

Churches and Charities.—There are about 50 churches, among which may be especially mentioned St. Paul's (M. E.), the Second Presbyterian, Holy Trinity (P. E.), and St. Theresa's Procathedral (R. C.). The charitable institutions include the State insane asylum, to the S. W. of the city, St. Elizabeth's Hospital, Catholic Orphans' Home, Home of the Friendless, and Tabitha Home, under control of the Lutheran denomination.

Parks.—The first systematic attempt at improving the park spaces was made by the City Improvement Society, composed of women. In 1905 a park commission was appointed, whose first efforts were directed toward securing, by donation and by purchase, several plots of ground in the S. E. part of the city, in the wooded Antelope valley, comprising over 80 acres. It is planned to extend this park system toward the N. as far as the State Fair grounds, at the confluence of the Antelope and Salt creeks, and ultimately to acquire and improve lands in the W. part of the city. In this direction there are already 3 private parks—Capital Beach park, in the N. W., a public pleasure resort in both summer and winter, with 750 acres of land and 450 acres of lake; and Lincoln and Epworth parks, in the S. W., with lake, stream, and woods.

Education.—Lincoln is the foremost educational center in the Missouri valley. At the head of its educational institutions stands the University of Nebraska. The Nebraska Wesleyan University is located in the suburb of University Place, Cotner University at Bethany Heights, and Union College at College View. Other educational institutions include the Nebraska Military Academy, the Convent of the Holy Child Jesus, a Lutheran and several Roman Catholic parochial schools, etc. The public school system comprises a high school with 1,132 pupils in 1907, 16 elementary schools

Lincoln

with 6,880 pupils, and a total of 219 teachers. The annual public school expenditure is about $200,000.

Industry, Commerce, and Transportation.—The manufacturing industries of the city comprise foundry and machine shops, flour and grist mills, lumber and planing mill products, saddlery and harness, hardware, structural ironwork, electrical machinery, cars and general shop construction and repair by steam railroad companies, carriages and wagons, furniture, marble and stone work, brick and tile, paints, mirrors, printing and publishing, mattresses and upholstered furniture, overalls and shirts, gasoline engines, grain graders, corn planters, incubators, gloves, cigars, confectionery, etc. One of the largest broom factories west of the Mississippi is located here. Lincoln is also headquarters for the Beatrice Creamery Co., the largest manufacturers of butter and cream products in the United States. In the suburb of Havelock are the construction and repair shops of the Chicago, Burlington, and Quincy railroad, employing 500 men. According to the United States Census of Manufactures of 1905, the number of factories—exclusive of neighborhood industries and hand trades and of the factories in the suburbs—was 128, with $4,421,000 of capital, 2,062 wage-earners (exclusive of 381 salaried officials and clerks), who received during the year $853,000 in wages, used materials valued at $2,691,000, and turned out products valued at $5,223,000. According to local information, the total value of manufactured products in 1907 was $9,206,000, including butter and cream products, $2,935,000; printing and publishing, $1,150,000; harness, saddlery, and leather, $750,000; paints and oils, $540,000; sashes, doors, and woodwork, $440.000; brick and stonework, $450,000; brooms and brushes, $325,000; mattresses and upholstered goods, $310,000; shirts and overalls, $395,000. The city is the market and shipping point of a fertile agricultural and dairying region. The wholesale trade of 1906 was valued at $22,430,000, including groceries and fruits, $5,500,000; butter and eggs, $3,850,000; lumber, $1,400,000; harvesting and threshing machinery, $1,375,000; harness and saddlery, $1,090,000; paints, oils, and glass, $975.000; paper, cigars, and drugs, $700,000; furniture, mattresses, and upholstery, $590,000; clothing and furnishings, $695,000; plumbing and water supplies, $590,000; hardware, $560,000. Other important articles of commerce are woodwork, flour, feed and hay, brooms and whisks, confectionery, jewelry, millinery, crockery, seeds, coal, oils, etc. Lincoln is a center of life, fraternal, and fire insurance, and it has 4 National, 1 State, and 2 savings banks, with deposits aggregating $7,915,033 in 1906. The clearing-house report for the year ending Dec. 31, 1907, showed exchanges amounting to $67,559,566. Real estate transfers in 1906 amounted to $6,982,431 and in 1907, $6,851,815. The city is entered by 12 lines of railway belonging to 5 trunk lines—the Burlington, Northwestern, Rock Island, Missouri Pacific, and Union Pacific. In 1905 there were shipped in and out 54,494 carloads, against 35,689 in 1902. Local transportation is furnished by the Lincoln Traction Co., with 37 miles of track in 1907, the company also furnishing heat, light, and power to homes and factories; and by the Citizens' Railway Co., which began operations in 1906. The electric interurban railway between Omaha, Lincoln, and Beatrice was partially completed in 1907.

Administration and Public Affairs.—The city is governed by a mayor, elected biennially, and a unicameral council, other elective officials being the city treasurer, auditor, attorney, engineer, water commissioner, and police judge. Several of the administrative officials are appointed by the mayor with the consent of the council. The city owns the water works, which yield a net profit, and the municipal electric lighting plant, which was acquired in 1905 at a cost of $86,691. The annual expenditure, exclusive of that for schools, is about $400,000. The municipal debt stood at the beginning of 1907 at $1,368,000, and the municipal property was valued at $1,708,000 (including the water plant, $1,351,000, the city library, $121,000, etc.). Saloons are restricted to the downtown section, and their number is unusually small.

History and Population.—The first settlement near the site of Lincoln was made in 1857 on the banks of the Salt creek. In 1859 the site was chosen for the location of a city to be named Lancaster, but in 1864, when the city was platted, there were barely a dozen settlers. Nebraska was admitted to the Union in March, 1867, and in August following Lancaster was chosen as the capital and its name changed to Lincoln. The saline springs, which furnished salt to Indian and buffalo, overland emigrant, and early settlers, seemed to offer great commercial prospects and determined the choice of the capital. The growth of Lincoln has been substantial and its importance among cities has steadily increased. Population, 1870, 2,441; 1880, 13,003; 1890, 55,154; 1900, 40,169; 1910 (census) 43,973. The census of 1890 is regarded as defective, and the actual number of inhabitants in that year is supposed to have been exaggerated by about 20,000. In 1900 the population consisted of 20,726 males and 19,443 females, and included 814 negroes, making 2 per cent. of the total population, and 5,297 foreign born, or 13.2 per cent. of the total. The most numerous elements among the latter were 1,367 Germans, 688 Scandinavians, 596 English, Scotch, and Welsh, and 447 Irish. *Revised by* CHARLES W. BRYAN.

Lincoln

Lincoln, Abraham, an American statesman and 16th President of the United States; born in Hardin co., Ky., Feb. 12, 1809; the son of Thomas Lincoln and Nancy Hanks, and a descendant of Samuel Lincoln, who came from Norwich, England, to Hingham, Mass., in 1638. The family removed in 1816 to Spencer co., Ind., and for many years Abraham was engaged in hard work with little schooling. In 1830 the family removed to Macon co., Ill., and subsequently he was for some time in charge of a store and mill at New Salem. On the breaking out of the Black Hawk war in 1832 he joined a volunteer company and was elected captain of it, a promotion which gave him more pleasure than any subsequent success in his life. He served three months in the campaign. He next opened a country store which did not succeed; was appointed postmaster of New Salem, and began to study law by borrowing books from a neighboring lawyer. At the same time he turned amateur land surveyor. In 1834 he was elected a member of the Illinois Legislature, to which he was again returned at the three following biennial elections. In 1836 he was licensed to practise law, and in 1837 he removed to Springfield and opened an office in partnership with Maj. John F. Stuart. He soon became distinguished as an advocate in jury trials. He still continued to take a prominent part in party politics, and in 1844 he canvassed the whole of Illinois and part of Indiana making almost daily speeches to large audiences on behalf of Henry Clay. In 1846 he was elected a Representative to Congress. He voted steadily in Congress with the Anti-slavery party, especially opposing the extension of slavery to new territories. In 1849 he was a candidate unsuccessfully for the United States Senate. Till 1856 he continued to pursue his profession taking at the same time an active share in party political movements in Illinois. In the presidential election of that year he worked strenuously for Fremont, and his own name was mentioned in connection with the vice-presidency.

In 1858 he was nominated by the Republican State Convention as candidate for the United States Senate in opposition to Stephen A. Douglas. The two candidates canvassed the State together, addressing everywhere the same meetings. In this canvass when pressed by his opponent he admitted the right of the Southern States to a fugitive slave law and declared that while determined to keep slavery out of the territories, if any territory demanding admission to the Union should deliberately adopt a slave constitution he saw no alternative but to admit it into the Union. He gained a majority on the popular vote of about 4,000, but Douglas was elected Senator by the Legislature by a majority of eight on joint ballot. This defeat only inspired Lincoln and his supporters with fresh determination and induced them to aim at a higher achievement.

In the Republican National Convention held at Chicago in May, 1860, he was nominated as a candidate for the presidency and after several votes for diminishing the number of candidates, in which he ranked below Seward, he gained a majority over him and was eventually chosen unanimously. The other candidates for the presidency were his old opponent Douglas, Breckinridge and Bell. This division of his opponents proved fatal to the Democrats or Southern party, who for a long period had uniformly carried the presidential elections. Lincoln had a majority of very nearly 500,000 votes over Douglas, while the other two Democratic candidates divided more than 1,250,000 votes between them. The Southern States, exasperated at this defeat, and alarmed at the aggressive anti-slavery policy which many of the leading Republicans had proclaimed their determination to follow in the event of success, refused to acquiesce in Lincoln's election, and on the doctrine of the sovereignty of the States and the voluntary character of the Union, began one after another to announce their secession and to organize the means of resisting the enforcement of the claims of the Federal government. This movement began during the closing period of the administration of Buchanan, the interval which, according to the Constitution, intervenes between the election of a President and his assumption of office. This circumstance was probably unfortunate for Lincoln, as no position could be less suitable for resisting such movements than that of a retiring President, and when Lincoln took the reins, secession had had time to acquire irresistible impulse. The election of Lincoln took place in November, 1860, and he assumed office on March 4, 1861. In this fatal interval the time of conciliation if it had ever existed passed away. It was the intention of Lincoln to use every means of conciliation consistent with the policy he deemed it essential to the national interest to pursue. On one point, however, his resolution was steadfast, to admit no secession, and before his assumption of office secession was as resolutely determined on, by the other side. On Feb. 4 the Southern Confederacy had been constituted, and on April 14 the first blow in the Civil War was struck by the capture of Fort Sumter by the Confederates.

The events of the next four years in Lincoln's career belong to the history of the United States, where they will be dealt with in more detail. The spirit in which the war was conducted by the President, and his qualifications for guiding the State through the crisis in its affairs, of which his

election had been the occasion, were aptly indicated in his advice to his generals when the long succession of Southern victories had raised keen discussion in the North as to the proper policy for pursuing the war. While not indifferent to suggestions as to tactics, the President's final prescription was to "keep pegging away"; and it was his persistence in raising and pouring in fresh troops after every disaster that, in spite of deficient generalship and faulty tactics in their earlier campaigns, finally enabled the Federal government to subdue the secession. Without this, which was Lincoln's share of the work, the military capacity of Grant and Sherman would never have had the opportunity of becoming manifest. Another feature of President Lincoln's policy which demands notice was displayed in his successive proclamations abolishing slavery. As we have seen, this formed no part of his previous policy as a statesman. It was suggested by the exigencies of war, but a revolution of such social magnitude could never have been undertaken on the dictation of a war policy alone. The toleration of slavery was always in Lincoln's opinion an unhappy necessity; and when the Southern States had by their rebellion forfeited their claim to the protection of their peculiar institution, it was an easy transition from this view to its withdrawal.

The successive stages by which this was effected — the emancipation of the slaves of Confederates, and the offer of compensation for voluntary emancipation, followed by the constitutional amendment and unconditional emancipation without compensation — were only the natural steps by which a change involving consequences of such vast extent is reached. The determination of the Northern States to pursue the war to its conclusion on the original issue led to the reëlection of Lincoln as President in 1864. The decisive victory of Grant over Lee on April 2, 1865, speedily followed by the surrender of the latter, had just afforded the prospect of an immediate termination of this long struggle when, on the 14th of the same month, President Lincoln was shot in Ford's Theater, Washington, by John Wilkes Booth (brother of the better-known actor Edwin Booth), and expired on the following day. Booth, who escaped for the time, had no personal enmity to the President but was a fanatical adherent of the Southern cause. Vice-President Andrew Johnson at once became President. Lincoln received a magnificent funeral, being buried in Oak Ridge Cemetery, near Springfield, Ill., where a fine monument to his memory was dedicated in 1874. This sudden termination of Lincoln's career gave a sort of sanctification to his character and time has not lessened the veneration and affectionate regard which the citizens of the republic entertain for him. He is universally looked upon as the savior of his country and Washington himself holds no higher place in the hearts of the American people. Simple and even careless in dress and demeanor, shrewd and penetrative in his judgment of men, humorous himself and fond of humor in others, he was much more of a representative American than Washington.

Lincoln

Lincoln, Benjamin, an American military officer; born in Hingham, Mass., Jan. 24, 1733, and lived as a simple farmer till he was 40 years of age. On the breaking out of the Revolution he began his military career and was rapidly promoted. Appointed chief in command of the S. division of the army, he led the American forces against the British at Charleston and Savannah. He was forced to capitulate when in possession of the former place, by Sir Henry Clinton, in 1780. Notwithstanding the failure of his Southern campaign, the bravery and capacity of Lincoln were left untarnished, and after being imprisoned, he was, on his exchange in 1781, received with honor by Washington and appointed to the command of the central division at the siege of Yorktown. On the surrender of Cornwallis he was deputed to receive the submission of the captured troops. In 1781 he was chosen by Congress Secretary of War, and served in that office for three years, when he returned to his farm; but was called in 1786 and 1787 to command the militia in repressing Shay's insurrection. In 1787 was elected Lieutenant-Governor of Massachusetts. In 1789 was made collector of the port of Boston, which post he held for 20 years. In 1789 was commissioner to treat with the Creek Indians; and in 1793 again, to make peace with the Western tribes. He was the author of various papers, historical, agricultural, etc. He died in Hingham, Mass., May 9, 1810.

Lincoln, Charles Perez, an American lawyer; born in Quincy, Mich., Oct. 7, 1843; was educated at Hillsdale College; enlisted in the United States army for three months' service at the beginning of the Civil War; at the end of which he raised a company of his own of which he was made captain. He served in this post till mustered out of the service in June, 1864. He was admitted to the bar in 1871; consul to Canton, China, in 1875–1881, when he returned to Washington and began to practise. He was elected Commander of the Department of the Potomac, G. A. R., in 1888; and was appointed Second Deputy Commissioner of Pensions in 1889.

Lincoln, David Francis, an American hygienist; born in Boston, Mass., Jan. 4, 1841; was graduated at Harvard University in 1864 and at its Medical School in the same year; acting assistant surgeon in the United States navy during part of the

Civil War; and later practised as specialist in various diseases. He was the author of "Electro-Therapeutics"; "School and Industrial Hygiene"; "Hygenic Physiology," a text-book; "Sanity of Mind"; "Reports on School Hygiene"; and wrote articles on "School Hygiene" in Burke's "Hygiene and Health," and in Keating's "Cyclopædia of the Diseases of Children."

Lincoln, Levi, an American lawyer; born in Hingham, Mass., May 15, 1749; was graduated at Harvard College in 1772; held a seat in the Massachusetts House of Representatives in 1796, and in the State Senate in 1797; was a member of Congress in 1800–1801; then appointed attorney-general of the United States, and later acting Secretary of State for a short period. He died in Worcester, Mass., April 14, 1820.

Lincoln, Robert Todd, an American diplomatist; born in Springfield, Ill., Aug. 1, 1843; eldest son of Abraham Lincoln; was graduated at Harvard College in 1864; served on the staff of General Grant as assistant adjutant-general; was admitted to the bar in 1867; Secretary of War in 1881–1885; minister to Great Britain in 1889–1893; and became president of the Pullman Palace Car Company in 1897.

Lincoln College, a college of Oxford University, England; founded in 1427 by Richard Fleming, Bishop of Lincoln.

Lincoln College, a co-educational institution in Lincoln, Ill.; chartered in 1865 under the auspices of the Cumberland Presbyterian Church, and opened in 1866; has grounds and buildings valued at over $61,000; endowment funds, $125,000; scientific apparatus, etc., $5,000; volumes in the library, about 4,000; ordinary income, $8,000; average number of faculty, 20; average student attendance, 285; graduates, over 350.

Lincrusta, a decorative material invented by Walton, is a compressed sheet of cellulose, paper, cork, etc., impregnated with linseed oil and resin, and while still plastic, impressed with molds so as to make raised patterns. It is tough, leathery, impervious to water, and much cheaper than embossed leather.

Lincture, or **Linctus,** anything to be licked up with the tongue. A term used in the pharmacopœia to designate any soft confection or mixture, as the conserve of roses, jams, or jellies. A vehicle for any medicine to correct the state of the mouth, — such as borax and honey, which would be called a borax linctus.

Lind, Jenny. See GOLDSCHMIDT.

Lindau, Paul (lin-dou'), a German author; born in Magdeburg, June 3, 1839. He trained himself for journalistic work in Paris, returned to Germany in 1863, and edited various journals. He labored in three or four fields of literary activity. Among the earliest fruits of his industry were the pleasantly-written books of travel, "Venice" (1864) and "Paris" (1865), and later "The New World" (1884). But he is perhaps better known as a writer of plays and novels, the subjects of which are taken almost exclusively from modern life. The former possess the merits of lively dialogue and a fair degree of dramatic power; the most successful was perhaps "Maria and Magdalena." The novels include "Herr and Frau Bewer," "Toggenburg" (1883), "Mayo," a romance cycle, "Berlin" (1886–1890), and "The Brothers" (1894). He wrote works of travel, and in 1895 became manager of the court theater at Meiningen.

Lindau, Rudolf, a German diplomat and novelist; born in Gardelegen, Oct. 10, 1830. He was for many years engaged in the consular and diplomatic service of Switzerland and Germany. His principal novels are: "Robert Ashton" (1877); "Liquidated" (1877); "Good Company" (1880); "The Flirt" (1894); "Silence" (1895).

Lindley, John, an English botanist; born in Catton, near Norwich, England, Feb. 5, 1799. Botany attracted young Lindley's attention at an early date. When little more than 20 he went to London, and wrote for the "Encyclopædia of Plants." In 1822 he was appointed assistant secretary to the Horticultural Society, and in 1829 Professor of Botany in University College, London. He retired from this chair in 1860. His works include the "Synopsis of British Flora" (1829); "Introduction to the Natural System of Botany" (1830); "Outline of the Structure and Physiology of Plants" (2 vols. 1832); "Flora Medica" (1838); "The Vegetable Kingdom" (1846), a standard work on the subject of classification; and "Theory and Practice of Horticulture" (2d ed. 1855). He died in Turnham Green, Nov. 1, 1865.

Lindner, Albert, a German dramatist; born in Sulza in Saxe-Weimar, April 24, 1831. His tragedy "Brutus and Collatinus" won him the Schiller prize. "The Bloody Nuptials, or St. Bartholomew's Eve" (1871) had extraordinary success upon the stage. He wrote several other tragedies: "Marino Faliero" (1875); "Don John of Austria" (1875); "The Reformer" (1883). He wrote also "The Swan of Avon" (1881), and "The Riddle of Woman's Soul" (1881). He died in Berlin, Feb. 4, 1888.

Lindner, Theodor, an Austrian historian; born May 29, 1843. Among his numerous works are: "The Vehm" (1887); "German History under the Hapsburgs and Luxemburgs" (1889–1893); and "History of the German People" (1894).

Lindsay, or **Lyndsay, Sir David,** a Scotch poet; born about the year 1490. He studied in the University of St. Andrews, and in 1509 became page of honor to James V., then an infant. In 1528 he produced his "Dreme," and in the following year presented his "Complaynt" to the king. In 1530 he was inaugurated lyon king-at-arms, and knighted, and in 1531 sent on a mission to Charles V., on his return from which he married. He soon afterward published a drama entitled a "Satyre of the Three Estatis," followed in 1536 by his "Answer to the King's Flyting"; and by the "History and Testament of Squire Meldrum" in 1538. His last work, "The Monarchie," was finished in 1553. For more than two centuries Lindsay was the most popular poet in Scotland. His satirical attacks on the clergy in some degree paved the way for the Reformation. He died in 1555.

Lindsey, William, an American poet and prose-writer; born in Fall River., Mass., Aug. 12, 1858. His works: "Apples of Istakhar," a volume of poems; and "Cinder-Path Tales," stories of athletic sports.

Lindum Colonia. See LINCOLN.

Line, in music, one of those members of the stave between and upon which the notes are placed. The stave itself consists of five lines only, but other and smaller lines, called ledger lines, are placed above and beneath, for the reception of all notes that are too high or too low to come within the stave. The invention of lines is attributed to Guido. At their first introduction the spaces between them were not used.

Line Formation, the disposition of soldiers on a wide front and shallow depth as compared with columnar formations with narrow front and great depth. It was first extensively used by Frederick the Great, battalions being in three ranks but in line. He moved in columns of companies across the enemy's front, and wheeled into line opposite his flank in order to attack. French formations were always more or less columnar for attack, but in the early Napoleonic wars the columns were at deploying interval, so as to form line if required for defense. British formations formerly were usually line in two ranks, both for attack and defense. After the campaign of 1870–1871, both formations, for attacking purposes, were abandoned, the line being too slow, the column too dense to advance without loss under the fire of breechloaders, and an "attack formation," not dense and yet deep, was substituted.

Linea Alba, a white tendinous band in front of the abdomen, and beneath the external oblique muscle, extending from the ensiform cartilage to the *os pubis;* on each side of it are the *linea semilunaris,* and connecting them together are three or four transverse bands, the *lineæ transversæ.*

Linear Perspective. See PERSPECTIVE.

Linen, a general name for a cloth of very extensive use, made of flax, and differing from cloths made of hemp only in its fineness. The manufacture of linen is of so ancient a date that its origin is unknown. At a very early period linen cloths were made in Egypt, the cloth wrappings of the mummies being all composed of this substance. In the time of Herodotus linen was exported from Egypt; it also formed the dress of the Egyptian priests, who wore it at all their religious ceremonies; hence they were called "linen wearing" by Ovid and Juvenal. Linen passed from Egypt to the Romans, but not till the time of the emperors, when the Roman priests began to wear linen garments. Linen was also used as a material for writing; the Sibylline books, and the mummy bandages covered with hieroglyphics, are instances of this use of the fabric. Linen and woolen cloths formed the only material for dresses during the Middle Ages; and fine linen was held in very high estimation, the manufacture being carried to the greatest perfection in Germany and Brabant. Cotton, on account of its cheapness, has taken the place of linen for many purposes; but the best paper cannot be manufactured without linen. In the process of manufacture, the flax fibers are first steeped and freed from woody particles. Very little machinery was used in the manufacture of linen cloth till recently. After being freed from the woody particles, the distaff and spinning wheel were used in order to make the thread or yarn, and the hand loom was employed for the purpose of weaving the cloth. About the middle of the 18th century the inventions of Hargreaves and Arkwright were first applied to the manufacture of linen at Leeds. When brought to the spinning mills, the flax is in small bundles, weighing a few pounds each. The first process is called "scutching," by which the fibers are subjected to a sort of combing action, in a machine. They are next "heckled," an operation by which they are cleaned, the coarser parts being removed and the rest arranged in a parallel direction to each other. This used to be done with the "heckle," a sort of large comb with iron teeth; but the operation is now effected by a rotating machine, on the outer circumference of which the flax is fixed, and drawn against or between a series of sharp teeth. The fibers pass through six heckling machines in succession, each of which has finer teeth than the one preceding it. After being heckled the flax is divided into portions selected according to their fineness, etc. The next process is that of "drawing," similar to the carding process in the cotton manufacture. In this operation the flax is

doubled and carded repeatedly till it presents the appearance of a smooth glossy band, about an inch in width, called a "sliver." All the good portion of the flax at this point is called "line," and all the irregular short fibers, "tow." This tow is not the rough substance generally known by the name; the latter is the refuse of hemp. Flax tow can be drawn, doubled, carded, and spun into yarn of coarse quality. The principal object in drawing the heckled fibers is to form a sliver of uniform thickness, or such that a foot in length taken at any one place will be equal to a foot in length taken at any other place, or as nearly so as possible. The drawn sliver is next taken to the roving frame. The use of this machine is to give the sliver another drawing, also a slight twist, and to wind it upon a bobbin. These processes are all preparatory for the spinning of the yarn. This is effected on the bobbin-and-fly principle, and the flax spinning frame acts similarly to the "throstle" used in cotton spinning. Flax, however, differs from cotton, wool, and silk, as it is required to be wet while under the process. Formerly it was wet with cold water, but it is now found that finer yarn can be produced when warm water is used. In general, the rove or twisted sliver, before it passes through the retaining rollers, is led through a trough of water kept hot by steam. The spun yarn is applicable either for making thread or for weaving into linen cloth. The quality of flax is denoted by numbers expressing the number of "leas" in a pound weight — a lea being a measure of 300 yards. Thus, No. 50 has 50 leas, or 15,000 yards. Flax is seldom spun finer than No. 200, which contains 60,000 yards. No. 200 is applicable for making cambric of fine quality. The manufacture of linen was introduced into the United States by the establishment of a large mill in 1834 at Fall River, Mass., and the industry since that time has become largely extended.

Line of Beauty, a term used by some artists for an ideal line frequently represented in the form of a very slender elongated letter S.

Line of Circumvallation. See CIRCUMVALLATION.

Ling, a northern fish, found as far N. as Iceland. Back and sides gray, inclining to olive, belly silvery, ventrals white, dorsal and anal edged with white, caudal marked with transverse black bar, tip white. It is extremely valuable as an article of commerce, being largely exported to Spain and the Mediterranean ports. The fish are split from head to tail, cleaned, soaked in brine, washed and dried, and then are known as stock fish. The liver yields an oil used by the fishermen in their lamps, and it has been employed as a substitute for cod-liver oil.

Ling, Peter Henrik, a Swedish poet; born in Ljunga, Nov. 15, 1776. He founded Swedish gymnastics, and wrote "The General Principles of Gymnastics" (1840). He also produced several spirited lyric poems, tragedies, and epics, to inspire his countrymen to emulate the exploits of the ancient heroes of Scandinavia. He died in Stockholm, May 3, 1839.

Linga, in the sectarian worship of the Hindus, the phallus, as emblem of the male or generative power of nature. The linga worship prevails with the Sivaites. Originally of an ideal and mythical nature, it has degenerated into practices of the grossest description; thus taking the same course as the similar worship of the Chaldæans, Greeks, and other nations of the E. and W. The manner in which the linga is represented is generally inoffensive — a pillar of stone or other cylindrical objects being held as appropriate symbols of the generative power of Siva. Its counterpart is "Yoni," or the symbol of female nature productive.

Lingard, John, an English historian; born in Winchester, England, Feb. 5, 1771. He was educated at the college of Douay, in France, and on its removal to England, during the French Revolution, accompanied it there. The work on which his fame rests is his "History of England from the First Invasion by the Romans to the Accession of William and Mary in 1688"; the first edition of which appeared between 1819–1825. It was subsequently considerably enlarged, and has passed through six editions, having deservedly attained the rank of a standard work. Based, for the most part, on original researches; abounding in solid learning and acute suggestion; written in a lucid, manly, unaffected style, it is esteemed one of the best text-books on English history yet written. While looking at ecclesiastical affairs and persons from the Roman Catholic point of view, Lingard has the merit of not overpassing the limits of fairness and moderation in his treatment of controverted matters. He was author also of the "History and Antiquities of the Anglo-Saxon Church." The dignity of cardinal was offered to Lingard, and declined. He died in Hornby, Lancashire, England, July 17, 1851.

Lingg, Hermann, a German poet; born in Lindau, Jan. 22, 1820. He published (1853) a volume of "Poems" of great originality, and remarkable for wealth of imagery and deep elegiac tone. "The Migration of Peoples" (3 books, 1866–1868) showed grandeur and epic power. His dramas are less admirable; among them are: "The Doge Candiano" (1873); "The Sicilian Vespers"; and "Catiline." Besides "Patriotic Ballads" (1868), "Dark Powers," and several volumes of collected poems,

he has written "Byzantine Tales" (1881); "From Forest and Lake," five stories (1883); "Clytia, a Scene from Pompeii" (1883).

Lingua=Franca, the corrupt Italian which has been employed, since the period of the Genoese and Venetian supremacy, as the language of commercial intercourse in the Mediterranean, especially the Levant. Any language which serves a similar purpose, as, for instance, Swahili and Haussa in Africa, and the Chinook jargon in the N. W. part of the United States, is called generically a *lingua-franca.*

Linguet, Simon Nicolas Henri (*lang-ga'*), a French historian; born in Rheims, July 14, 1736. He won great fame by his "History of the Age of Alexander" (1762), and his "Judiciary Memoirs" (7 vols.). Of his numerous works on laws, politics, science, etc., these may be mentioned: "History of the Revolutions of the Roman Empire" (2 vols.); "Theory of the Civil Law" (1767); "Impartial History of the Jesuits" (1768); "Memoirs on the Bastille" (1783). He died June 27, 1794.

Lingula, a genus of mollusks of the class *Brachiopoda* and family *Lingulidæ,* a family that has survived with but little change since the early Silurian period. These mollusks are one of the few examples of pedunculated bivalve shells. The members of the genus inhabit the Indian Archipelago and the Australasian seas.

Liniment, a soft or thin ointment; a substance or preparation thinner than an ointment but thicker than oil. A stimulating preparation for external application. Garrod enumerates 16 linimenta. They are: *Linimentum aconiti, L. ammoniæ, L. camphoræ, L. saponis,* etc.

Link Motion, gear by which the valve is operated in locomotives and similar engines. It acts as a variable cut-off, or reverses the steam, or renders the valve inactive, as may be required. It consists of two eccentrics and their rods, one for the forward and the other for the backward eccentric; the outer ends of the rods are connected by a slot link (hence the name), and the end of the valve rod works in the slot. The steam valves are partially opened, quickly closed again, so that the admission of steam ceases some time before the termination of the stroke, and the steam, being cut off, is worked expansively. The nearer the slide is to the middle of the slot, the quicker is the cut-off.

Linköping (*ling'*che-ping), one of the oldest towns in Sweden, capital of East Gothland and the seat of its bishop. The Romanesque cathedral, which dates from the 12th century, is one of the finest churches in Sweden. Since 1887 Linköping has had direct communication for vessels with the Baltic, and now exports timber and gilded moldings. Pop. (1906) 16,125.

Linley, Thomas, an English musical composer; born in Wells, England, about 1725. He first gained a reputation at Bath as teacher of singing and conductor of the concerts in the Assembly Rooms. But in 1775 his son-in-law Sheridan induced him to compose great part of the music for his opera "The Duenna," and persuaded him to go to London to superintend its performance. In the following year the two, in conjunction with R. Ford, bought Garrick's share of Drury Lane Theater. During the next 15 years Linley was musical director of this theater, composing numerous occasional pieces and the music of the operas "Gentle Shepherd" (1781); "Carnival of Venice" (1781); "Selima and Azor" (1784); "Strangers at Home" (1786); "Love in the East" (1788); etc. Linley's name stands highest, however, as a composer of music for songs and elegies — it is simple, sweet, melodious, and yet lively. He died in London, Nov. 19, 1795. Two of his sons inherited his musical talent, THOMAS (1756–1778), who possessed real genius and was a friend of Mozart in Italy, and WILLIAM (1767–1835), who composed a number of glees, songs, etc.

Linlithgow, an ancient royal burgh, the county town of Linlithgowshire, Scotland; 16 miles W. of Edinburgh. Linlithgow Palace, mostly rebuilt between 1425 and 1628, was fired by Hawley's dragoons in 1746. It was the birthplace of James V. and Mary Stuart.

Linnæa (named by Dr. J. Gronovius after Linnæus, with the sanction of the great botanist himself, who preferred having his name attached not to a showy plant, but to this lowly Northern flower), a genus of *Caprifoliaceæ,* tribe *Lonicereæ.* The calyx limb is five-cleft; the corolla campanulate, five-cleft, with equal segments; the stamens four, didynamous; the fruit a dry, three-celled berry, one cell only having a perfect seed. Only known species, *L. borealis.* It is a small plant, with twisting, filiform-branched stems; opposite, broadly-ovate, stalked leaves; axillary peduncles of two, three, or four flowers, rarely fruiting. It is a Northern plant, found wild in Europe, Asia, and North America.

Linnæan Society, a society founded to carry out those botanical and zoölogical investigations with regard to which Linnæus, in his "Systema Naturæ," had led the way. It was founded in 1788, and incorporated on March 26, 1802. In 1791 it began to publish "Transactions."

Linnæan System, the sexual system of botany introduced by Linnæus, which, though unequaled for the aid it affords in finding the name of a flower, yet labors under the fatal defect that it is purely artifi-

cial. Previous to his time, Jung, rector of the gymnasium at Hamburg, who died in 1657, had introduced the Latin botanical nomenclature. Tournefort, who died in 1708, had been the first to classify plants into strictly defined genera. It remained for Linnæus to arrange them, and define the several genera and species scientifically. He divided the vegetable kingdom into 24 classes. The first 11 were founded on the number of stamens. They were: Monandria, Diandria, Triandria, Tetrandria, Pentandria, Hexandria, Heptandria, Octandria, Enneandria, Decandria, and Dodecandria; the 12th and 13th, Icosandria and Polyandria, on their number and insertion; the 14th and 15th, Didynamia and Tetradynamia, on their number and relative lengths; the 16th to the 18th, Monadelphia, Diadelphia, and Polyadelphia, on the way in which they are combined; the 19th Syngenesia, on the aggregation of the flowers; the 20th, Gynandria, on the abnormal situation of the stamens; the 21st to the 23rd, Monœcia, Diœcia, and Polygamia, on the existence, more or less, of unisexual flowers; and the 24th, Cryptogamia, grouping together all plants of concealed nuptials; in other words all flowerless plants. As a rule, the orders were founded on the number of pistils; hence the words Monogynia, Digynia, Trigynia, etc. In other cases, where the classes were not founded on the number of stamens, Pentandria and Decandria, etc., were used as orders. For the orders of the exceptional classes, Tetradynamia and Polygamia, see these words. Linnæus himself, in his "Philosophia Botanica," published in 1751, laid the foundation of a natural system by establishing 68 orders of plants linked together according to what he believed their proper affinities.

Linné (lin'nā), **Karl von,** commonly called LINNÆUS, the greatest botanist of his age; born in Rashult, Sweden, May 13, 1707. He was the son of a clergyman, who had him educated at the grammar school and the gymnasium of Wexiö. He showed an early interest in botany; entered the University of Lund, where his botanical tastes were encouraged; and removed to Upsala in 1728, where he undertook the supervision of the botanic garden. Here he made the acquaintance of the botanist Rudbeck, whose assistant he became. Aided by the Academy of Sciences at Upsala Linné made a journey through Lapland, the result of which was shown in his "Flora Lapponica," published in 1735. In this year he went to the University of Harderwyk in Holland and took an M. D. degree; afterward visited Leyden, where he published the first sketch of his "Systema Naturæ" and "Fundamenta Botanica." In 1736 he visited England, went to Paris in 1738, and afterward settled in Stockholm as a physician. He became Professor of Medicine at Upsala in 1741, and then of botany and natural history; was made a Knight of the Polar Star with the rank of nobility; and died on his estate near Upsala from apoplexy. The

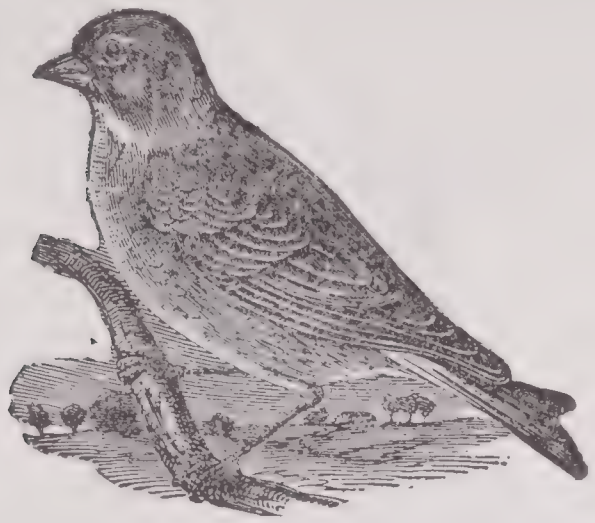
KARL VON LINNÉ.

great merit of Linné as a botanist was that he arranged plants on a simple system of sexual relationship and prepared the way for the more natural and satisfactory classification which has superseded the Linnæan system. Nor must it be forgotten that he was eminent not only in botany, but in all the sciences of his time. His chief works besides those already mentioned were: "Genera Plantarum" (1737); "Classes Plantarum" (1738); "Flora Suecica" (1745); "Fauna Suecica" (1746); "Philosophia Botanica" (1751); and the "Species Plantarum" (1753). He died in Upsala, Jan. 10, 1778.

Linnell, John, an English artist; born in London, England, June 16, 1792. He was a pupil of Benjamin West and Varley, and himself taught drawing to Mary Wollstonecraft Shelley. He painted many portraits of eminent men, as his friend Blake, Malthus, Whately, Peel, and Carlyle. His landscapes were mostly painted from the sweet scenery of Surrey. Of these need only be named "Harvest Showers," "A Coming Storm," "Autumn," and "The Heath." Linnell died in Redhill, Surrey, England, Jan. 20, 1882.

Linnet, a very common and well-known song-bird, frequenting all Europe S. of 64°, and in Asia extending to Turkestan. It is a winter visitor to Egypt and Abyssinia, and is found in great numbers in Barbary, the Canaries, and Madeira. It frequents open places, preferring commons and fields of furze. In autumn and winter the plumage is brown; in the breeding season the breast and head of both sexes becomes a crimson-red, varying only in degree. The

(later) generic and specific names have reference to the fondness of the bird for the seeds of flax and hemp. It is popularly



LINNET.

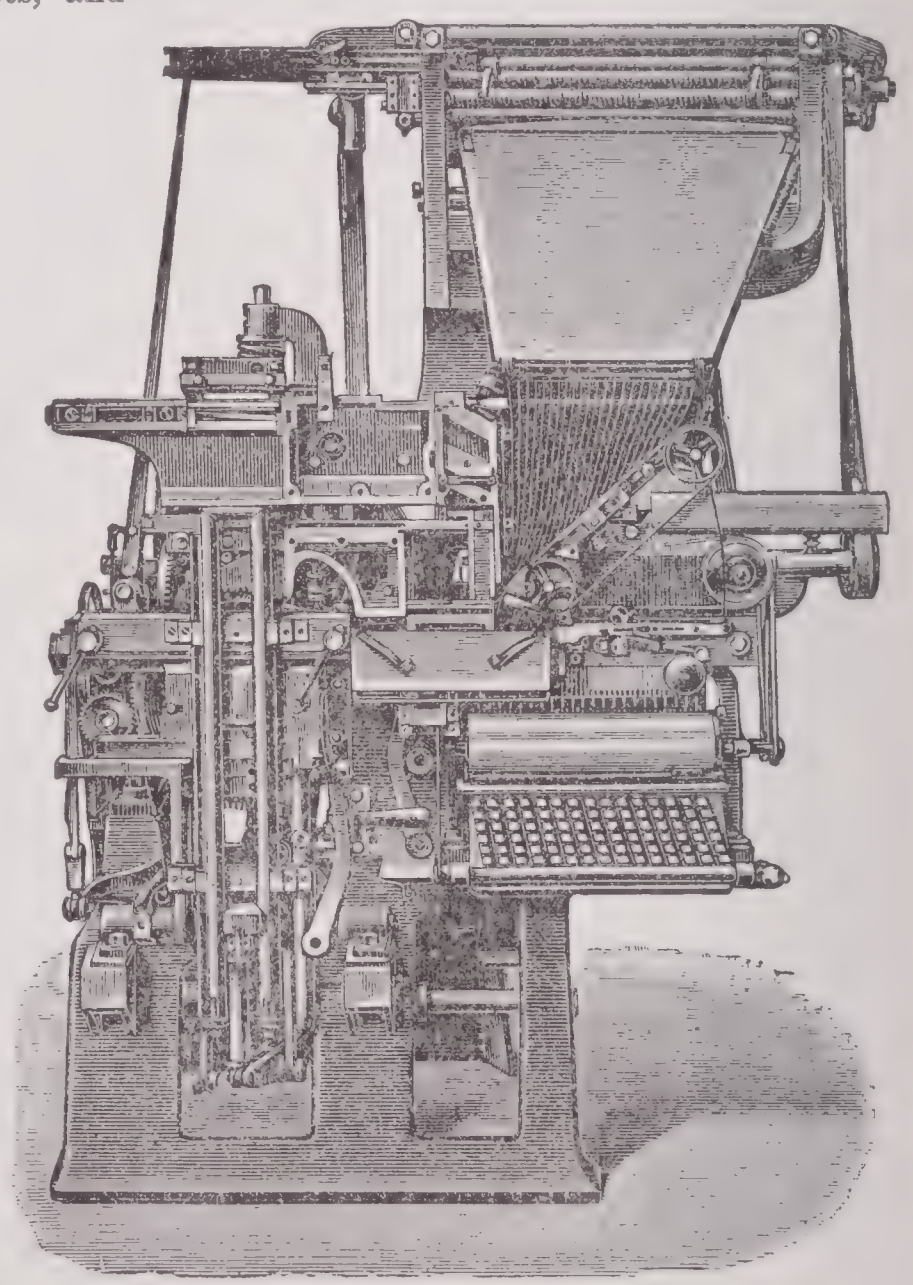
known, according to its sex and the season of the year, as the red, gray, or brown linnet.

Linoleum, a preparation of linseed oil, rendered solid by admixture with chloride of sulphur. It is rolled into sheets, and used as a substitute for india- rubber or gutta-percha. Vulcanized, it is carved into moldings and polished; and, mixed with brown cork and pressed upon canvas, it forms a kind of floor cloth. Dissolved, it is used as a varnish for waterproof fabrics, or as a paint for iron or wood, ships' bottoms, etc. The name is applied to the floor cloth so prepared. See OIL CLOTH.

Linotype, a machine, operated by finger keys, which automatically produces and assembles, ready for the press or stereotyping table, type metal bars, each bearing, properly justified, the type characters to print an entire line. The linotype is the invention of Ottmar Mergenthaler. Beginning in 1876, he perfected his device in 1886, the first newspaper to use it being the New York "Tribune." The device has since been greatly improved by means of spacing facilities, etc., and is adapted for book work as well as for newspapers. Its manipulation may be roughly approximated to that of a typewriter. The linotype does not set type. It produces a slug or line of metal upon which the characters to be printed stand out after the fashion of reading matter for the blind.

Linseed, the seed of the flax plant (*Linum usitatissimum*). It is grown in various countries, but chiefly in the N. of Europe. Its composition varies considerably, but the following is the average proportion in which the principal constituents are present: Albuminous substances, 30 per cent.; fat and oil, 32 per cent.; mineral matter, 4 per cent.; water, 10 per cent. It also contains a large quantity of mucilage in the outer layers of the cells of the epidermis, which swells up when the seed is macerated in water. One part of linseed in 16 parts boiling water yields a mucilage thick enough to be drawn into threads. The chief ash constituents are lime, potash, and iron, partly as phosphates and partly united in the ash with carbonic acid. The residue obtained after expressing the fixed oil forms the principal oil-cake of commerce.

Linseed Oil, the fixed oil expressed from linseed. Linseed oil consists of the glycerides of linoleic, palmitic, and stearic acids, about nine-tenths of the whole being the glyceride of linoleic acid. It may be taken as the type of the class known as drying oils, from their property of drying up into a transparent, tough, resinous mass when exposed to the air. When the oil is boiled for some time, till it loses about one-sixth



LINOTYPE.

of its weight, it becomes thicker, tenacious, and viscid, and dries up, still more readily than in the fresh state, into a turpentine-like mass, scarcely soluble in oils. It then forms the basis of printers' and painters' varnishes. The freshly pressed oil has a pale yellow color, and is without disagreeable taste; but the commercial oil has often a sharp, penetrating smell and taste. It has a sp. gr. of .9335 at 15°, and becomes solid at 20° to 27°. Linseed oil mixed with chloride of sulphur forms caoutchouc-like products. A drop of strong sulphuric acid forms a yellow-brown spot, quickly changing to black, with ropy consistence. Linseed oil yields, with alkalies, a very soft soap, and is acted on with facility by oxidizing agents generally.

Linstock, a pointed staff with a crotch or fork at one end to hold a lighted match, formerly used in firing cannon.

Lint, the name given to linen cloth or rags when shredded or scraped down so as to form a soft material, suitable for dressing wounds and soaking up discharges. This is now superseded by a cotton cloth specially woven for the purpose, with one side soft and fluffy.

Lintel, in architecture, a horizontal piece of timber or stone over a door, window, or other opening, to discharge the superincumbent weight.

Linton, Eliza Lynn, an English novelist; born in Keswick in 1822. In 1858 she married William James Linton, but they separated in 1867. Her works include: "The World Well Lost"; "The One Too Many"; "In Haste and at Leisure"; "The Girl of the Period"; etc. Her best novels are: "The True History of Joshua Davidson"; and "Autobiography of Christopher Kirkland." She died in 1898.

Linton, Sir James Drumgole, an English painter; born in London, Dec. 26, 1840. He labored with success to elevate the status of his favorite branch of art, painting in water-colors; and in 1883 the Institute of Water-color Painters, of which he had been elected a member in 1867, was reorganized, its title being henceforth the Royal Institute of Painters in Water-colors, and its exhibitions being thrown open to everybody, not confined, as hitherto, to members. Linton himself was chosen president in 1884, and in the following year was knighted. His most successful pictures are those of single figures. As a painter in oil his most notable productions are the "Marriage of the Duke of Albany," painted by royal command in 1885, and a series illustrative of the 16th century for a private house at Nottingham.

Linton, William James, an Anglo-American wood engraver and author; born in London in 1812. As a wood engraver he may be said to be the most artistic who ever lived. Some of his finest work may be found in the pages of the "Illustrated London News," to which he frequently contributed from its commencement till he finally came to the United States in 1867, leaving his wife, Eliza Lynn Linton, behind him in England. As an author, the zealous Chartism of his youth tinged much of his work. Among his various works may be mentioned: "The Plain of Freedom" (1852); "Claribel and other Poems" (1865); several volumes of "The English Republic"; "Some Practical Hints on Wood Engraving" (1879); "Life of Thomas Paine" (1879); "A Manual of Wood Engraving" (1884); "Poems and Translations" (1889), and "The Masters of Wood Engraving" (1890). He died in 1897.

Lion, a very typical member of the great carnivorous order of mammals, standing as the chief representative of the family *Felidæ* or cats. The dental arrangement comprises six incisors and two canines in each jaw; the false or pre-molars number six in the upper and four in the lower jaw; and the true molars are two in each jaw. The molars are fewer in number in the *Felidæ* than in other *Carnivora.* The last molar in the upper jaw is tuberculate, all the other molars are trenchant. The carnassial or "flesh" tooth — the last tooth but one, of the upper jaw — has three lobe-like cutting surfaces, and a blunted "heel" or internal point, and the carnassial or last in the lower jaw has two cutting lobes or surfaces, but wants a blunted inner lobe. There is a small tubercle-like tooth behind each flesh tooth of the upper jaw, this being the last molar; but in the lower jaw there are no teeth behind the single molars, which form the lower flesh teeth. The jaws are short and the muzzle in consequence is rounded. The legs are of nearly equal size, the fore feet being provided with five toes and the hind feet with four only. The toes are furnished with powerful curved claws which can be retracted within sheath-like pouches of the skin and are thus saved from being worn or blunted. The last joint of the toe, to which the claw is attached, can be retracted on the preceding joint, or lodged by its side by the action of two strong elastic ligaments, while, when it is to be protruded, the flexor tendon, or that which bends the toe draws it forward ready for use. Like all other *Felidæ* the lion is digitigrade, that is walks on the tips of the toes. The heel, small in this family, is raised from the ground together with the greater portion of metacarpus and metatarsus. The walking surface of the foot is provided with hairy elastic pads or cushions on which the animals move about with noiseless tread; these structures are also of use in breaking the shock of the leaps

which the lions are accustomed to make in springing on their prey. The tongue is provided with papillæ of a horny structure; the presence of these bodies giving to the tongue the character of a powerful rasp, serviceable in scraping the flesh from the bones of their prey.

The great muscular development of the lion and his neighbors may lastly be noted in concluding the consideration of the general distinctive characters of the genus. This muscular development is indicated in the skeleton by the presence of strong bony ridges for the attachment of muscles, these ridges being well seen in the skull and bones of the limbs. The outward form and appearance of the lion species is familiar and readily recognized, especially in the male animals. The large size of head chiefly given to it by the great mane which covers the head, neck, and shoulders of the males; the uniform, unmarked, tawny color of the skin; and the tuft at the extremity of the tail, are the distinctive characters of the lions. The reputation for certain admirable traits of character and disposition in the lion has been founded chiefly on his striking appearance and on tales told without any verification. The truth is that the lion is endowed with all the fierce, insatiable instincts of the cat tribe, and wherever he has been held to be courageous his immense strength has made him so; and his apparent mercy or forbearance has simply arisen from the fact of his wants and hunger having been duly satisfied, or when under the dominion of man of permitting his keeper to approach him without injury. In distribution the lion appears now to be much more limited than in former years. In geological periods these animals had a wide range over Europe, but even since historical periods the distribution of the genus has decreased in extent.

The African continent forms the headquarters of the lions, and in Southern Asia — in India, Persia, and Arabia — they are also found. America totally wants evidence of any geological or historical lion — the puma (*Felis concolor*) supplying its place in the New World. The African lion (*Leo Africanus* or *Felis leo*) is the most familiar species — if, indeed, the few known lions differing from each other in minor points, not always to be determined, are to be considered different species. The specific nature of these forms is of doubtful existence and it seems more correct to consider that there is but one species — the typical *Felis leo* or *Africanus* — and that other lions are mere varieties of this one species. The African lion has long formed the typical specimen of the tribe. It extends all over the African continent, but exhibits certain variations throughout that large area. Thus the Barbary and Cape lions vary a little in color and size, the former being generally the larger, and even the Cape or South African forms appear to present variations in color one being paler in color than the other, and hence these latter forms become divisible into the pale and black lions. The maneless lion of India (*Leo goojratensis*) presents a distinct feature from the other forms in that the males want the characteristic mane of the other varieties. And among the lions generally the differences on which the formation of distinct species have been founded have a chief reference to the development and form of the mane in the various kinds. The period of gestation in the lions is five months. Only one brood is produced annually and from two to four young are produced at a birth. The mother nourishes the whelps for about a year, their size at birth being about that of a pug dog. In their young state the whelps may be marked with various markings, brown bands on a tawny body color being most frequently observed. As they grow older, however, the markings disappear and the uniform tawny hue of the adult is reached. The mane of the male does not begin to grow until the animal has attained the age of three or three and a half years. The adult age is reached in the males at seven and in the females at six years. The probable limit of age of the lion has been differently stated by different writers. Buffon fixed it at 22 years. But a lion which died in the Tower of London in 1760 had lived in captivity above 70 years, and another died in the Tower at the age of 63.

The habits of the lion will be familiar to most readers. The lurking place is chosen near a spring or by the side of a river, where concealed among the brushwood he lies in wait for the animals coming to drink. A single powerful leap generally lands him on his prey, but if unsuccessful he retires to wait a second opportunity. In the night time the lion appears more active and prowls about in search of prey, and in the dark even ventures near man's domain and carries off domestic animals. In stormy nights also the lion appears active and takes advantage of the panic produced by the storm among the other inhabitants of the forest to spring on and seize them unawares. The conformation of the eyes in enabling the lion to see well at night aids him greatly in his marauding expeditions. The roar of the lion has aften been alluded to and described by travelers as being exceedingly terrific. The roar is his natural voice and is made by a prolonged effort resulting in a deep-toned grumbling mixed with a sharper grating noise. When enraged the cry of the lion is a sharp, short, repeated, and somewhat shrill cry. The statement that the lion roars at stated periods appears to be almost wholly without foundation; in summer alone and especially before storms, etc., and atmospheric changes, the lion roars be-

fore dawn. In rage the lion beats his sides with his tail, agitates his mane and facial muscles, protrudes the tongue and claws, utters the peculiar, sharp, frequent growl, and altogether presents a very terrific appearance. About 15 pounds of flesh per diem is stated as the average requirement of a lion. They also require to drink frequently, lapping the water like dogs. The odor of the breath is offensive and the urine has a very fetid smell. While the distribution of the lion has become more limited than in former years the actual number of lions has also apparently decreased, as in North Africa, whence the Romans obtained so many. From Europe lions have long since completely disappeared.

In the arenas of ancient Rome large numbers of lions were frequently exhibited. Sylla, the dictator, once exhibited 100 of these animals and Pompey presented 600 in the circus. Lion fights were common during the consulate and during the empire also. Hadrian, it is said, caused 100 to be destroyed at one exhibition and others of the emperors and consuls were equally prodigal. Lions are hunted in Africa for the sake of their skins and also for purposes of extermination. Where there are plenty of animals to supply him with food the lion commits great ravages, killing every day a large animal such as an antelope, buffalo, zebra, or wild boar, the remains of which he leaves to the hyenas and jackals. When urged by hunger he will even eat carrion but never except with great reluctance. Unless when taken unawares the powerful Cape buffalo will often engage successfully in battle with the lion, which never attacks the elephant the rhinoceros, or the hippopotamus, knowing too well that the struggle would not be likely to terminate in his favor. In some districts of Africa serious losses are caused to the natives and colonists by the ravages of lions among their flocks and herds. At one time this was particularly the case in Algeria. At the present day, however, little or nothing is heard of lions in Algeria, the European hunters having managed to rid the country of them almost entirely. Formerly the Arabs used to organize great lion hunts when they formed a ring around his lair and all fired together on his appearance. Almost invariably the lion, whether wounded or not, would break through the circle, killing or wounding some of the hunters before he breathed his last. The native Negroes and Kaffirs hunt him fearlessly in the same manner, though only armed with lances. In some parts of Africa he is killed by means of snares or pitfalls. Everywhere he has given way before firearms much more quickly and we may even say in a much more cowardly manner than the tiger. Very full accounts of the lion and his habits are to be found in the narratives of African travelers from the earlier, such as Sparmann and Burchell, to the later, such as Gordon Cumming, Du Chaillu, Baker, Speke, Grant, Livingstone, Selous, etc.

Lion of the Sea, an old name for the Cape of Good Hope.

Lions, Gulf of, the large gulf of the Mediterranean on the S. of France, extends from the frontier with Spain E. to the Hyères Islands.

Lipari Islands (lē′pä-rē), known also as the ÆOLIAN ISLANDS, a volcanic group in the Mediterranean, consisting of half a dozen larger and numerous smaller islands, with an aggregate area of 116 square miles, and situated off the N. coast of Sicily, N. W. of Messina. They rise to 3,170 feet above the level of the sea; many of the smaller islands form part of the rim of a gigantic crater. The ancient classical poets localized in these islands the abode of the fiery god Vulcan — hence their ancient name, Vulcaniæ Insulæ. Lipari is the largest. The next in size are Vulcano, Stromboli, Salina, Filicudi, Alicudi, and Panaria. The principal products of the islands are grapes, figs, olives, wine (Malmsey), borax, pumice stone, and sulphur. The warm springs are much resorted to, and the climate is delightful. Lipari, the chief town, is a bishop's see and a seaport, and has 4,968 inhabitants. Stromboli (3,022 feet) is almost constantly active; Vulcano (1,017 feet) is so intermittently; the rest are extinct.

Liparite, an igneous rock, so called from its occurrence in the island of Lipari. It has a wide geographical distribution, and is also known as rhyolite and quartz trachyte. It is a highly acidic rock, and has a glassy base, often more or less devitrified. Throughout this base are scattered quartz, sanidine, plagioclase, and biotite; and other minerals may also be present. The more compact varieties often exhibit sphenelitic and fluxion structures, which occasionally impart a kind of laminated or banded aspect to the rock. Other varieties of texture range from compact up to coarse-grained and granitoid.

Lipetzk, a town in the Russian province of Tamboff; on the Voronezh, a tributary of the Don; 300 miles S. E. of Moscow; founded in 1700 by Peter the Great, but only began to flourish at the commencement of the 19th century, when the admirable qualities of its chalybeate springs became known. It has a large annual influx of visitors during summer.

Lipogram, a species of verse characterized by the exclusion of a certain letter, either vowel or consonant. The earliest author of lipogrammatic verse was the Greek poet Lasus (born 538 B. C.); and it is recorded of one Tryphiodorus, a Græco-Egyptian writer of the same period, that he composed an Odyssey in 24 books, from each of which, in succession, one of the letters of

the Greek alphabet was excluded. Fabius Claudius Gordianus Fulgentius, a Christian monk of the 6th century, performed a similar feat in Latin. In modern times the Spaniards have been most addicted to this laborious frivolity, and Lope de Vega wrote five novels, from each of which one of the vowels is excluded.

Lippard, George, an American story-writer; born in Yellow Springs, Pa., April 10, 1822. His most notorious work was "The Quaker City" (1845), modeled on Sue's "Mysteries of Paris," and implying that Philadelphia was a modern Sodom, though he disclaimed the inference when threatened with legal consequences. "Mysteries and Miseries of Philadelphia" and "The Empire City: New York — Its Upper Ten and Lower Million" were companion pieces. He wrote also "Paul Ardenheim," a Rosicrucian romance; "Legends of Mexico" and "Legends of the Revolution" (1847); "Washington and his Generals"; and others. He died in Philadelphia, Feb. 9, 1854.

MADONNA BY LIPPI.

Lippe, or **Lippe-Detmold,** a small principality of Northern Germany; between Westphalia on the W. and Hanover on the E. The Weser touches it on the N. and the Teutoburger Wood crosses it on the S.; area, 475 square miles; pop. (1905) 145,577. The present constitution of Lippe dates from 1853; capital, Detmold; other towns, Lemgo and Horn. The surface is hilly; woods cover 28 per cent., and are well cared for. The principal occupation is agriculture, with the rearing of cattle and swine. The products of these callings, with timber, salt, meerschaum pipes, tobacco and starch, are the chief results of the industrial activity exported. Every spring some 12,000 of the inhabitants spread themselves over Central Europe, as far as South Russia, to burn bricks, and return home in the autumn. The little country is governed by an administrative college, and a House of 21 Representatives, elected directly by the people, who are for that purpose divided into three classes. The princes of Lippe belong to one of the oldest sovereign families of Germany, and can be traced back to the 10th century. The first who took the name of Count of Lippe was Bernhard in 1129. The family split into three branches in

1613—Lippe, Brake, and Schaumburg. The second of these became extinct in 1709. For the third, see SCHAUMBURG-LIPPE.

Lippi, Fra Filippo (lēp'pē), commonly known as LIPPO LIPPI, a Florentine painter; born in Florence, in 1412; but, losing his parents while still an infant, he was intrusted to the Carmelite friars of Florence when only eight years of age. In the story of his life as told by Vasari there are several romantic incidents; but most of them are now discredited, except that he abducted Lucrezia Buti, a ward or novice of the convent of St. Margaret at Prato, and afterward married her. Lippo Lippi, who studied principally Masaccio, painted religious subjects, which he conceived and designed from a human standpoint. His greatest work was done on the choir walls of the cathedral of Prato—illustrations of the lives of John the Baptist and St. Stephen. He was busy executing a series of incidents from the life of the Virgin in the cathedral apse at Spoleto, when death arrested his hand. Besides these works he painted several Madonnas and altarpieces, among these last one for the nunnery chapel of S. Ambrogio, Florence, the subject of Browning's poem. He died in Spoleto, Italy, Oct. 9, 1469.

His son, FILIPPINO LIPPI, was born in Florence in 1460, and educated at Prato. His artistic style has a strong element of originality, but also shows the influence of his father and Botticelli. His most celebrated frescoes are scenes from the lives of St. Peter and St. Paul in the Brancacci chapel at Florence, incidents illustrating the character of St. Thomas Aquinas in the Minerva church at Rome, and subjects from the legends of St. John and St. Philip in Sta Maria Novella at Florence. His best easel pictures include "The Virgin and Saints" (in the Uffizi at Florence), "The Adoration of the Magi," "The Vision of St. Francis." Filippino died in Florence, in April, 1504.

Lippia, a genus of plants, natural order *Verbenaceæ. L. pseudo-thea,* a native of Brazil, is aromatic and fragrant, and when dried makes an agreeable tea.

Lippincott, Joshua Ballinger. an American publisher; born of Quaker parents in Juliustown, N. J., in 1816. He had charge of a bookseller's business in Philadelphia from 1831 to 1836, when he founded the house of J. B. Lippincott & Co., and by 1850 was at the head of the book trade in Philadelphia. He died in Philadelphia, Pa., Jan. 5, 1886, and the firm was converted into the J. B. Lippincott Company. "Lippincott's Magazine" was established in 1868.

Lippincott, Sarah Jane (Clarke), pseudonym GRACE GREENWOOD, an American writer; born in Pompey, N. Y., Sept. 23, 1823. She was favorably known as an editor and contributor. "Ariadne" is one of her best poems. She published: "Greenwood Leaves" (1850); "Poems" (1851); "Merrie England" (1855); "Records of Five Years" (1868); and "New Life in New Lands" (1873); "Victoria, Queen of England"; "Recollections of My Childhood"; "Stories and Legends of Travels"; etc. She died April 20, 1904.

Lippmann, Julie Mathilde, an American writer; born in Brooklyn, N. Y., June 27, 1864. She is the author of "Through Slumbertown and Wakeland"; "Jock o' Dreams," a collection of short stories; "Miss Wildfire," a novel for girls; "A Fool and His Money"; etc.

Lipsius, Justus (lip'sē-us), properly JOEST LIPS, a Dutch humanist; born in Overyssche, Belgium, Oct. 18, 1547. His strength lay chiefly in the Latin historians and in Roman antiquities; his editions of Tacitus and of Seneca, with commentaries, were prepared with extreme care, and (especially Tacitus) finally determined the genuine text in all essential particulars. In addition he wrote 48 separate treatises and essays, among them: "The Amphitheater" (1584); "On Politics" (1589); "The Cross" (1593); "The Military System of the Romans" (1595); "Vesta and the Vestal Virgins" (1603); "Introduction to the Stoic Philosophy" (1604); "Natural Philosophy of the Stoics" (1604). He died in Louvain, March 23, 1606.

Lipsius, Marie. See LA MARA.

Lipsius, Richard Adelbert, a German theologian; born in Gera, Feb. 14, 1830. He studied theology at Leipsic, and after serving there as privat-docent and professor extraordinary, was called to fill a chair at Vienna in 1861, at Kiel in 1865, and at Jena in 1871. Lipsius made contributions of the greatest importance to theological science in the fields of dogmatics and the history of dogma, the philosophy of religion, and New Testament exegesis and criticism. He died in Jena, Aug. 19, 1892.

Lipton, Sir Thomas Johnstone, a British sportsman; born in Glasgow, of Irish parents. He was proprietor of large tea estates in Ceylon; owned a refrigerator car plant in the United States; and was president of a pork packing company in Chicago. He was, however best known as the owner of the English yachts "Shamrock I," and "Shamrock II," with which vessels he unsuccessfully competed for the AMERICA'S CUP (*q. v.*) with the American yacht "Columbia" in 1899 and 1901. During Queen Victoria's Jubilee, in 1897, the Princess of Wales issued an appeal for money to provide dinners for the poorest of the poor in London on some one day of the festivities. To this fund Lipton con-

tributed $100,000. The result of this movement was "The Alexandra Trust," the purpose of which is to provide restaurants all over London where working people may buy wholesome, well-cooked food at cost price. To this object Lipton gave $500,000 in 1898, and promised more when needed. In consideration of his liberality he was knighted in 1898. The same year he sent a check for $10,000 for the relief of American soldiers wounded or invalided in the war with Spain, and in 1900 gave the New York Yacht Club $1,000 for a prize cup for a season's races. He was created a baronet June 25, 1902.

Liquation, the act or operation of separating one metal from another less fusible by exposing the alloy to a heat sufficiently great to cause the more fusible metal to melt and run off. Thus silver is separated from copper by melting the alloy with the addition of lead, and cooling the triple alloy suddenly in the form of cakes. These cakes are heated to such a degree on an inclined hearth as to cause the alloy of lead and silver to run off, and allow the copper to remain.

Liquefaction of Gases. Faraday showed that there is no broad distinction between gases and vapors; the difference in their natures is one of degree merely, a vapor being in reality a gas near its temperature of liquefaction. He liquefied cyanogen, ammonia, chlorine, carbonic acid, and many other gases by placing a mixture, which when heated evolves the gas, in the longer limb of a strong bent tube of glass, and after hermetically sealing the tube immersing the shorter limb in a freezing mixture. The gas was evolved in a very confined space, and was therefore subjected to great pressure as well as diminution of temperature, conditions generally sufficient to liquefy it. He found, however, that there were certain temperatures at which no pressure however great would liquefy a gas. He came to the conclusion that —100° C. was too high a temperature for the liquefaction of oxygen, hydrogen, and nitrogen.

For a number of years there remained six gases — carbonic oxide, marsh gas, nitric oxide, oxygen, nitrogen, and hydrogen — which resisted all efforts to liquefy them, so that it was common to speak of them as the permanent gases. An explanation of the difficulty was afforded by the experiments of Andrews, published in 1869, by which it was shown that for every gas there exists a certain temperature, the critical temperature, above which liquefaction is impossible, and at which liquefaction takes place under the influence of a certain definite pressure, the critical pressure. Up to this time the lowest temperatures attainable had been above the critical points of the permanent gases. In 1877, however, M. Pictet of Geneva and M. Cailletet, a French iron founder, independently succeeded in liquefying oxygen. Pictet's process was essentially that of Faraday, but he used a better cooling agent, viz., liquid carbon dioxide boiling in a vacuum. Cailletet employed an apparatus in which the gas was subjected to great pressure, and, when greatly reduced in volume, suddenly allowed to expand. Under these conditions the absorption of heat attending the change of condition was so great as to condense a portion of the gas to the liquid state. With this apparatus Cailletet liquefied oxygen, carbonic oxide, nitric oxide, and marsh gas, besides ethylene and acetylene. There still remained nitrogen and hydrogen, but in 1883 Professors Wroblewski and Olszewski reduced nitrogen to the liquid state, using as a cooling agent liquid ethylene boiling in a vacuum. The highly compressed and strongly cooled gas was allowed to expand as in Cailletet's process, and this additional cooling effect induced liquefaction. In a similar manner Olszewski went so far as to obtain evidence of the liquefaction of hydrogen and was able to determine its critical constants with some degree of accuracy (1895). It was not, however, till 1898 that liquid hydrogen was obtained in sufficient quantity to allow of the study of its properties. This last and greatest victory is due to Professor Dewar of the Royal Institution, and in the following year he announced the success of his efforts to solidify hydrogen. See Liquid Hydrogen.

Liquid Air. Under Liquefaction of Gases the chief steps leading to the liquefaction of air have been noted, and to the names there given may be added that of C. E. Tripler of New York, by whose process liquid air and liquid hydrogen can be easily produced in large quantities. The various forms of apparatus used for liquefying air may be grouped under two main types. The first of these is based on Pictet's original apparatus, and is the form adopted, with various modifications, by Wroblewski, Olszewski, and Dewar. In it several cooling agents are employed in series, as it were, the first cooling the second, the second the third, and so on, the last and coldest being used in the actual liquefaction. Pictet used sulphur dioxide and carbon dioxide, and the substances chiefly used by Dewar in his liquefactions have been liquid ethylene, liquid nitrous oxide, and liquid carbon dioxide. The second type of liquefying apparatus is that known as the self-intensive, and is the one adopted by Tripler. The idea appears in a provisional English patent issued to William Siemens in 1857, and may be thus explained: A gas falls in temperature when suddenly expanded, and with a proper ap-

paratus it is possible to reduce the temperature of a gas considerably by causing the portion cooled by expansion to cool the entering gas before the latter is subjected to the expanding process. Thus the gas is, as it were, made to assist in reducing its own temperature by a cumulative process, ultimately becoming liquefied. By this method Tripler has succeeded in making liquid air in gallons. Later liquefiers on the same principle, but applying it in a somewhat different way, are those of Linde and Hampson. In these the highly compressed air is allowed to escape through a fine hole at the extremity of a copper coil, and the air, cooled by expansion, is made to return over the coil before escaping. The air entering the coil has thus its temperature brought lower and lower until it is reduced below the critical point, and with sufficient pressure a portion of the air liquefies and is blown in drops out of the hole at the extremity of the spiral. Professor Dewar has devised a special form of vacuum bulb for preserving liquid air. Mr. Tripler has sent large quantities of it to considerable distances in a sort of double tin or bucket consisting of one tin wrapped in felt and placed inside another.

Liquid air when pure has a bluish tinge, but the liquid form of ordinary air has a somewhat cloudy appearance owing to the presence of solid carbon dioxide and other matters. These can be filtered off in the ordinary way. If some of the clear liquid be poured in a glass vessel it will boil vigorously, apparently emitting clouds of vapor, but these are due to condensation of water vapor in the neighboring atmosphere. The outside of the vessel will at the same time become covered with hoar frost. If a kettle containing liquid air be placed on a block of ice, boiling will again take place and the addition of ice to the contents of the kettle will make the boiling proceed more rapidly. Many striking experiments can be performed with mercury and liquid air. The liquid metal can be frozen in a mold into any desired shape, and if screw-eyes be frozen into the ends of a bar heavy weights may be supported by its means. Hammers, tuning forks, and many other articles can thus be made from the normally liquid metal. If a tuning fork be dipped in liquid air its pitch is raised, and many other substances have their properties markedly altered by a similar treatment. Thus india-rubber becomes very brittle, and lead quite elastic. When liquid air is kept for a time it becomes richer in oxygen, or rather poorer in nitrogen, because the latter evaporates more readily than the former. If liquid air be added to water in a glass vessel it will be seen at first to float on the surface of the water, but after a little it begins to sink, and some of the water in contact with it becomes frozen. Finally, after some disturbance, the air passes off in the gaseous form. Alcohol or alcoholic liquors may be frozen by contact with liquid air. Since liquid air becomes very rich in oxygen after being kept for a time, it may be used to make combustion more vigorous. Thus paper soaked in liquid air burns vigorously when set on fire, and a piece of steel can also be burned in this way. The evaporation of liquid air in a closed vessel may produce violent explosive effects of various kinds. Carbon dioxide gas when brought into contact with liquid air is deposited as a snow-like solid. Many other striking experiments may be made with liquid air. If such substances as cotton, felt, charcoal, etc., be soaked in liquid air, they become very combustible, and may be used as powerful explosives. It has also been proposed to use the intense cold attainable by employing liquid air in order to purify certain substances, such as chloroform, ether, and alcohol, by freezing or crystallization. Liquid air may also be used in the near future as a source of energy in motors. Pictet showed that, when properly managed, exposure of the body to very low temperatures obtainable by using liquefied gases may be a very valuable curative agent in certain cases. Liquid air may therefore prove useful to the physician in some forms of disease; and it has been already employed as a cautery.

Liquidambar. See SWEET GUM.

Liquid Hydrogen. On May 10, 1898, Prof. James Dewar, of the Royal Institution, London, announced that he had succeeded in liquefying hydrogen in quantity, and that by means of the liquid hydrogen he had also liquefied helium. Professor Dewar, by the use of liquid air, cooled hydrogen to −205° C. The gas was allowed to escape continuously under a pressure of 180 atmospheres from the nozzle of a coil of pipe at the rate of 10 to 15 cubic feet a minute, in a vacuum vessel doubly silvered and of special construction, all surrounded by a space kept below -200° C.

Liquid Marble. See PYROLITH.

Liriodendron, a genus of *Magnoliaceæ* tribe *Magnolieæ*. *L. tulipifera* is the tulip tree, whitewood, tulip-bearing lily tree, Virginia poplar or poplar of America.

Liropoop, the ancient dress of a clergyman; in early times, probably a hood or tippet; later, a scarf or an appendage to the ancient hood, consisting of long tails or tippets, passing round the neck and hanging down to the feet, and often jagged. This ornament was not always confined to the clergy, for Peck, speaking of the extravagance of dress used by the commons in the time of Edward III., says: "Their lerripippes reach to their heels all jagged."

Lisbon (Portuguese, Lisboa; ancient, Olisipo), the capital of Portugal, province of Estremadura, on the Tagus, near its mouth. The city is partly built on the shores of the Tagus and on several small hills, and presents a magnificently picturesque appearance from the river. Including the suburbs it extends about 5 miles along the river. The older part is composed of narrow, crooked streets, badly paved, with high, old-fashioned and half ruined houses, monuments of the earthquake of 1755; though this portion suffered least on that occasion. The most beautiful part is called the New Town, stretching along the Tagus, and is crowded with palaces. The principal public squares are, the Praco do Commercio, 565 feet long; and the Praco do Rocio, 1,800 feet long. The churches are profusely decorated, and some of them are built of marble. Among other architectural curiosities the most important is the Alcantara aqueduct, which supplies all the public fountains and wells of the city. It brings water from springs about 3 leagues N. W. of the city. Its course is partly underground, but as it crosses the deep valley of the Alcantara near Lisbon, it is carried over 35 marble arches for a length of 2,400 feet. In one place it is 260 feet high, and remained uninjured at the great earthquake in 1755. Lisbon contains a large number of educational and scientific institutions, among which are the Royal Academy of Sciences, founded in 1778, a naval academy, and an academy of engineering; also a society for the promotion of national industry. The harbor, or road, of Lisbon, is one of the finest in the world; and the quays, which extend nearly 2½ miles along the banks, are at once convenient and beautiful. The foreign trade of Lisbon, formerly of considerable importance, has rapidly declined since the emancipation of Brazil. Indeed, the produce of Portugal now sent to foreign countries is almost entirely conveyed in foreign ships. The exports comprise wine, oil, fruit, and salt; imports, woolens, cottons, silks, metals, colonial produce, and furs. The manufactures are inconsiderable. The climate is healthy and genial. A political storm that had been gathering for several months suddenly broke out here in a short-lived revolution on Oct. 5, 1910, that resulted in the overthrow of the kingdom, the establishment of a republic, the flight of the royal family, and the choice of Señor Theophile Braga for President. Pop. (1908) 357,900.

Liscum, Emerson Hamilton, an American soldier; born in Huntington, Vt., July 16, 1841. In the Civil War he served three months in a volunteer regiment (1861), and then enlisted in the 12th U. S. Infantry. He took part in the battles of Big Bethel, Cedar Mountain, Gettysburg, and Bethesda Church, and in the campaign before Richmond; was promoted 1st lieutenant in 1863 and brevetted captain in 1864. After the war he served in Indian campaigns, and in 1898 accompanied the troops to Cuba; was wounded at the battle of San Juan Hill and for gallantry in that action was promoted brigadier-general of volunteers. With that rank, in 1899, he served in the Philippines. When the Boxer troubles in China broke out in 1900, he was ordered with his command to the seat of the uprising, and was killed while leading his men with the allied troops against the Chinese near Tientsin, July 13, 1900.

Lissa (Polish, Leszno), a town of Prussia, 40 miles S. by W. of Posen; was during the 16th and 17th centuries the headquarters of the Bohemian Brethren in Poland; here were their most celebrated school, a seminary, a printing office, and their archives. The town grew up round a colony of that sect, to whom the Leszczynski family afforded an asylum early in the 16th century. It was burned by the Poles in 1656, and again by the Russians in 1707.

Lissa, an island of Dalmatia, in the Adriatic Sea, 32 miles S. W. of Spalato; area, 40 square miles; is mountainous, grows good wine and olive oil, and has about 8,000 inhabitants. Fishing is the chief occupation. The island was held by Great Britain from 1810 to 1815. Off it the Italian fleet was defeated by the Austrians under Tegethoff on July 20, 1866. The Italian admiral, Persano, was next year expelled from the service.

List, Friedrich (list), a German political economist; born in Reutlingen, Aug. 6, 1789. He emigrated to the United States in 1825 and settled at Harrisburg, Pa. There he wrote "Outlines of a New System of Political Economy" (1827). He went to Leipsic (1833) as American consul and did not return to America. He published (1841) Vol. I. of "The National System of Political Economy." He died in Kufstein, Nov. 30, 1846.

Lista y Aragon, Alberto (lēs'tä ē ä-rägōn'), a Spanish poet; born in Triana, near Seville, Oct. 15, 1775. He was one of the best lyric poets of his time in Spain, with a rich fancy, deep sensibility, and a philosophic mind. His "Poems" were published in two volumes (2d ed. 1837). He wrote a "Course of Universal History," an adaptation of Ségur's work; and "Literary and Critical Essays" (2 vols. 1884). He died Oct. 5, 1848.

Lister, Sir Joseph, an English surgeon; born April 5, 1827. He was graduated at London University in arts (1847) and medicine (1852), and became a Fellow of the Royal College of Surgeons, England, in 1852, and of the Royal College of Surgeons,

Edinburgh, in 1855. He was successively assistant surgeon and lecturer on surgery, Edinburgh; Regius Professor of Surgery, Glasgow; Professor of Clinical Surgery, Edinburgh; Professor of Clinical Surgery, King's College Hospital, London (1877); and was made surgeon extraordinary to the queen. In addition to important observations on the coagulation of the blood, the early stages of inflammation, and other matters, his great work is known as the antiseptic system of surgery. This system and the theory on which it is based are now almost universally accepted; and their acceptance has in great measure revolutionized modern surgery, removing some of its most serious dangers, and thus greatly widening its field of usefulness. Lister was awarded many foreign honors, and received the medal of the Royal Society in 1880, the prize of the Academy of Paris in 1881. He was made a baronet in 1883 and a peer in 1897.

Liston, Robert, a Scotch surgeon; born in Ecclesmachan manse, near Linlithgow, Scotland, Oct. 28, 1794. He studied at Edinburgh and London, and settled in Edinburgh in 1818 as lecturer on surgery and anatomy. His surgical skill, and the rapidity with which his operations were performed, soon acquired for him a European reputation; and in 1835 he accepted the invitation of the council of University College, London, to fill the chair of clinical surgery. He soon acquired a large London practice; in 1840 he was elected a member of the council of the College of Surgeons; and in 1846 he became one of the Board of Examiners. His most important works are "Elements of Surgery" (1831) and "Practical Surgery" (1837). He died in London, England, Dec. 7, 1847.

Liszt, Franz, a Hungarian pianist and musical composer; born in Raiding, Hungary, Oct. 2, 1811. His father, who was in the employment of Prince Esterhazy, had sufficient knowledge of music to direct his son's studies, and at the age of nine he was performing in public. After one of his appearances at Presburg several Hungarian noblemen jointly undertook to have the boy thoroughly trained in music and he was sent by them to Vienna, where in 1821–1823 he studied the pianoforte under Czerny and composition under Salieri. He then went to Paris, where he received further teaching from Paër and Reicha, and settled as teacher of the piano and musical composer. In 1831 he heard Paganini play the violin, and this inspired him to work hard for years in order to achieve a like mastery of the piano. His real career as a pianist began, therefore, about 1839, when he left Paris and made an extended concert tour through Europe, his playing being received in all the great cities with enthusiasm. When his popularity was at its height he settled in Weimar and became director of the court theater. In this position he was enabled to produce works by Schumann, Berlioz, and Wagner, and to win favor for their new methods of musical composition. He made Weimar famous in the annals of music by producing Wagner's "Lohengrin" and Berlioz's "Benvenuto Cellini." In 1861 he resigned the directorship at Weimar and went to reside in Rome, where he took minor orders in the Roman Catholic Church in 1865, and was henceforth generally known as Abbé Liszt. Subsequently he retired from Rome to his native country, where in 1875 he received a government pension and was named director of the Hungarian Academy of Music in Budapest. He gave his assistance to foster the Wagner festivals of music in Bayreuth, and it was while on a visit there on July 31, 1886, that he died. His chief musical compositions are: The "Faust" and "Dante" symphonies, "Hungarian Rhapsodies," "Symphonic Poems," a large number of pianoforte pieces, several masses, and the oratorios of "St. Elizabeth" and "Christus." He also wrote monographs on Chopin and Franz. His writings were published in six volumes at Leipsic in 1880–1883. By the Countess D'Agoult, well known under the pseudonym "Daniel Stern," he had a son and two daughters.

Litany, a prayer of a supplicatory nature used in public worship.

Roman.—There are three forms of litany recognized by the Roman Church as admissible in public worship: (1) The Litany of the Saints, used on the feast of St. Mark, on Rogation Days, on Holy Saturday and Whitsun Eve, and during the Exposition of the Blessed Sacrament. (2) The Litany of the Blessed Virgin—usually called the Litany of Loretto, from its being first sung in the Santa Casa of Loretto—now generally used at benediction. (3) The Litany of the Holy Name of Jesus, consisting of titles of our Lord, with the invocation "Miserere nobis" (Have mercy on us).

Anglican.—The first change from the Roman litany in the direction of its present form was made in 1544. In the Prayer Book of Edward VI. (1549), directions were appended to the Communion office that "Upon Wednesdays and Fridays the English litany shall be said or sung in all places." In the revision of 1552 it was placed where it now stands, with the rubric "To be used on Sundays, Wednesdays, and Fridays, and at other times when it shall be commanded by the Ordinary." Grindall in 1571 forbade any interval between Morning Prayer, Litany, and Communion Service; but the Fifteenth Canon of 1604 recognizes the litany as a separate office. The practice of the present day tends in that

direction, and in many churches the litany is recited on Sunday afternoon, followed by a brief address. When it is said at morning prayer it follows the Third Collect for Grace.

Litchfield, a city in Montgomery co., Ill.; on the Cleveland, Cincinnati, Chicago, and St. Louis, the Chicago, Peoria, and St. Louis, and several other railroads; 60 miles S. W. of Decatur. It is in a region rich in coal, natural gas, and oil; and has manufactories of machinery, railroad cars, brick and tile, and flour. There are a public library, high school, St. Francis Hospital, waterworks, electric light plants, National and State banks, daily, weekly, and monthly periodicals, and an assessed property valuation of $450,000. Pop. (1890) 5,811; (1900) 5,918; (1910) 5,971.

Litchfield, Grace Denio, an American novelist; born in New York city, Nov. 19, 1849. She lived in Europe for a number of years, and afterward in Washington, D. C. Among her works are: "Only an Incident"; "The Knight of the Black Forest"; "Criss Cross"; "A Hard-Won Victory"; "In the Crucible"; "The Moving Finger Writer"; etc.

Litchi, or **Lee=chee** (*Nephelium Litchi*), one of the most delicious fruits of China, Cochin-China, and the Malay Archipelago. The tree which produces it belongs to the natural order *Sapindaceæ*, and has pinnate leaves. The fruit is of the size of a small walnut and grows in racemes. It is a red or green berry, with a thin, tough, leathery, scaly rind, and a colorless, semi-transparent pulp, in the center of which is one large dark-brown seed. The pulp is slightly sweet, subacid, and very grateful. The Chinese preserve the fruit by drying, and in the dried state it is imported.

Lit de Justice (lē duh jūs-tēs′) (literally "bed of justice"), formerly a solemn proceeding in France, in which the king, with the princes of the blood royal, the peers, and the officers of the crown, State, and court, proceeded to the Parliament, and there, sitting on the throne (which in the old French language was called *lit*), caused those commands and orders which the Parliament did not approve to be registered in his presence. The last lits de justice were held by Louis XVI. in 1787 and 1788.

Liter, or **Litre,** the French standard measure of capacity in the decimal system. It is a cube, each side of which measures 3.937 inches, and it contains 61.028 cubic inches, or 2.113 pints.

Literary Development. On New Year's day, 1901, there were thousands of "general readers" of English literature where there was one on New Year's day in 1801. The printing presses of England and America printed more pages in the 12 months then ended than had been printed in all the world in all languages before the year 1801. With the immense demand for books on every subject, with the certainty that more and more books will be read, literature, which is men's permanent expression of what they feel, think and know, has before it, in the 20th century, fields of work vastly larger than it had when the 19th century began.

James Ballantyne went to see Walter Scott one day, with a memorandum of the number of people who had paid hair-powder tax in the united kingdom in a year. He said to Scott that the class of people who used hair powder could be relied on to read books, if, by some new system, the right books were printed for them. At the end of the century, publishers and printers and writers are all aware that "Readers"—a very important factor in the business—are by no means any such separate class as these befrilled or bepowdered people to whom Ballantyne was looking. In America almost every family buys more or less books as every year goes by. In England the proportion of readers is vastly larger than it was in 1829. Among many other things, there results from this a distinct difference of style and a difference in the choice of subjects between the literary work of 1800 and that of 1900, and any comparison between the work of men of letters in the beginning of the century and that of the end, is affected by this change.

At the moment when the 19th century came in, England was at war with half the civilized world. America, as we call the United States of America, was busy in many things. Among others, she was beginning to raise cotton, she was beginning to people the valley of the Mississippi, and she had one or two men who were dreaming of steamboats. She had set forward the miracle of constitutional government in such advance as it had never made before, and so she had contributed to the literature of the world already the State constitutions, the Constitution of the United States and the other great State papers which belong to that period. That was the duty next to hand of America at that moment, and that duty America performed.

The men who came forward here at that time—the men who were trained under the auspices of the new-born nation—have written and said many things worth remembering. Of all these men it is to be observed that they had studied carefully in the best schools of English politics. One can trace the effect which Milton, Sidney, Locke and Chatham, Hume and Charles

Literary Development

Fox, and especially Edmund Burke, had on their thought and on their method of writing. Hardly any era in the history of English literature is marked so distinctly. The old century bade farewell to the little time of its best poets when William Cowper died in the spring of 1800. Robert Burns had died in 1796. The slate was cleared. For England a new life of English literature began, with Scott, Wordsworth and Coleridge. Scott published the "Border Minstrelsy" in 1802. He followed it up closely with the "Lay of the Last Minstrel." His personal companions must have known long before how he outranked every writer of his day; but to the torpid minds of most reading men and women in America and England this was the first morning flash of a new gun. As we look back on it all, we see very distinctly that what people like to call the realism of our century was born into our modern literature with Scott. He could not talk of roses and lilies as if there were no other flowers, but would put into his foreground the visible flowers of the place with their local names.

Coleridge and Wordsworth had already published the "Lyrical Ballads." Another set of the "Lyrical Ballads" appeared in 1802. Southey was the friend of both of these men. All three of them began in perfect sympathy with the English radicalism of their time; all three lived through their enthusiasm, and won the love and admiration of their time by poems which one does not associate with the special intrigues or crises of any hour. These writers and other great men like Scott and Byron, prized Shelley and his work. But I suppose that the constituency of the few men and women who then read Wordsworth and Shelley was at the first quite different from that larger company who enjoyed "Marmion" and "Childe Harold." Still the two schools of poetry, if one may call them so, belong together, and as one looks back on the literary and intellectual training of our fathers and grandfathers, it is easy to see how the poets of the first 25 years enlarged the life of England and America. One is tempted to say that since 1830 it has been impossible even to print such melancholy stupidity as it was good form to print and read in the London and Edinburgh and Philadelphia of 1790.

It is said of a Boston lady that when she met one of the most charming women in the world, who has not had the good fortune of going to a Boston school, with a certain surprise she cried out: "Why, the creature can speak!" as if she had been addressing a statue of Galatea. There is a little of this tone in the way in which Oxford men and Cambridge men in London spoke of Lamb and Dickens at first. And here it should be said that the year 1840, or thereabouts, marks the period when the language of all England and of America takes the place in our literature of a certain genteel language, only used among certain peacock feather mandarins of the classics. I mean that people now begin to call a spade a spade; that they talk of a linch-pin or gib-key. A man speaks of a doll in the pulpit. This change, which has given great additional range to the language employed in literature, may be said to have been first indicated in what I have called the group or school of London authors.

It is said that the Italian opera uses but 650 words. The Italian opera certainly represents the lowest possible expression of what may be called by courtesy human thought. The writer of these lines uses about 2,500 words in his familiar conversation. Shakespeare used 5,000, which means that Shakespeare had twice the power of expression which I have. Now, without their knowing it, perhaps, the range of the modern school of novelists has extended just so far the range of the instruments which they use. If you call these instruments mowers or reapers, you might say that the swath which they cut is 10 times as broad as that which was cut by the mower of the "mown land" described by King David.

The convenient word "realism" is used to represent the gradual change which has been thus wrought in literature as it has been wrought in art. In art, people ascribe it in part to photography. It appears as well in history. The historical work of Motley and Parkman in America, and that of John Richard Green and Mrs. Green in England, even that of Macaulay, is of very different character from such work as was done by Hume more than 100 years ago. In general, it would be fair to say that there is less distinction now between the language of the man of letters and the man of the world than there was in the days of Addison, or in the earlier days of Chaucer's pilgrimage. The language of the workshop, of the traveler and of the laboratory finds its way into literature; and the charm of attractive style is expected in the work of the physicist or the mathematician and the traveler.

I have made no effort to discriminate between literary work in America and that of England. Students of each continent have drunk at the same fountains, they have read the same books. Realism appears distinctly in the best work of the American poets, philosophers, preachers, historians and novelists. The pulpit in America has had the great advantage that it does not speak for a class, as it does in England. The English preacher is a magistrate, who looks down with a certain condescension on the plebs which he sees before him. The American preacher is one

of his own people; and if he should speak as a superior he would be said to be taking airs on himself. Perhaps something of the same sort may be said of the American novelist. Mr. Howells is one of the people and is glad to be one of the people; he believes in the people; and as you read one of his books, you feel that all this is so. He is not approaching the working classes with kid gloves. And what he says, therefore, is vital. This is more than you can say of Lord Beaconsfield's "Sybil," or even of the best of Charles Kingsley's novels, though they rest on the life of the modern workman.

There is no more interesting variation, as the botanists would call it, of the species of the "modern novel" than that larger range of writing in which working men and working women play prominent parts. Mrs. Gaskell may be said to have been the first eminent writer who brought factory life into vivid exposure.

Carlyle made himself known by articles in the magazines as early as 1830. Some American schoolboys knew his work before they knew him, for he assisted Brewster in his translation of Legendre's "Geometry," a version which was for many years used as a school book. His work was never more serious than in those early magazine articles. But year after year he took a wider and wider range. He is to be rated not simply as one of the first moral philosophers of the century, but at the same time, as one of its great historians.

Every English or American writer of the least sense between that time and this shows more or less the result of Carlyle's work. On this side of the water, his friend, his adviser — more than once his protector — is Emerson, one of the great philosophers of all time. It is well said that Emerson preaches today in every pulpit of English-speaking Christendom. To both these leaders, to their contempt for forms, consistency and conventionalism, one must refer in large measure the triumph of simplicity and reality in our literature.

In such limited space I had better illustrate this by what we see in the development of the novel, to which I have referred, and to its place in any estimate of literature, a place so different from anything it had 100 years ago. On this side of the water in the years 1850 and 1851 Mrs. Stowe wrote and published "Uncle Tom's Cabin," the novel which shares with "Robinson Crusoe" the honor of having been read by more people than any other novel. Its power in political history cannot be overestimated. And while it fulfils all the conditions of romantic fiction, it is realistic from end to end. In England, at the same time, Dickens was opening up to literature fields which since DeFoe died, the great authors had neglected.

Literary Development

The custom was now renewed of publishing the great novels as serials. "Uncle Tom's Cabin" was published thus, and more than a year passed between its first and last chapter. "The Pickwick Papers" and all Dickens' large novels, all, perhaps, of Thackeray's novels, of George Eliot's, of Mrs. Gaskell's, Anthony Trollope's, Mr. Howells', Mr. James', Stockton's and Besant's have been published in the same way.

I have spoken of Mrs. Gaskell as the first great novelist who introduced the factory operative and the giants of machinery into fiction. Miss Yonge is not to be forgotten in the decorum and virtuousness of her well-trained heroes and heroines; no, nor on our side, the sisters Wetherell. Mrs. Lewes' stories are so many chapters in what, in old times, we called moral philosophy. And Mr. Howells may say what he chooses about the artistic failure of books which have a purpose, all the same the reader of his books is led, and knows that he is led, by a master who means to make him believe that all must live for each and each for all.

To the surprise of critics, and of other readers, who know much more than critics do, Robert Stevenson and Rudyard Kipling stepped forward, when still young, and took that front rank among story tellers which they hold today. Stevenson's career before the public covers hardly 15 years, Mr. Kipling's not so many. It must be confessed that the reign of the novel is as mighty, as wide and as imperious as ever. Granting that poetry has had to abdicate the highest seat in our Pantheon, granting that the novel has taken that seat, the nation has no need to be ashamed which can name Scott, Jane Austen, Dickens, Thackeray, Mrs. Stowe, George Eliot, Mrs. Gaskell, Miss Brontë, Trollope, Besant, Hardy, Howells, James, Blackmore, and George Meredith among its novelists.

Poetry has for the present taken the second seat. But there is no such disgrace to the poetry of England and America as in the last half of the 18th century, when the genteel poetry was intolerable and Burns and Cowper held up their heads in an ocean of conventional dullness.

The first half of the century records among its poets the great names with which we began. For the last half, the circle of American and English poets contains such names as Tennyson, Browning, Kipling, and in America, Bryant, Emerson, Longfellow and Lowell. We remember gratefully Edgar Poe, Walt Whitman, Dobson, Jean Ingelow, Lang, Holmes, William and Louis Morris, Patmore and Sterling, Matthew Arnold and Edwin Arnold and Swinburne among others. In all the half century there is no such name as Homer, Dante, Shakespeare or Milton; but we need not

despair. He who shall bear that fifth name is perhaps already born.

EDWARD EVERETT HALE.

Literature, Modern English. There are certain landmarks in the history of modern English literature, which, without being of paramount importance in themselves, serve to remind us vividly of the imminence of change. Among these are the accession of James I. in 1603, the death of Dryden in 1700, the publication of "Lyrical Ballads" in 1798. We are unable yet to withdraw into sufficient perspective to perceive what event of the passing decade will hold for the 20th century a like importance. But we are beginning to be able to follow the course of the 19th century, and we can already, perhaps, get far enough away from its literature to compare it with that of its predecessors. To the literary historian, the period of English letters which offers the most ideal conditions is the 18th century; not too irregular, yet full of variety; not too crowded, yet singularly well supplied with striking and picturesque figures. If the history of English literature as a convenient and shapely object of study was advancing till 1798, it certainly since then has declined, tending to become, that is to say, confused, choked, and bewildering. But we can hardly doubt that the 20th century is destined to be still more overcrowded, still more pathless; and as time proceeds, in the horrible onset of unnumbered books, it is probable that literary history will cease to be attempted, and the deafened world will simply turn back to a contemplation of the old quiet times. By the side of the literature of the 25th century that of the 19th will probably seem cool, sane, and Quakerish.

At present, however, we are more conscious of the exceptions than of the general plan, yet perhaps something of the latter may already be perceived. To venture on one of those broad generalizations which are merely useful as leaping poles to carry us bounding over chasms in the path, I would define the 19th century in English literature as a period of individualism. It followed a century which had been mainly interested in general ideas. David Hartley had given us his "Observations on Man" and Hume a "Treatise on Human Nature." These were exactly to the taste of 1750, but in 1850 we wanted to receive observations on the man, Carlyle, and what was welcome was a treatise on the personal nature of Ruskin. It is a commonplace to say that the 18th century closed in revolution, and that the 19th is the result of that cataclysm. But, in studying all cases of successful revolt, the great interest is to discover whether the old dynasty comes back in a new form or whether a new dynasty is inaugurated. After the romantic revolution of 1798 did the old rhetoric come back again, or did a new thing take its place?

We are in the habit of thinking that the spirit of the 18th century was killed by Wordsworth and Coleridge. But we neglect to observe that it was on the point of being brought to life again by Byron and Shelley. Those poets were saved, and our romantic literature was saved with them, by the happy accident that each of them was born with a temperament so extremely individualized that it overweighted his tendency to rhetoric. But if Shelley — with his force and genius, and his native passion for rhetorical effect — had possessed no inclination to analyze his own feelings, he might almost have succeeded in stemming the tide of romanticism. And this moment of danger under the reaction against Scott and Wordsworth was but the first, though perhaps the most important, of successive resistances which recurred up to the end of the century.

The general course, then, of the last 100 years in English literature has been one of individualism as a strong current, every now and then unsuccessfully fretted by attempts at reaction. The form that this individualism has taken has been mainly that of self-study and self-revelation The 17th century was all phenomenal and dramatic, with stormy fits of external observation. The 18th century sought, in unruffled calm, to meditate on Man and the broad generic principles of his action. The 19th century shattered this artificial "dome of many-colored glass" into innumerable fragments, each fragment an epitome of human kind; and desired to know the wants, the passions, and even the frailties of each individual. If we glance at the most characteristic names of the 19th century,— Coleridge, Byron, Keats, Carlyle, Thackeray, Tennyson, Rossetti, Ruskin, Stevenson — whom we will — they are all the names of men who have written, with more or less tactful show of reticence, mainly about themselves, who have judged mankind by samples of brains and blood, who have made self-study and self-revelation the starting-points of all their adventures in the edification and entertainment of mankind. And in this sense Robert Browning, it may be, sums up the century and is its most characteristic exponent, since he, more consistently than anyone else, has repeated the thoughts and emotions of us all, only with those splendid modifications which are the ornament of genius. And then, at last, comes Rudyard Kipling, who breaks with all his ancestors, who appears to have no desires or feelings of his own, who is exclusively external and objective, for whom (just as for the 18th century) "a man" is nothing and "Man" is everything. Is he the precursor of a totally new condition of literature, in which psychology, the analy-

Literature

sis of the soul, will be rejected, as the impersonal rhetoric was rejected 100 years ago? Perhaps so, but this is not the place for prophecy.

In consequence, perhaps, of its tendency to self-study, the 19th century has been preeminent in the reproduction of lyrical poetry. The young man, vividly conscious of the peculiarities of his personal temperament, and seeking solace in self-description, naturally confides his sorrows and his longings to the world in song. Looking back over our history, we find the century which has just closed to have been above all others the age in which the lyrical voice has made itself heard. This predominance of poetry is to be judged, not by the number of persons who have appreciated it — for those have often been few — but by the force, skill, and variety of the poets themselves. That is to say, time soon eliminates the commercial element of success and one fit reader overweighs a million of the unfit. Percy B. Shelley and Jane Porter, for instance, attempted to address the English public at the same moment. It is no exaggeration to say that the lady possessed 10,000 admirers for every one that listened to the gentleman. The instance is not an unfair one, because the authoress of "Thaddeus of Warsaw" was not one of the worst, but one of the best deciduous novelists of her time. Yet her romantic prose is forgotten, and Shelley's verse is as indestructible as diamonds.

When we admit that it is the poetry of the century which has been its most characteristic feature, we go on to conjecture that its regular and stately growth from one single stem has a great deal to do with this uniform distinction. In the 17th century, when also poetry flourished with so much splendor, its growth was capricious and irregular. It rose to violent heights in Shakespeare and his compeers, it sank to positive inanity in the later dramatists; it spread upward once more on a totally different plane at the Restoration, it expired with the expiring century. But a magnificent uniformity of development has distinguished the English poetry of the 19th. There has been a regular transmission of the great lyric manner. There has been no extraordinary disinclination to tread in the steps of the ancestors. Wordsworth and Coleridge are followed by Byron and Shelley, Keats and Tennyson by Browning and Rossetti; the web is complicated by the gorgeous threads of color shot through it, but it remains one texture. Nor, certainly at the death of Tennyson, in 1892, could it be perceived that any new tendency or stream of influence had entered English poetical literature since the publication of the "Lyrical Ballads" of 1798.

In the novel, which is the other great popular division of literature as it is generally understood, though there has been remarkable and even preposterous abundance of production, the result does not seem to be in any way so characteristic. If the figure of Johnson present itself to us as representative of the center of the 18th century, it is not any novelist, it is rather a prophet, Carlyle, or a poet, Tennyson, who occurs to us as the typical literary personage of the center of the 19th. This may be partly because the impressive uniformity of ideal which we have noted as a striking source of strength in the line of the poets is totally wanting in the line of the novelist. At the very opening of the age there was a discord between the romance of Walter Scott and the naturalism of Jane Austen. But this might have been gradually eliminated if a genius had not arisen in whose hands the confusion became ten times greater. Dickens, one of the most enjoyable of writers, is one of the worst disturbers of literary history. He arrived at a time — 1835 — when the extinction of other forces in fiction made insistent the call for a thoroughly sober novelist of manners. Dickens arose with his gigantic humor, his fantastic misrepresentation of human nature, his incomparable vitality and vivacity, and he made the novel as a branch of sound literature in England almost impossible. Dickens led the whole nation away from the idea of the novel as a faithful picture of life, and he did this just at the moment when Balzac was leading the French habit of mind back to reality and genuine observation. When Dickens was at the height of his influence, that influence was resisted by Thackeray and by the Brontés. We owe much to the strenuous labors which made George Meredith, and, later, Thomas Hardy and Robert Louis Stevenson, possible. But it will take us long to escape from our critical disrespect for experience, and even in "Tess of the d'Urbervilles" and in "Dr. Jekyll and Mr. Hyde" the Dickens deformation of types and incidents is marked. Of this national disease, this indifference to reality, the main bulk of 19th century English fiction has died already or must soon be dead.

In an age of marked individualism the study of history is sure to show freshness and a novel zest. We are so much interested in ourselves that we recognize the futility of treating our ancestors as abstractions. Even if we falsify our fiction, we must pursue truth — minute, particular, unembroidered truth — when we are discussing fact. We are no longer satisfied with the trappings of monarchy, with the crown and the robes of State, but we endeavor at every point to resuscitate the human movement of the crowd. Hence the 19th century has been an age in which history has so greatly flourished that, as we

Literature

look back, this seems one of its main intellectual distinctions. Quite at the beginning of the 100 years there were those modest rebels against rhetoric, Sharon Turner, Sir Francis Palgrave, Lingard, Napier. These were, after their fashion, disciples of Gibbon, and they passed on the lamp of research to Hallam. These men started the theory that you should build "the history of a country on unquestionable muniments," and this the 19th century proceeded to do. There followed an interlude of brilliant writing, in which Macaulay and Carlyle raised this branch of literature to the highest popular honors. But the historians who really carried on the tradition went back to the precursors for their art; in Froude's hands we see, not Macaulay at all, nor even Hallam, but a vivification of the patient methods of Palgrave. In Froude first we see the completed individualist historian, who illustrates personal character without losing hold of the political situation, working toward a definite aim with perfect composure. His great rival, Freeman, keeps more closely still — almost too closely — to the authorities. Too closely, one thinks, because the imperfect psychology of the mawkish chronicler may make him a worse guide to the sources of action that the common sense of a wise man living many hundreds of years later. But the clear line of truth sweeps around, in the hands of conscientious and scrupulous historians, Stubbs, Gardiner, Hodgkin; and the 19th century closed with an immense labor of systematic research performed, and adorned, more than we sometimes are willing to acknowledge, by the durable splendor of style.

In philosophy, the 19th century was not illustrated by a succession of critics of abstract thought, as the 18th century was. There was no Berkeley, or Hartley, or Hume, or Reid — no chain of lucid thinkers descending from theory to theory. But two men of gigantic intellect gave enormous impetus to thought by concentrating their energies on a theory which shall combine the principles of biology, psychology, and sociology. This is, of course, the famous theory of evolution, applied by Darwin and Herbert Spencer to all systems of nature, organic and inorganic. In the briefest sketch of what the 19th century has done in literature, it is absolutely imperative to mention the publication of "The Origin of Species" (1859) and "Principles of Psychology" (1855), because, though neither work is written with an attractive elegance, each is the starting-point of an intellectual and moral revolution so vast that every branch of life is affected by it, and literature itself — in its lightest forms — can no longer ignore the germinal forces with which evolution has quickened all our emotions.

Ruskin would fain have been numbered, also, with the philosophers. But the philosopher must be consistent and he must be calm. It was not Ruskin's privilege to see life serenely or to see it whole. He saw it, however, with penetrating passion, and his deepest claim on us is not for what he divined, but for what he reported. If we must place him, it will be with the prophets or critics, not with the philosophers. He is the finest descriptive writer in the English language, and that section of the literary activity of the 19th century which depends on the instant and almost magical rendering into brilliant language of a violent impression culminates in Ruskin. He is the greatest, though far from the soundest or broadest, of the English critics of the century, and he is intensely characteristic of it, because of his unbridled, often tiresomely excessive, always poignantly acute, individualism. He is master of the criticism which aims not primarily at making us know, but at making us feel; and in consequence Ruskin, who is often wrong, and sometimes even indifferent to his error, has radiated knowledge and sensation into the remotest corners of the age. He then, too, for his worship of beauty, his magnificence of style, his ardent and reckless pursuit of intellectual and moral vitality, must always be mentioned as one of the leading "types" of the 19th century.

It would not be fair to dwell on the brilliant successes of individualism in the 19th century without confessing to its failures also. That "charlatanry" which Taine recognized as the main danger of modern thought, the rapid dismissal of sides of a question which require sustained consideration — ignorance, in short, married to presumption — has not been absent from the production of the 19th century, and has often disfigured it. But it was not absent from that of the 17th century; perhaps wherever there is rapid movement and vivid vitality, this turbid element is roused and cannot be evaded. If we look at the records of satire, we shall find that each successive generation has seemed to its own cynics to be more deeply afflicted with it than any other. But a very happy circumstance is that this floating and whirling rubbish invariably sinks to the bottom and the historian is not called upon to share the agitation of the satirist. The bad novels and bad poems and bad essays of 1810 and 1840 and 1870 were very trying indeed to people who lived beside them and watched their popularity. But when we look back at those years we think only of what was of durable merit. So — let us have the courage not to question — will it be with the tares and wheat of 1900.

Some weeds, however, have very pretty flowers, and while they last they attract and disturb attention. This is a phenome-

Literature

non which seems to be characteristic of the 19th century and which is worth noting. In the 18th century, where there was a more exact standard of literary merit, whatever attained a certain definite acceptance might expect to retain it. To this day we return to the faded minor masters of the age of Queen Anne or George II., feeling that, up to their modest level, they hold their own; people like Parnell or Akenside have sunken, but they will sink no more. There they are, embedded in history, stationary for what they may be worth. But since the Romantic Revival there has been a tendency for literature to be invaded by names which proved really ephemeral, representing writers who did not write badly, but who could not make themselves ultimately felt; these people have not become small and dry, but have disappeared altogether. At various periods since 1800, authors have attained considerable fame and wide circulation who have now ceased to exist. No pre-19th century obscurity compares, for instance, with the absolute extinction of James (not Robert, who was simply a bad writer) Montgomery, of Samuel Parr, of T. N. Talfourd, of Douglas Jerrold — names taken at random.

This is quite what one would expect of a literature patently individualistic, since, when it is mainly the expression of personality which interests, if the person is void of real importance, when once that emptiness is detached, nothing attractive remains. Hence, even when there is a genuine individuality, the presence of artificiality and non-reality greatly endangers its permanence. We tremble for some of the most famous names of the middle of the century. We ask ourselves whether the faint and rigid sincerity of comparatively small writers like Gray or Cowper may not preserve them long after Bulwer Lytton and Elizabeth Browning have ceased to please. One thing is quite certain, and it must be faced with intrepidity: history will not endure the burden of the immense literature which the 19th century laid upon its shoulders. It will bear much, for instance, but it will not bear the torrents of verse from Wordsworth to Stephen Phillips without encouraging tremendous leakage, evaporation, and diversion. Nevertheless, it is probable that the poetry will stand the test more satisfactorily than the prose. The 19th century was most distinguished, most constantly successful, in its verse; the finest gift which it presents to posterity is unquestionably its unrivaled succession of poets, names of which not only any century but any country might be proud.

It is perhaps interesting to endeavor to see what are the greatest names of influence which have diversified the face of this crowded, turbulent, motley century of literature. To the critics of the first quarter of it, prophesying in a vacuum, certain names appeared the most prominent which we should now not mention in a very rapid survey. But of the earliest generation Wordsworth and Coleridge remain, the Dioscuri of our romantic poetry, every year shining more brightly as they slide higher up the firmament. In the next generation we still meet Byron, sadly despoiled of his beams, in spite of the over-emphatic eulogy of a few untimely admirers, but always acutely alive as an individual; Shelley, who perhaps has passed the meridian of his influence; and Keats, still advancing steadily, and likely, perhaps, in remote posterity, to prove the most durably delightful of all the poets of the century. Later Tennyson, Browning, Matthew Arnold, Rossetti, Swinburne, are the most illustrious poet-figures, each attended and succeeded by presences scarcely less splendid than his own.

In prose the names are myriad. As we glance very superficially down the whole century and endeavor to perceive it comprehensively, the most eminent of those who have made literary expression in elaborate prose their object, and have endeavored to produce in it effects analogous to those of verse, are: De Quincey, with his mellifluous splendor; Charles Lamb, with his tender resuscitation of the 17th century forms; Macaulay, the unimaginative, so positive and pleasing; Carlyle, with his turbulence and thunder; Thackeray, and Froude, and Matthew Arnold, in their various modes so harmonious and persuasive; Newman, with his lucid amenity; Ruskin, unapproached in the splendor of "his flights and his music," like the Bee in Swift's "Battle of the Books." To these nine, if a tenth name were to be added, in the judgment of not a few of those of the younger generation it should be that of Pater — an opinion which I record without venturing to affirm or reject it.

The current reviewers of books love to gird at the pretensions of "style," and repeat to weary ears the commonplace that it is what a writer says that is of importance, and not how he says it. It is not worth while to combat this contention, which springs up in the daily and weekly press like a pretty daisy. But when we attempt such a heroic, such a ridiculous task as to recapitulate in a brief essay the crowning merits of a whole century we see how completely everything unattended by a fine manner disappears. In the larger sense, in the wider outlook, positively nothing whatever remains observable in imaginative literature except what has been recorded with consummate technical skill. In the survey of 100 years, where so much has been written by an infinite cloud of authors, we have no time nor space to consider

whether such a one displayed a valuable chain of moral thoughts or desired to deliver himself of really sound ideas. We are driven to selection, and we select those whose expression, whose form of delivery, was the most original and splendid. Keats had nothing very important to say, and while he was singing it, infinitely graver matters were being discussed by Godwin and by Mackintosh, by James Mill and by Jeremy Bentham. But it is now Keats and not these people at all who is read, and read with rapture. Perhaps the most striking lesson which the study of English literature in the 19th century has to offer us is that the only absolute element of literary durability is style. EDMUND GOSSE.

Litharge, the yellow or reddish protoxide of lead partially fused (PbO). It is extensively used in the manufacture of glass, of enamels, of artificial gems, of lead plaster and lead soap, of sugar of lead, white and red lead, and other compounds.

Lithia, in chemistry, oxide of lithium. Carbonate of lithia acts as a powerful diuretic, which may be given in acute and chronic gout, in uric-acid gravel, and renal calculus. It may be used externally as a lotion. Citrate of lithia is also lithontriptic. These salts, being solvents for uric-acid calculi, alter the quality of the urine, and prevent the crystallization and deposit of the substances forming gravel and calculi. Muriate lithia waters are waters impregnated with chloride of lithium, as at Baden Baden. They are useful in gout.

Lithium, (symbol Li; at. wt. = 7), a monatomic element of the alkali group of metals. It is of comparatively recent discovery, and although occurring generally in minute quantities, is very widely distributed through the mineral kingdom. It can be obtained by reduction of its fused chloride by means of the electric current. The metal has a white color, and fuses at 180°. Lithium appears to be the lightest solid body known, having a density of only 0.5936. It burns with a white light, and, when thrown upon water, is oxidized like sodium. It is volatile at a high temperature, and may be distilled in a current of hydrogen. Like potassium and sodium, lithium dissolves in anhydrous ammonia, and on evaporating the liquid, it is left behind, with its original appearance and color.

Lithography, the art of drawing on and printing from stone, is a comparatively recent invention, the principles on which it is based having been discovered by a young German literary adventurer about the close of the 18th century.

The entire superstructure of lithography rests on the facility with which calcareous stones absorb grease and imbibe watery solutions; the mutual antipathy of water and grease and the disposition of greasy substances to adhere to each other. In illustration, suppose a drawing made on a smooth stone with lithographic ink, which is a greasy substance. The drawing is first treated with weak solutions of acid and gum, then subjected to a process of charging, in which gummed water is freely used. After this the stone is again wet and an inking roller is passed repeatedly over it. The parts of the stone not occupied by the drawing are protected by the water and gum repelling the printing ink, and therefore remain clean. But the greasy lines or marks forming the drawing, having rejected the water, receive the greasy ink, which adheres to their surfaces in sufficient quantity to give off an impression to paper when subjected to the action of the printing press.

It will be seen that this process differs essentially from copperplate, wood, or type printing. In those operations the impressions are taken from incisions below the surface or from projections above it; whereas in lithography they are obtained from a uniformly level surface by the operation of the laws of affinity and repulsion; hence the term chemical printing.

The story of Alois Senefelder, the inventor, is told by himself in his "Complete Course of Lithography," published at Munich in 1817. He was born in Prague in 1771, but was early removed to Munich, where his father, an actor by profession, permanently settled. Young Senefelder received a fair education and was studying jurisprudence at the University of Ingoldstadt when his father's untimely death threw him on his own resources. An early predilection for the drama led him to connect himself with the theaters as a means of subsistence; but after two years of wandering and privation he left the stage in disgust, resolving to devote himself exclusively to literature. His first essay—a small dramatic composition—proved a failure.

His poverty forbidding all hope of launching a second venture in the usual way, he set about devising means to become his own typefounder, printer, and publisher. With this view he partially wrought out a contrivance to imitate type printing; but that was soon relinquished because of the expensive nature of the materials, and his next scheme was to etch imitations of printed characters on copper plates. In prosecuting this design, the necessity for a varnish to cover and enable him to reëtch his frequent errors in writing backward soon presented itself. The stopping-out mixture of the engravers being unknown to him, he proceeded to make one for himself and in course of his experiments hit upon the mixture of beeswax, soap, and lampblack, by means of which he was destined afterward to found an entirely new art.

Though the possession of this varnish removed one great obstacle to his practising on copper, the labor of repolishing the used plates eventually disheartened him and he was on the point of abandoning all further attempts when his attention was drawn to a slab of Kellheim stone — a species of calcareous slate he used for grinding colors. It struck him that by polishing this slab and covering it with a thin layer of his composition, he might continue his writing exercises with greater facility than on copper, the stones being plentiful and prepared at a trifling cost. He accordingly proceeded to work on the new material, treating and printing it in the same manner as a copper plate; but at this juncture a seemingly trifling circumstance gave a new direction to his experiments, resulting in the discovery of lithography.

He had just polished a stone when his mother desired him to make out a list of clothes she was giving out to wash. Neither paper nor ink were at hand, but the polished stone and his composition kept by him in a liquid form presenting convenient substitutes, he therewith jotted down the list to be copied at leisure. Soon after, when about to wipe the writing from the stone, the thought struck him to try the effect of reversing his usual practice. Hitherto he had scratched and corroded the writing into the stone through a thin layer of his varnish; but he now proposed to execute the writing on the clean stone with his varnish and then depress with diluted aqua fortis all parts of the stone not covered by the writing, which resisting the acid would thus leave the lines standing above the surface. This slight relief, he thought, might admit of the printing ink being applied to the writing in the same manner as to a wood block or types.

The first trial was encouraging; and after varied experiments his gratification was intense, when even with the rude and imperfect means at his command, he found he could produce with ease a firm and clear impression from the slightly raised writing.

Though this was not the chemical lithography now practised and which he afterward invented, still the comparatively perfect results of the new and facile method of printing and the inexpensive nature of the process convinced Senefelder that he had made an important discovery. The prospects of fame and wealth it opened up at once diverted his ambition into a new channel; but his poverty stood in the way of giving his invention the fair trial which he felt assured was only wanting to prove its wide utility.

Various expedients to procure the necessary means utterly failed and he was becoming hopeless of ever realizing his dreams of success, when he met with Gleissner, a musician, who, being about to publish some compositions, was induced to intrust the work to Senefelder and to advance the necessary funds on condition of sharing half the profits. These pieces, the first fruits of stone printing published in 1796, with a number of subsequent works, chiefly writing and music, were executed as described above, inked with a flat board covered with cloth and printed with an old copperplate press. The range of this method was, however, very limited; and it was not till Senefelder invented a press with a new action and by applying the principles of chemical affinity avoided the objectionable necessity of depressing the surface of the stone, that lithography attracted the attention it merited and took its place among the fine arts.

Within a few years the secret of the new art had become widely known and practised in defiance of the inventor's claim to exclusive privilege. Senefelder experienced the not unusual fortune of inventive genius; for while he continued to plan and work out improvements and new methods, others adopted them and reaped the fruits; for though he had occasional gleams of pecuniary success, he found himself at the end of 15 years' unremitting toil still poor and in debt. But at this period a fortunate accident introduced him to the president of the board commissioned to survey the kingdom of Bavaria, by whose intervention he was appointed superintendent of the lithographic department with a liberal salary, this good fortune being after a few years further increased by a pension from the king.

Senefelder was now in a position to continue his efforts toward perfecting his invention unmolested by the strifes and cares which had so long pursued him and he sedulously devoted every spare hour to the all engrossing pursuit. He died in 1834, and so far as the principles and methods of application are concerned, it may safely be affirmed that he left the art of lithography in nearly as perfect a state as it now is. Even in his work published 17 years before his death, he enumerates 20 different "manners," including all or nearly all the methods now practised. And though the accumulated experience and mechanical improvements of three-quarters of a century have simplified the processes and perfected the appliances, thereby reducing the practice of the art to a degree of certainty it did not possess in the earlier time of Senefelder, it is doubtful whether he left much or anything for his successors to discover in novelty of application.

An attempt to establish lithography in England was made in 1802 by M. André, one of Senefelder's temporary partners, and Senefelder himself visited London to superintend the commencement of the undertaking. But the project failed through the incompetency of M. André's brother, who was left in charge. In 1807 a second at-

Lithography

tempt was made in London but failure was again the result. About this time, however, lithography was taken up by the ordnance authorities, though it was not generally adopted till 1816, when it began to attract the attention of competent artists. From this period till about 1830 its progress in Great Britain was slow, but since then it has rapidly advanced both in the beauty of its artistic productions and in its extensive application to trade purposes.

Lithography seems to have been excluded from France till 1814, but its development there was more rapid than in Great Britain and at a very early period the chalk drawings of the French artists surpassed all others. France and Germany have still the preëminence in chalk drawing but in chromo lithography they are now rivaled by Great Britain.

We now proceed to describe the materials and instruments used in lithography and the methods generally followed in executing works in the different styles.

Lithographic Stones.—The kind of stone which Senefelder first met with and continued to use is superior in quality to any hitherto found elsewhere. It had long been used in Bavaria for interior architectural decorations, an abundant supply being obtained in the district extending from Pappenheim to Kellheim on the banks of the Altmühl, a tributary of the Danube. A similar stone has since been found in France, Prussia, England, and America; but all are inferior to that supplied from Solenhofen, the depot of the Bavarian stone district. It is a species of slaty limestone, found in layers from ⅛ inch to 8 inches thick. The color of the best quality is a pale yellowish drab; the inferior descriptions vary in hue from a dirty reddish drab to a cool gray or green tint. The thickness necessary to stand the pressure in printing ranges from 1½ inch to 4 inches, according to the size of the stone.

Grinding, Polishing, and Graining Stones.—In order to insure good printing and prevent breakage, the stones must be carefully prepared for the lithographer. They are shaped oblong to suit the various sizes of paper and made perfectly level on one face by placing them on a planing machine which planes the stone perfectly smooth and true (on both sides if desired), a final hand polishing with "Water of Ayr" stone being given in the case of very fine work. Formerly, instead of the planing machine, a grinding machine was employed, the stones being also hand polished with freestone and Water of Ayr stone, the freestone removing the granulated surface caused by grinding. A different finish is given to the stone for chalk drawing or for tinting, the surface being granulated or grained. This is done by moving a small stone over the surface of that to be grained, causing it to revolve in small circular sweeps. Very finely sifted sand is used and considerable skill and experience is needed to determine when the movement should cease or fresh supplies of sand be stopped, as thereon depends the quality of the grain which must be rough or smooth according to the size of the drawing or the texture of the objects in it.

After polishing or graining, the stone must be carefully brushed and washed with pure water and then laid aside to dry. Used stones can be reground and made fit to receive successive drawings or transfers but all traces of the former work must be obliterated.

Should a stone be too thin, or made so by repeated grinding, it is usually backed by bedding it on an inferior stone, on slate or Aberdeen granite.

Lithographic Inks and Chalks or Crayons.—As most lithographers manufacture their inks and chalks* according to their own particular formula, the following materials and modes of compounding though frequently are by no means invariably adopted.

The ink used in pen or hair-pencil drawing direct on the stone is commonly made of the following materials:

Virgin wax.	Shellac.
Dry white soap.	Mastic.
Tallow or lard.	Lampblack or Paris black.

For writing or drawing on paper prepared for transferring to stone, the shellac is sometimes omitted and the ingredients differently compounded but generally the same ink is used for both purposes.

The ink for transferring copper or steel plate engravings, etc., to stone is usually composed of

Shellac.	Varnish of burned linseed oil.
Tallow or stearine.	Burgundy pitch or black pitch.
Brown soap.	Lampblack.
Brown wax.	

Some lithographers use the above mixture indifferently for plate transfers and for transferring work from one stone to another. Others again make up a separate ink for stone transfers of brown wax, soap, tallow, and shellac, and while warm grind lampblack into it.

The ingredients composing the chalks are nearly the same as those used in making drawing ink, but the mastic is frequently omitted and a little Brunswick black added to give more firmness and tenacity. Castile soap is also often substituted for the common white soap always used in making ink.

The manner of compounding the inks and the chalks is nearly the same, but here again the practice is not invariable. The usual mode, however, is first to melt the wax and tallow in a copper or iron pot over a moderate fire, then adding the other in-

* The term chalk, or crayon, applied to the lithographic substance so named, is strictly technical, and seems to have been given it merely because its appearance and use are similar to the mineral chalks and crayons made for drawing on paper.

gredients keep the vessel on the fire, while continuing to stir until the whole is perfectly dissolved. It is then removed from the fire, ignited by a rod of red-hot iron and allowed to flame for 15 or 30 minutes, according to the required consistence. The flame is now extinguished by closing the vessel, and lampblack and Frankfort black are stirred into the mixture. When thoroughly incorporated the mass is poured out on a hot slab, and if to be made into chalk or crayons, is cut, when cool, into small pieces fitted for the different uses it is to be put to, or it may be poured into oiled brass molds and thus fashioned into the desired shapes.

It is worthy of mention that Senefelder's first and simplest compound of wax, soap, and lampblack makes a good ink or chalk.

The composition for ink drawing or writing is made liquid by dissolving it in pure soft or rain water, the presence of the soap causing its solubility.

Transfer Paper.— Writings or pen drawings made on prepared paper can be transferred to stone in a very perfect manner and the process is so convenient that it has to a great extent superseded ink drawing or writing direct on the stone. Impressions from engraved plates, wood blocks, types, or stone can also be perfectly transferred by means of a somewhat differently prepared paper. That for drawing or writing upon is made by coating one side of thin, well sized paper with a mixture of isinglass or gelatine, flake white, and a little gamboge, melted over a slow fire, carefully strained and spread over the paper while hot with a broad camel hair brush. The paper is afterward passed through the press with the coated side laid on a steel plate in order to render it perfectly smooth. The mixture for coating the paper used in transferring from plates, etc., is made of fine wheaten flour, plaster of Paris, and a little glue or gelatine; it is likewise strained but is spread when cold on a thicker, softer paper.

Instruments.— The lithographic draughtsman requires all the instruments employed in drawing on paper, but besides these he not only adopts some tools of the engraver but manufactures others peculiar to himself. For writing or drawing with ink on transfer paper or upon stone, he uses quills scraped very thin, small sable hair brushes, and a peculiar kind of steel pen made by himself from very thin and finely tempered ribbon steel. For etching or engraving, steel points similar to those of the copperplate engraver are employed, and the glazier's diamond as securing a permanently keen point is also used. The flat scraper of the mezzotint engraver is a useful instrument to the lithographer in all styles, and common needles fixed in handles are used to pick out inequalities or give fine gradations in chalk shading.

Lithography

In proceeding to describe the different methods of lithography it is perhaps hardly necessary to premise that in the practice of this as in all other arts there are peculiarities in manipulation and treatment which vary according to the taste or training of the artist or the necessities of his subject.

Ink drawing direct on the stone is executed with the steel pens and sable hair brushes, the dissolved ink being made of such a consistence as will permit it to flow readily in working, but not so thin as to spread on the stone. A polished stone is used, on which the outline is traced by means of red chalked paper. The artist then proceeds to work as if drawing on paper; but the stone must be carefully protected from the slightest contact of its surface with anything of a greasy nature.

The work is executed chiefly in lines but broad touches may be laid in to strengthen the effect and light details can be taken out with the scraper, which is also used to reduce the strength of any part made too dark or to erase errors which may again be worked over; but the grease in the ink, we may remark, sinks immediately under the surface of the stone.

Preparing the Stones.— When a drawing is completed the very important operation of preparing the stone for printing remains. As this preparation precedes the drawing in some styles and is necessary at the completion of all, a brief description now will save repetition.

The object of the preparation is to give to all parts of the surface of the stone exposed to its influence the property of repelling greasy substances. After numerous experiments Senefelder discovered that this property could be most efficiently imparted by treating the stone with diluted nitric acid and a solution of gum arabic. His view of the rationale of the process was that the action of the acid upon the stone is chiefly of use in making it receive the gum more effectually and that the gum, in conjunction with water, is the principal agent in repelling greasy substances. The truth of this opinion is confirmed by the fact that stones containing transfers are in some cases prepared with gum alone. No greasy matter will adhere to the parts of the stone impregnated with gum; neither will the acid or the gum take effect upon a part solidly covered with a greasy substance, unless the acid remain long upon it or a strong mixture be applied. The acid, however, renders the ink or chalk insoluble with water by combining with and neutralizing the alkali in the soap.

In preparing a stone it is sometimes first subjected to the action of the acid alone by laying it in a trough slightly inclined and pouring repeatedly over it a weak mixture of about 1 part of nitric acid to 100 parts

Lithography

water. This is called etching the stone, which is next washed with pure water and then covered with the solution of gum. The acid and gum are, however, frequently mixed and applied together with a broad, flat camel hair brush and allowed to remain till dry. When thus applied there is less danger of the acid injuring the work by eating away the ink or chalk of the drawing, the greasy portion of which has not yet penetrated below the surface of the stone. Before printing the drawing undergoes further treatment but this will be noticed in the proper place.

Chalk Drawing.— The best quality of stone is required for this style. It must be equal in color and consistency and grained to suit the size and nature of the drawing. The outline is traced on as before by means of the red chalked paper.

Though the manner of execution is much the same as chalk drawing on paper and a rough sketch can be drawn with nearly as much facility, still the necessity of impressing every touch on the stone in such a manner as will make it tell in the subsequent printing causes the operations to be more tedious. This is especially the case in the deep rich textures and delicate tones of a highly finished drawing, on which the manipulation calculated to insure a satisfactory result in printing is not only a very tedious process but demands great skill and experience in the artist. Repeated and careful working over the parts must be followed by a laborious picking with needles to equalize the tones and perfect the gradations. Thin light lines and sharp white touches are taken out with the scraper; intense black lines or touches may, if required, be put in with the hair pencil and ink.

The preparation of a chalk drawing for printing requires more care and judgment than any other style. The particles of chalk in the delicate shades having such a slight hold on the granulations, they are liable to be removed by the acid.

Engraving on Stone.— This manner, which resembles line engraving on metal, is well adapted to precise and minute work, such as machinery, ornament, small figure subjects, etc. A hard-polished stone is selected and first prepared with the acid and gum. It is then washed with water, a portion of the gum being left on the surface. Dry powdered red chalk is now rubbed over it with the palm of the hand, or it gets instead a thin coating of gum mixed with black. The black ground shows the work with greater distinctness during progress, but the red permits greater freedom in working, the outline being traced on with red or black as the opposite color of the ground requires. The drawing is produced wholly by lines scratched through the ground and preparation with steel points, the ruling machine being also made available in representations of machinery. The lines should fully penetrate the stone so as to expose it to the linseed oil which is spread over the drawing when completed — the ground protecting all parts excepting the lines, which at once absorb the oil. The ground is now washed carefully off with water, the oil on the surface being carried with it and left only in the lines which are next charged by printing ink being rubbed gently all over it, the gum previously absorbed still preventing the greasy ink from adhering to any part but the oiled lines. The inking roller is now passed over the stone and takes up all the superfluous ink from the surface which is again slightly gummed previous to printing.

When prepared the stone is heated and covered with etching ground similar to that for copper but containing more wax. It is next smoked and when the stone cools the outline is traced on or transferred by passing it through the press. The work is executed as described in ENGRAVING (*q. v.*), but as the incisions need not penetrate beyond the etching ground on account of their being afterward cleaned out with acid, the movement of the point is much freer and hence this method is better adapted for picturesque subjects than engraving is. The biting-in is effected with diluted acetic or with muriatic acid, stopping-out being done with drawing ink. When bit the stone is washed and dried and the lines filled with printing ink. The ground and surface ink are cleaned off with a mixture of turpentine and water and a slight gumming fits the stone for immediate printing.

Writing and Drawing on Transfer Paper. — All kinds of writing, plans, outline, and half shaded drawings can be executed with facility and precision on this medium. The manner is precisely that of pen and ink drawing on ordinary paper. When the work is completed the paper is dampened, placed on a warmed polished stone and passed several times through the press. The back of the paper is again dampened and the stone again passed repeatedly through the press, its position being changed to insure equal pressure on all parts. The paper is now soaked with water and taken off piecemeal, revealing the writing or drawing perfectly transferred to the stone. It may be prepared for printing by merely gumming the surface and strengthening the lines either by inking with the roller or by passing a woolen rag charged with printing ink rapidly to and fro over them. It is desirable, however, to etch the stone with acid so as to cleanse it from all impurities. Any writing on common paper executed with lithographic ink can also be transferred, if sponged on the back with clean water.

Transferring Engravings, etc., to Stone.— This branch of lithography has of late years made great advances and excepting

fine and highly finished pictorial work almost any engravings in line or stipple can now be transferred and printed in a very perfect manner. Transfers from woodcuts or types and from one stone to another are also effected with equal success. The process is very simple. A careful impression is taken on the prepared paper with the ink previously described, the impression from a plate being generally passed through the press between blotting paper to divest it of the superfluous ink from the deep incisions. The paper is then dampened as before, placed on the stone and transferred in the same manner as the writings or drawings described above.

Tinting and Chromo-lithography.— Tinting, in lithography, includes not only the warm or cool neutral tones printed over the whole or part of a drawing, but all color printing in flat or uniform single colors. The term chromo-lithography is applied to the combinations and blendings of colors in imitating oil paintings and water color drawings; copies of which, approaching facsimile in exactness, can be produced by a series of printings from separate stones. The operations in all kinds of tinting and chromo-lithography being nearly alike, a sufficiently clear understanding of the whole may be conveyed to the general reader by describing one of the processes. We shall therefore confine ourselves to that adopted in imitating a chalk drawing on tinted paper touched with white.

The subject is drawn on a grained stone —the dark shadows and the positive shading required to make out form only being put in. It is then prepared for printing and an impression taken, which is immediately reversed on a separate stone, also grained. This latter forms the tint stone which is ordinarily thus treated: The outlines are first scratched firmly into the stone with a point, after which the margins and the parts intended to tell as white touches in the printing are painted over with an acidulated solution of gum colored with vermilion. The stone is then warmed and when the gum hardens a piece of soft ink is rubbed all over the surface and spread evenly with a woolen rag. The only trace now left of the impression is the incised outline which guides the artist in laying in darker gradations more solidly with liquid ink, if necessary, or in taking out softer lights with the scraper. Etching and gumming now follow, after which the gum protecting the margins and touched parts is washed off and the process is completed. When this stone is printed over an impression of the drawing, the parts grounded with the soft ink having only taken on the colored ink from the inking roller, form the tint, the white touches being produced by the non-printing of the gummed and scraped out parts.

Lithography

A simpler and more elegant method than the above is now, however, practised by many lithographers, obviating the necessity for incising the outline which sometimes caused blemishes in printing. The improvement lies in the manner of grounding the tint stone after reversing the drawing and gumming the margins and white touches. Instead of rubbing on the soft ink a roller charged with a varnish of burned linseed oil slightly colored is passed over the stone imparting a thin transparent coating. When this hardens it can be scraped and otherwise treated with greater freedom and certainty than the rubbed-in ground, as the reversed drawing is clearly seen through the transparent varnish.

In a pure chromo-lithograph the first or key stone consists only of the outlines of the picture. From this impressions are taken and reversed on as many separate stones as there are colors to be printed; as many as 30 different stones having been required in some of the finer specimens lately published. On each of these stones all objects in the picture having the same color are separately worked in with chalk, ink, stumping, spraying, etc., the gradations of tone in the colors being produced by darker or lighter shading. They are called original or mother stones, from which transfers may be taken when reprints are required and will keep good for any length of time by rubbing the work over with powder resin or French chalk and covering the surface with a solution of gum; thus preserving them from the action of the atmosphere.

To make the colors on the different stones fall on the proper places in the separate printings from the hand press, the following method is adopted: Cross-marks are drawn on the opposite margins of the key stone, and are offset with the reverse on to the other stones, and then drawn over with lithographic ink. After the first color has been printed the impressions are pierced through the center of the cross-marks, and small holes drilled in corresponding positions on the remaining stones. In laying on the paper small needles fixed into wooden handles are put through the pierced holes from the back and into the holes in the stones, being then carefully withdrawn.

Lithographic Printing.— In lithographic printing by hand press the impression is obtained by the friction of a scraper under which the stone is made to pass. In the more modern process of printing by machine the pressure is given by a revolving cylinder.

As the printing ink will not adhere readily to the ink or chalk remaining on the surface of the stone, it is desirable to remove it by dissolving it with turpentine mixed with a little sweet oil and washing it off with water. The result is an apparent

obliteration of the work. But the colorless grease remaining in the pores of the stone receives the printing ink, which is now applied by passing the roller over the surface in all directions, causing the writing or drawing gradually to reappear. This operation demonstrates that the grease alone is essential to the results in printing and that all the other ingredients in the inks and chalks are merely vehicles for applying the grease to the stone in such manner and quantity as determines the character and effect of the work.

In printing with the hand press, the stone previously placed on the carriage of the press is again wet and again inked; the paper is laid on the stone and the tympan brought down over it and the further end run under the scraper. The lever is now brought down, raising up the carriage with the stone; the handle attached to the roller below is turned, by means of which the table and stone are moved slowly along to the end under the pressure of the scraper. The pressure is now relaxed by raising the lever, the table is drawn back, the tympan raised, and the paper with the impression now on it lifted carefully off. The operations of wetting the stone and inking are repeated for each impression. The printing paper must not have any acid or alum in its composition, because the presence of either destroys the work after a very few impressions have been taken.

About the year 1850 steam power began to supersede manual labor in driving the lithographic press and not long after a cylinder machine driven by steam power was introduced, by which the entire operation of printing is now performed, the pressure of the cylinder being employed to produce the impressions instead of the scraper of the hand press. For a considerable time the printing of the machine was so imperfect that only the very lowest quality of work could be intrusted to it. In course of a few years, however, improvements in construction and additional appliances in inking, registering, etc., so perfected the machine, that transfers from plates, line drawings, and chromo prints of the finest description can now be printed by it in excellent style, the number of impressions printed by each revolution being from 1 to 12 or upward according as the size of the print and paper allows the greater or lesser number of transfers to be put on the one stone.

The speed of the machine and the number of impressions taken from one transfer or drawing depend very much on the quality of the work on the stone. If it is fine and delicate a slow speed is necessary; and sometimes the transfer or drawing has to be renewed before the desired quantity is obtained. But if the work is of an ordinary kind 20,000 or 30,000 copies at a speed of 1,000 revolutions per hour are obtainable.

Instead of stone plates, zinc and aluminum plates are now extensively used as originals and for printing from machine; and being only about $\frac{1}{32}$ of an inch in thickness they are far more portable. They are treated and printed from in much the same manner as the stones, but phosphoric and gallic acids are used instead of nitric. The plates are roughened slightly by going over them in a similar manner as for graining a stone for chalk drawing, but pulverized pumice and felt pad are employed instead of stone and sand. For chalk drawing the plates may be obtained prepared ready for use in various textures, or they can be grained with sand as in the case of stone. To clean off the old design and prepare the plate for new work the nitric acid bath is used. Zinc plates may be obtained coated on one face with a calcareous composition which renders the plate easier of working, but such plates require recoating when a new design is to be put on them. W. S. Forbes.

Lithology, a name sometimes used for that division of geology which considers the constitution and structure of rocks, apart from their relations in time or position to each other.

Lithotomy, the operation, art, or practice of cutting into the bladder, in order to extract one or more stones or calculi.

Lithuania, the former name of an extensive tract of country lying between Poland and Prussia, and now comprised in the Russian provinces of Wilna, Grodno, and Minsk. It is very flat, generally sandy, and intersected by vast marshes and bogs. Occupied in 1009 by a savage people whose origin is unknown, Lithuania was conquered by the Sword-bearers and the Knights of Jerusalem, in the 13th century. Having united the independent tribes, and concentrated his power, Ringold assumed the title of grandduke in 1230, and was succeeded by his son, Mendog, who embraced Christianity in 1255, though he abjured it in 1255. Witenes acquired the supreme power in 1282, which he transmitted to his son Ghedemin in 1315. Jagellon came to the throne in 1381; and on the condition of receiving in marriage Hedwige, daughter of the King of Poland, together with the crown of that country, he consented to become a Christian, and was baptized, with his nobles and many of his subjects, Feb. 14, 1386. By the treaty of Lublin, in 1569, the two countries were formally united. Part of it passed with Poland under the sway of Russia, Feb. 17, 1772, and the remainder in March, 1794. An insurrection, which was soon suppressed, occurred in 1831. The peasants took part with Russia during the Polish revolt of 1848.

Lithotypy, the art or process of stereotyping by pressing the types of a page set

up into a soft mold or matrix. The hollows left by the types are then filled with a mixture of gum shellac, fine sand, tar, and linseed oil, heated, which, when cold, becomes as hard as stone and can be printed from.

Litmus, or **Lacmus,** a vegetable color, obtained from *Roccella tinctoria.* It is used in chemistry to denote the acidity or alkalinity of a solution. The blue color of litmus is changed to red by an acid, and the red color again becomes blue on being mixed with an alkali.

Litrameter, an instrument for ascertaining the specific gravity of liquids, invented by Dr. Hare, of Philadelphia. It is founded upon the principle that when columns of different liquids are elevated by the same pressure their heights must be inversely as their gravities. It consists of two tubes, their lower ends open and submerged in two liquids whose specific gravity is to be compared, say one vessel of water and the other of an oil or spirit. The tubes connect above with a horizontal pipe from which the air is exhausted by an air-pump. Atmospheric pressure causes the liquids to rise in the tubes to a height according to their gravity.

Litter, a stretcher with a bed, and in many cases, a canopy; used, not as the stretcher ordinarily is, in emergency and haste, but provided for the use of the sick during transportation home or to the hospital. Among the ancient Eastern and classic nations litters were used for carrying females, sick persons, and ultimately the luxurious rich from place to place. They were provided with cushions, canopies, and curtains, and sometimes constructed of gold and ivory.

Little Blue Creek, a stream in Missouri, which flows into the Missouri river from Jackson county. In October, 1864, a force of Confederates, under Gen. Sterling Price, was here attacked by a body of Union troops commanded by General Curtis, and after a contest of several hours were compelled to fall back to Big Blue creek, another small affluent of the Missouri in Jackson county. Here they took a strong position, but were soon driven from it with heavy loss by General Pleasanton's cavalry, and then retreated into Arkansas.

Little Britain, an English designation of the French province of Bretagne, or Brittany.

Little Christians, a sect of Russian dissenters claiming to be the possessors of a special revelation.

Littledale, Richard Frederick, an English clergyman; born in Dublin, Ireland, in 1833. He was curate of St. Mary Virgin, London, from 1857 to 1861, when he resigned on account of ill-health and devoted himself to the study of religious subjects, particularly the Anglican ritual. Among a number of polemical, historical, exegetic, and other publications are: "The Catholic Ritual in the Church of England" (1865); "Pharisaic Proselytism" (1870); "Plain Reasons against Joining the Church of Rome" (1880); "A Short History of the Council of Trent" (1888). He died in 1890.

Little Egret, in ornithology, *ardea garzetta.* In the adult bird the whole of the plumage is a delicate white; the feathers of the occiput and the bottom of the neck in front elongated. It is common in Southern and Central Europe; native in the region between the Black and Caspian Seas, and very common in India.

Little Englander, a term applied to the opponents of Great Britain's imperial policy by those who favor it.

Little Falls, a city in Herkimer co., N. Y., on both sides of the Mohawk river; and on the New York Central and Hudson, and the West Shore railroads; 22 miles E. of Utica. The chief industries are dairying, cheese-making, lumbering, and the manufacture of knit goods, bicycles, and calfskins. There are Union Free School and Academy, public library, city hospital, waterworks, National bank, daily and weekly periodicals and an assessed property valuation of $2,500,000. Pop. (1890) 8,783; (1900) 10,381; (1910) 12,273.

Little Horse. See PICTOR.

Little John, a big stalwart fellow, named John Little (or John Nailor), who encountered Robin Hood and gave him a sound thrashing, after which he was rechristened, and Robin stood godfather. Little John was executed on Arbor Hill, Dublin.

Littlejohn, Abram Newkirk, an American clergyman; born in Montgomery co., N. Y., Dec. 13, 1824. He was graduated at Union College in 1845 and was ordained clergyman of the Protestant Episcopal Church. After holding various posts in his denomination he was made bishop of Long Island in 1869. He wrote "Philosophy of Religion"; etc. He died in Williamstown, Mass., Aug. 3, 1901.

Little Paris, Milan, Italy; so named in allusion to its similarity to the Gallic capital in point of gayety and dissipation.

Little Rock, a city, capital of the State of Arkansas, and county-seat of Pulaski co.; on the Arkansas river and the Little Rock and Memphis, St. Louis, Iron Mountain and Southern, and the St. Louis Southwestern railroads; 125 miles S. W. of Memphis. It is the trade and jobbing center of the State; and has cotton-seed oil mills; gas works, railroad machine shops, cooperage shops,

etc. It is the seat of the Law and Medical College of Arkansas, Arkansas Industrial University, and the Arkansas Schools for Deaf Mutes and the Blind, Little Rock University, Arkansas Female College, and Philander Smith College. It contains the State capitol, State Library, St. John's Military College, high schools, and convents; and has gas; electric light and street railroad plants; waterworks, many daily, weekly, and monthly periodicals, and an assessed property valuation of over $4,000,000. The city was settled in 1819; made the capital of the territory in 1820; and was held by the Confederates during the greater part of the Civil War. Pop. (1890) 25,874; (1900) 38,307; (1910) 45,941.

Little St. Bernard. See BERNARD, LITTLE ST.

Little Sisters of the Poor. See SISTERHOODS.

Little Striped Skunk, a variety of pole cat; habitat in the S. parts of the United States. Animals of this species from which the secretory glands have been removed are often domesticated as mousers. Length from snout to insertion, about a foot; tail not so long. The fur is black, marked with white spots and stripes.

Little Tennessee, a picturesque and fertile portion of Virginia, in the S. W. part of the State.

Littleton, or **Lyttleton, Sir Thomas,** an English jurist; born in Frankley, Worcestershire, England, in 1402. He was recorder of Coventry in 1450, king's sergeant in 1455, in 1466 judge of common pleas, and in 1475 a knight of the Bath. Littletons' "authentical reputation" (Fuller's phrase) rests on his work on "Tenures," which was originally written in Norman-French, or rather law French. It treats of the English law relating to rights over land, and was the first scientific attempt to classify the subject. It seems to have been first printed in the year of its author's death, if not before, and passed through numerous editions. The first translation into English was made probably as early as 1500. It was the original text that Coke commented upon in his famous "Coke upon Littleton." He died in Frankley, Aug. 23, 1481.

Little Venice. (1) A small island in the Moldau river, within the limits of the city of Prague. (2) Amiens, a town of France, which is so intersected by different branches of the Somme and the numerous bridges over them as to have moved Louis XI. to bestow on it the above name.

Littoral Deposits, accumulations formed in shallow water along a shore line. They are generally gravelly and arenaceous in character, and exhibit rapid alternations of finer and coarser grained materials.

Littré, Maximilien Paul Emile (lē-trā'), a French philologist; born in Paris, Feb. 1, 1801. He was one of the greatest linguists and scientists of the century, best known for his celebrated "Dictionary of the French Language" (1863–1872). In addition to his labors as a philologist he contributed to various scientific and philosophical journals, was active in politics, translated the works of Hippocrates (10 vols. 1839–1861), which admitted him to the Academy of Inscriptions, and Pliny's "Natural History" (1848), and wrote a "History of the French Language" (1862); "Studies of the Barbarians and the Middle Ages" (1867); "Medicine and Physicians" (1872); "Literature and History" (1875); "The Establishment of the Third Republic" (1880); and several treatises on Auguste Comte's positive philosophy, of which he was an ardent advocate. In 1871 he was elected to the French Academy. He died in Paris, June 2, 1881.

Littrow, Heinrich von (lit'trou), an Austrian naval officer; born in Vienna, Jan. 26, 1820. He is author of a "Maritime Dictionary" (1851); "Manual of Seamanship" (1859); "From the Sea," a volume of verse (4th ed. 1876); "Karl Weyprecht, Austrian Polar Explorer" (1881); "Pictures of Travel" (4th ed. 1883). He died April 25, 1895.

Littrow, Joseph Johann von, a German astronomer; born in Bischof-Teinitz, Bohemia, March 13, 1781. He was in 1807 appointed Professor of Astronomy in the University of Krakau; in 1810 to the same position in the University of Kasan, and in 1819 director of the Imperial Observatory at Vienna. His astronomical investigations covered a very wide range of important subjects, but perhaps he will always be best remembered for his classic work on popular astronomy "Wonders of the Heavens," with its accompanying atlas. He died Nov. 30, 1840.

Liturgy, the established form of public worship, a form of public devotion, the entire ritual for public worship. The liturgy of the Church of England is a modification of that previously existing in the Church of Rome, several parts of which, however, were traceable back to the early ages. McClintock and Strong give the following summary of ancient liturgies, with their developments:

(1) Liturgy of St. James, Antioch, or Jerusalem, with two forms — the Liturgy of St. Basil and the Syriac liturgy of St. James, the former becoming the liturgy of St. Chrysostom, and later the liturgy of the Oriental and Russian Churches, the latter giving rise to the various Monophysite liturgies.

(2) Liturgy of St. Mark, or Alexandria, the parent of the present liturgy of Egypt.

(3) Liturgy of St. Peter, or Rome, with two divisions — the Ambrosian (now, with slight modifications, in use in the diocese of Milan), and the sacramentary of St. Leo, developing successively into the sacramentaries of Gelasius and St. Gregory, and finally into the present liturgy of the Roman Church.

(4) Liturgy of St. John, St. Paul, or Ephesus, appearing later as the liturgy of Lyons, whence were derived the Mozarabic liturgy and the liturgies of Britain and Tours. These two were the foundation of the British liturgy as revived by St. Augustine, and gave rise to the various English uses, in their turn yielding place to the present liturgy of the Anglican Church, modifications of which are in use in the Scotch and American Episcopal Churches.

Lituus, a crooked staff, frequently represented in works of art as borne by the ancient Roman augurs in their divinations. It was somewhat like a crozier in shape. A trumpet, having a mouth which curved suddenly up, and which was used by the Roman priests and cavalry. In geometry a spiral, of which the characteristic property is that the square of any two radii vectores are reciprocally proportional to the angles which they respectively make with a certain line given in position, and which is an asymptote to the spiral.

Liu-Kiu (lyö-kyö′) **Islands,** a group of 37 (mostly small) islands which form an integral part of the empire of Japan, extending at irregular intervals S. W. from Kyushu in Japan toward Formosa, and constituting the Japanese prefecture of Okinawa; length 80 miles, average breadth 12 to 15 miles; area, 1,863 square miles; pop. 160,000. The only two islands of considerable size are Oshima and Okinawa. The people closely resemble the Japanese and are evidently of the same descent. These islands are said to possess a delightful climate and very fertile soil. Sugar is largely grown, the sago palm is cultivated, and rice, millet, cotton, tobacco, indigo and tea are raised, with a variety of fruits. The food of the people is largely sweet potatoes, fish and pork, each family keeping its pig. Capital, Shiuri, in Okinawa. These islands were conquered by the Prince of Satsuma in 1609, and long paid him an annual tribute. China has a claim on them, based on an earlier conquest, but has made no effort to enforce it, and they remain in the undisturbed possession of Japan.

Liutprand. See LUITPRAND.

Livadia, a town of Greece, on the little stream Hercyno. Here are the famous cave and oracle of Trophonius, and the fountains of Lethe and Mnemosyne.

Liver, the glandular structure, which, in animal forms, secretes the bile. In man the liver forms the largest gland of the body, weighing from 50 to 60 ounces. This gland is not confined to the vertebrate animals, all of which — save the amphioxus or lancelet — possess a well-developed liver, but is found in many *Invertebrata;* and indeed forms the first gland in connection with the digestive system which appears developed, as we trace the structure of the alimentary apparatus from the lower to the higher forms of life. Thus while the elementary structures of a liver may be doubtfully present in some of the lowest forms, the higher *Annulosa* (for example, crustaceans, insects, etc.) constitute the first group in which true and undoubted hepatic structures exist. In the lower *Mollusca* the *Polyzoa* and *Tunicata* doubtfully and the *Brachiopoda* certainly possess a liver; while a liver mass is well represented in all the higher molluscan forms, among which the ordinary mussels, cockles, snails, whelks, pteropods, and cuttlefish may be enumerated. In *Invertebrata* the structure of the liver is essentially tubular, the ultimate hepatic ducts being traceable into simple cæcal or blind tubes which are provided with a layer of epithelial cells. No gall bladder or receptacle for the secreted bile in which it may be stored until required in the digestive processes exists in connection with the liver of invertebrates; the efferent duct or ducts of the liver in the latter forms pouring their contents directly into the alimentary tract.

The liver of man occupies a position in the right upper side and toward the front of the abdominal cavity. In anatomical language it occupies that region of the abdomen to which the name of right hypochondrium has been applied and extends across the epigastric region into the left hypochondrium. It lies in front of the aorta, vena cava, and spine. The spleen lies to its left. The front or anterior border of the gland is thin and sharp, while its posterior margin is broad. It is connected to the midriff or diaphragm by certain ligaments which are derived from the peritoneum or lining membrane of the abdomen and which are attached to its posterior border. Its upper surface is convex or arched and fits into the concave surface of the diaphragm — the great band of muscle which forms the floor of the chest and which divides the chest from the abdomen. Its lower surface is somewhat flattened and irregular and divided into certain lobes or divisions to be presently noted and described. It overlies a portion of the stomach and duodenum or first portion of the small intestine; a part of the right kidney and its suprarenal capsule; and a portion of the transverse colon. From the prominent position of the liver it can be felt in spare or even in mod-

Liver

erately stout subjects projecting below the cartilages of the right ribs, while by means of percùssion the physician can with accuracy map out its further dimensions and size. From its position also it is extremely liable to compression and injury in tight lacing.

The ligaments which attach the liver by its upper surface to the midriff may be briefly noticed in the present instance. From the diaphragm two broad layers of the peritoneum are sent to be attached to the posterior border of the liver and so to form the lateral ligaments of the gland. The suspensory or falciform ligament is attached to the liver nearly in the middle line and joins the lateral ligaments posteriorly. The round ligament or remains of the umbilical vein — an embryonic structure which becomes obliterated a few days after birth — is attached in front to the free edge or border of the liver. The union of the lateral ligaments with the suspensory ligament is sometimes described as an independent structure, under the name of the coronary ligament of the liver. The general form of the liver having been already noticed, we may proceed to examine its more intimate structure and relations. The liver is completely invested by the peritoneum, except a small portion posteriorly, where it is united to the diaphragm. The depression in which the gall bladder rests is also uncovered by the lining membrane of the abdomen. The upper surface of the liver exhibits a division by the position of the falciform ligament into two unequal halves. These halves are the right and left lobes of the liver, the right lobe being much the larger of the two. This division indicates the fact that in the *Vertebrata* the liver is a bilateral organ; and in early life it exhibits a perfect two-sided symmetry extending to either side of the body. As development advances, however, the left lobe decreases in size, leaving the right lobe to form by far the larger half of the organ. The under surface of the liver shows a more complicated and further subdivision of its parts.

Five lobes, separated by four fissures or clefts, may be observed on the lower surface of the organ. The longitudinal fissure corresponds with the attachment of the falciform ligament above; and forms a deep groove dividing the liver into right and left lobes on its under surface, just as the falciform ligament divides it on the upper surface. The front portion of the longitudinal fissure lodges the round ligament or remains of the umbilical vein of early life; while the posterior part of the fissure contains the remains of the ductus venosus — a branch of the umbilical vein, and which also becomes obliterated soon after birth. Hence the longitudinal fissure anteriorly is sometimes known as the umbilical fissure; and posteriorly, as the fissure of the ductus venosus. The fissure for the gall bladder forms a second cleft in the under surface of the organ. The third fissure is that of the inferior vena cava, which transmits that vein; this fissure lying in the same line as the fissure for the gall bladder. And the fourth is known as the transverse or portal fissure, which in a manner unites the other fissures and runs at right angles into the longitudinal fissure. The transverse fissure transmits three vessels, all of importance in the structure and functions of the liver. These are the hepatic artery, the portal vein, and the hepatic duct. The two former vessels enter the organ and supply it with blood; the latter duct leaves the liver by this fissure and carries the biliary secretion from the gland. The arrangement of the fissures above described has been compared to the letter H. The longitudinal fissure and its posterior part (the fissure of the ductus venosus) being represented by the left bar of the letter; the fissures of the gall bladder and vena cava correspond to the right bar; while the transverse fissure is represented by the cross-bar of the letter.

Turning to consider the lobes of the gland, we find the larger right and smaller left lobe already differentiated. The right lobe bears on its under surface two hollows or depressions; the front depression being for the colon while the hollow behind receives the right kidney. The under surface of the left lobe is undivided into smaller portions, and the three remaining lobes are therefore formed by subdivisions of the larger right lobe. The Spigelian lobe is a small prominent division which lies between the fissures of the ductus venosus and that of the vena cava. These form its lateral boundaries, and anteriorly it is bounded by the transverse fissure. The Spigelian lobe is connected to the under surface of the great right lobe by the second lobe, of elongated shape, and known as the lobulus caudatus or caudate lobe. The last lobe is known as the quadrate lobe, and this division lies between the front portion of the longitudinal fissure and the gall bladder. It is so named from its somewhat square shape, and is sometimes connected to the left lobe by a bridge-like process of liver substance, which crosses the longitudinal fissure, and is known as the pons hepatis. Besides being invested by peritoneum, the liver is covered by a delicate coating of areolar or white fibrous tissue, which, however, sends no intimate prolongation of its substance into the body of the organ. This coating at the transverse fissure is known as Glisson's capsule, and surrounds the vessels which, as already mentioned, enter the liver by that channel, while it also invests them, in their

distribution throughout the gland, in a common sheath or covering.

The entire and apparently solid mass of the liver consists of a collection of small portions of an oval or roundish shape, each averaging about 1-20th of an inch in diameter, and which are known as the lobules of the organ. When cut across the lobules appear somewhat rounded in shape, each consisting of a boundary wall and a contained mesh-work. The outer or boundary wall of each, and the mesh-work within, are formed by blood-vessels and ducts — portal vein, hepatic artery, hepatic vein, and hepatic duct — while the interstices of the mesh-work of vessels are filled with the little bodies which manufacture the characteristic secretion of the liver — the hepatic cells. These cells each average $\frac{1}{800}$ or $\frac{1}{1000}$ of an inch in diameter, and are of rounded or polygonal shape. They contain nuclei, granules, and fat globules, and have generally a yellowish tinge or hue. Bearing in mind that the hepatic artery, the portal vein, and hepatic duct accompany each other from first to last, and that the hepatic veins are distributed by themselves, we shall thereby gain a clear comprehension of the relations of these structures in the intimate composition and functions of the liver. The bile is secreted from venous blood derived from the stomach, intestines, and spleen. This venous supply is brought to the liver by the portal vein. The hepatic artery is the nutrient artery of the liver, and supplies the gland with blood for the nourishment of its own structure, just as all other organs are supplied with blood, and apart from their secreting duties. The hepatic duct, while accompanying the artery and vein in their distribution, is to be regarded as the excretory channel of the liver. Tracing these three vessels within the substance of the organ, we find them to ramify and subdivide, until the portal vein and hepatic artery appear to end in the minute capillary vessels which we have already seen to form a network in the substance of the lobules. Each lobule is thus invested by interlobular veins, given off from the minute branches of the portal vein, which pass between the lobules; and from these external veins the interior of the lobules is supplied by fine capillary vessels which form the network within the lobules.

These capillaries finally unite to form a vessel in the center of the lobule — the intralobular vein, which is the commencement of the finest twigs of the hepatic vein. The intralobular vein, passing through the center of the lobule, joins a sublobular vein, running on one side of the lobule. By the confluence of these veins the hepatic veins are formed; and the blood thus gathered from the lobules is finally poured into the main trunks of the hepatic vein which terminate in the inferior vena cava as it traverses the liver. The subdivisions of the hepatic artery end similarly to those of the portal vein, its blood being returned into the capillaries of the portal vessel, or into the venous network of the lobules. We thus find the distribution of the blood of the portal vein to be carried out to a very perfect and minute degree throughout the gland. It remains to be noticed how this blood is made subservient to the grand purpose of the secreting structures. The hepatic duct, which closely accompanies the portal vein and hepatic artery in their distribution, is now to be examined as the channel into which the bile, secreted by the hepatic cells from the blood of the portal vein, is formed. And the next step therefore leads us to trace the hepatic duct to its ultimate ramifications and to its connection with the secreting cells of the liver.

By a method of natural injection Chrzonszczewsky was able to demonstrate the nature of this connection. A particular staining agent introduced into the body of an animal was, after death, found to mark out very distinctly very fine channels among the hepatic cells. These channels form a sort of mesh-work among which the cells lie, so that on all sides a hepatic cell may be in relation to such a channel. This method of demonstration showed that the coloring particles were separated by the hepatic cells from the blood and passed into the minute channels in immediate proximity to them. These minute channels are the radicles, or rootlets of the bile ducts. Commencing among the cells within the lobule, they pass into interlobular ducts at the border of the lobule, and their interlobular ducts unite to form larger ducts, till the great bile ducts are formed. The minute channels are mere passages; but the interlobular bile ducts have a distinct wall, lined by flat cells and the larger ducts have increasingly thick walls of connective and elastic tissue, and are lined by cylindrical cells. The largest bile ducts contain also involuntary muscular fibers in the wall; while mucous glands exist beneath the innermost coat of the duct wall, the glands of the bile ducts. The main hepatic ducts — one from the right and one from the left lobe of the liver — unite to form the single hepatic duct proper. And this latter duct communicates with the cystic duct, or that of the gall bladder, the two forming by their union the ductus communis choledochus or common bile duct. The common duct is about 3 or 4 inches in length, and opens into the duodenum at its posterior portion in close proximity to the entrance of the duct from the pancreas or sweetbread.

The general functions of the liver may be briefly alluded to here. These func-

tions comprise the secretion of bile, the disintegration of red blood corpuscles in the process of forming the pigments of the bile, and the formation of glycogen. The secretion of bile and the formation of glycogen are the chief functions it discharges. Glycogen was first discovered by the French physiologist, Claude Bernard, in 1857. It is chiefly formed from the carbohydrates of the food. It seems to be stored up in the hepatic cells for further use in the body. By the action of a diastatic ferment, also formed in the liver, it is converted into glucose, a variety of sugar. It is when transformed into sugar that the glycogen passes into the general circulation and is distributed to the tissues. Its ultimate destination is not yet a settled question. It may be that by its oxidation in the tissues it serves for the maintenance of animal heat, though no conclusive evidence of this is yet forthcoming. One generally accepted opinion of the use of glycogen is that it is employed for the upbuilding of muscle substance, so that the waste occurring in muscle by contraction is repaired by the glycogen brought by the blood. When the amount of sugar thus passes into the general circulation and is in excess, it appears in the urine, and the condition known as glycosuria, one of the chief features of diabetes, arises. The urine then has a peculiar smell and rapidly ferments if kept in a warm place. Claude Bernard showed that injury to a certain spot in the medulla oblongata caused the appearance of sugar in the urine. The liver also acts as an excretory organ, by assisting in the discharge of waste matters contained in the blood. Fats may be formed or arrested by the liver cells, and indeed it is from the enlarged, fatty livers of overfed, confined geese that pâté de foie gras is made.

The diseases to which the liver and gall bladder are subject are quite varied. Chief among its abnormal structural conditions may be mentioned that of cirrhosis, in which the fibrous tissue of the organ becomes greatly enlarged and hypertrophied, to the destruction of the cells and impairment of its functions; and also that of fatty degeneration, in which the oil globules of the liver cells become greatly increased in number, the tissue of the organ becoming very loose and friable. Both of these conditions are intimately associated with the abuse of alcoholic liquors. From its large size and prominence, as well as from the delicacy of the interlobular areolar or fibrous tissue, the liver is very liable to be ruptured by external violence, or even by the forcible action of the abdominal muscles. In a diseased state — especially when fatty or cirrhotic — the liver is more readily ruptured than when in a normal and healthy condition.

Livermore, Mary Ashton (Rice), an American reformer and lecturer; born in Boston, Mass., Dec. 19, 1821. In 1862 she was appointed agent of the Northwestern branch of the United States Sanitary Commission. After the war she was conspicuous in her efforts to promote the woman suffrage and temperance movements. Among her popular lectures are: "What Shall We Do with Our Daughters?" "Women of the War"; "The Moral Heroism of the Temperance Reform." She was the author of "Pen Pictures" (1865); "Thirty Years Too Late" (1878), and a work on her experiences during the war. She died May 23, 1905.

Liverpool, an episcopal city, parliamentary, municipal, and county borough, and seaport of England; in the county of Lancaster; on the right bank of the Mersey, about 4 miles from its confluence with the Irish Sea, 185 miles N. W. from London. It stands partly on flat ground along the margin of the river, but chiefly on the slopes of a series of moderate eminences whose summits are within the limits of the borough, and the highest of which is about 230 feet above the level of the quay wall of the river. It is irregularly laid out but, generally speaking, is well built, and it contains some magnificent public buildings. The general appearance of the town has been greatly altered in recent years by the demolition of old houses, the formation of new streets and the widening of old ones, and the erection of vast piles of warehouses and offices. Many of the new commercial buildings are of very ornate design. The classic style has always prevailed in Liverpool architecture, but Italian of a more or less enriched type is also a favorite style, some of the banks and other business premises being virtually reproductions of Italian palaces. The chief public buildings are the town hall, municipal offices, revenue buildings, St. George's Hall, exchange, public library and museum, art gallery, Wellington rooms, government offices, and law courts. The town hall is an elegant structure. A handsome dome surrounded by an open gallery rises from the center of the building. Within are a grand staircase, a superb suite of entertaining rooms, the council hall, etc.

The municipal offices were completed in 1868 at a cost of £160,000. The building is quadrangular, with its principal front, 226 feet long, in Dale street, and having a depth of 195 feet. The central clock tower and spire, about 200 feet high, is a conspicuous feature in the center of the town. The revenue buildings, which comprise accommodation for the offices of inland revenue, for the Mersey Dock and Harbor Board, and for the post and telegraph offices, cover an area of 6,700 square yards, and have an extreme length of 467 feet, and a total height of 67 feet; lofty

Liverpool

porticoes, each of eight Ionic columns, adorn the center and the E. and W. fronts; the center is surmounted by a dome, and ornamented with pilasters. St. George's Hall, which contains a large hall for public meetings, concerts, etc., a smaller concert room, and the assize courts, is a sumptuous building in the Corinthian style, externally and internally. The E. front is 420 feet long, with a colonnade of 16 columns 200 feet long. The free public library and museum — erected at the sole expense of the late Sir William Brown, a Liverpool merchant — is a handsome building of the Corinthian order. One portion of the building is devoted to the purposes of a reference library, with nearly 120,000 volumes. The other section is apportioned to the museum, in which there are two great departments — namely, the natural history, bequeathed to Liverpool by the 13th Earl of Derby; and the antiquities, chiefly contributed by a private citizen, Joseph Mayer, F. S. A. A little to the E. of the library and museum another local citizen, Sir Andrew Barclay Walker, has erected at his sole expense (upward of £50,000), a public gallery of art. This splendid structure is already richly furnished with paintings and sculpture presented by other wealthy patrons of the arts, or purchased by the corporation. Between the museum and the art gallery the town council has erected as an addition to the library a public reading room, called the Picton reading room. In connection with the reference library there are six lending libraries in various parts of the city.

The new Exchange is an edifice of great magnitude, consisting of a center and two wings, with a frontage of 1,500 feet. The building, designed by Wyatt, is Renaissance, Italo-French in character, with a great deal of statuary and ornamental carving; it is four stories high, and has a massive and highly enriched central tower, and two others at the angles of the projecting wings. The other structures, exclusive of the churches, deserving of notice, include many splendid piles of commercial buildings, banks, and charitable institutions, the latter of which are numerous and magnificent. Those associated with maritime vocations are especially conspicuous and useful. Several new hotels have been built of a size and architectural splendor rivaling those of late years erected in London. The provision markets are spacious, airy, covered buildings, and are five in number. The Haymarket is an area of about 15,000 superficial yards, nearly half of which has been roofed over. Among the places of worship with which Liverpool is provided, the Church of England possesses far the largest number of any individual body; other bodies well represented being the Methodists, the Roman Catholics, the Presbyterians, and the Independents. Many of the churches and chapels are very handsome buildings. Among these are St. Catherine's, St. Michael's, St. Nicholas', St. Luke's, the Church for the Blind, Great George Street chapel, Hope Street Unitarian chapel, St. Francis Xavier's, and St. Mary's Roman Catholic chapels, St. Andrew's Scotch Church, and Sefton Park Presbyterian Church. When Liverpool was constituted a bishop's see in 1880, the parish church of St. Peter was made the cathedral, but a new cathedral is to be built, many liberal contributions having already been made for the purpose.

Among the charitable and benevolent institutions are the royal infirmary, children's infirmary, Northern and Southern hospitals, lying-in institutions, dispensaries, etc. And in connection with these may be mentioned the public disinfecting establishments; and also the public baths. There are also various orphanages, refuges for the destitute, and institutions for the relief of every form of human suffering. The educational institutions include the University College, Royal Institution, the Liverpool Institute, Liverpool College, school of art and gallery of art. The University College (for which a fine building has been erected) is one of those belonging to the Victoria University; it has a department of language, science, etc., and a medical department. Besides the great educational machinery erected by the school board, private schools are numerous.

Though Liverpool is exceptionally deficient in squares and open spaces within the city boundary, there being only three of any pretensions, it is provided with an unusual number of public parks on the margin of the populous districts. These have been mostly provided by the corporation out of the rates, and they form a cordon around the town, available to the inhabitants of each quarter. Prince's Park, which is situated toward the S. of the town, is private property; but the public are admitted to it without restriction; and as the corporation has purchased the reversionary interests in it, it will become public property in 1918. Farther E. are the Botanic Gardens, and Wavertree Park, and beyond these are the park and grounds of Newsham House, which have been converted into a public park of 132 acres for the inhabitants of the E. side of Liverpool. In the same vicinity another piece of land has been laid out as pleasure grounds under the name of Sheil Park. Stanley Park (100 acres) in the N. of the town is well-laid out and picturesquely planted. Waverton Playground (108 acres) was a gift to the city by an anonymous donor. But all these are eclipsed by Sefton Park, of 375 acres, at the extreme S. of the town. The

Liverpool

ground is naturally broken into hill and hollow, the heights affording beautiful views; about 269 acres are reserved for the park, the remainder being appropriated to villa sites. The adjuncts of the park embrace a "Rotten Row" and carriage drives, botanical gardens, lakes, cascades with rock work, pavilions, and other ornamental buildings, a conservatory, fountains, etc. The greater portion of the land was bought from the Earl of Sefton for £251,177, and the total cost of land and works was £410,266. The total area of public parks and pleasure grounds under the control of the corporation is 772¼ acres, costing in land and works about £800,000. Of the public cemeteries, the most considerable are those of the parish of Liverpool at Anfield, the Toxteth cemetery, Kirkdale, Fazakerley, and West Derby cemeteries. Liverpool is well supplied with water. Local wells furnish part and part comes from the reservoirs in the hilly district between Bolton and Blackburn, distant from Liverpool 25 to 35 miles. From the collecting reservoirs at Rivington the water, after being filtered, is conveyed to the distributing reservoirs in town, the average quantity distributed daily being about 20,000,000 gallons, and the population supplied, about 850,000. In 1880 the corporation obtained an act of Parliament authorizing them to procure an additional supply of water from the Vyrnwy in North Wales. The works (inaugurated in 1881) were practically completed in 1892, and are calculated to yield an ultimate supply for Liverpool of about 50,000,000 gallons per day. This enterprise included the formation of Lake Vyrnwy, an artificial sheet of water 5 miles long, contained within a great dam or embankment 60 feet high across the Vyrnwy.

Next to London, which it exceeds in the value of its exports — Liverpool is the chief seaport of the United Kingdom. It is the main outlet for the manufactures of Lancashire, West Yorkshire, and Staffordshire, and carries on an immense export and import trade, especially with the United States. It possesses a magnificent series of docks and basins, and other requisites of a great seaport. The docks and commerce of the Mersey are under the charge of a separate trust constituted in 1857, and called the Mersey Docks and Harbor Board. This body, elected partly by the payers of dock dues and partly by the Mersey Conservancy Commissioners, is intrusted with the regulation of pilotage, lighting, and navigation of the Mersey and the approaches thereto, with the making and management of the docks on either bank of the river, and with the general control of commerce and shipping. The Mersey Dock Estate, on the right or Liverpool bank of the Mersey, extends in an unbroken line for about 7 miles. The river wall from the extreme N. boundary of the Dock Estate, near Rimrose Brook, to Herculaneum graving docks, is over 6 miles in length. There are 53 wet docks and half-tide docks, among the largest of which are the Alexandria, Brunswick, Canada, Hornby, Huskisson, Langton, Prince's, Queen's, and Toxteth. The total water area and quay space of the Liverpool and Birkenhead docks and basins is 550 acres, of which 385 are on the Liverpool side. The present bond debt of the Mersey Docks and Harbor Board amounts to £18,816,300. The works have been designed and constructed with consummate engineering skill. They include docks specially adapted to distinct branches of trade, for example, corn, timber, American steamships, etc.

On the margins of some of the docks are gigantic warehouses, among which may be mentioned the Albert and Wapping, used for general produce; the Waterloo grain warehouses, entirely devoted to the storage of foodstuffs, and furnished with special lifting and conveying machinery; the Stanley warehouses, formerly used for general goods, but now used exclusively for the storage of tobacco, and recently supplemented by one of the most gigantic warehouses probably in the world, 730 feet long, 165 feet wide, and about 120 feet high, which has in all 14 floors, having an aggregate area of 36 acres. This also is for the storage of tobacco, the total capacity in the three blocks of warehouses now available being about 100,000 hhds., or 50,000 tons. Adjoining these warehouses is another block specially constructed for the storage of wool. The quays are abundantly furnished with railway lines and every other mechanical appliance for expediting the transport of goods and economizing labor. An overhead electric railway running along the docks for about 7 miles was opened in 1893. There are numerous graving docks for the repair of iron and wooden vessels, and gridirons for their casual overhaul. The most modern of the graving docks, that at Canada Dock, is among the largest in the world, its length being 925½ feet, and width of entrance 94 feet.

One of the principal river features of Liverpool is the floating landing-stage moored off the Prince's and George's Docks, in the heart of the town. This magnificent structure, supported on iron pontoons, rising and falling with the tide, and connected with the river wall by bridges of easy gradient, is an effective engineering device to meet the tidal conditions obtaining on the Mersey, where spring tides present a difference in level between high and low water of over 30 feet, and even neap tides have a range of 13 feet. The first small stage was built in 1847, a much larger was destroyed by fire in 1874; the present stage,

as enlarged in 1896, has a length of 2,463 feet, and a width of about 80 feet. The great Atlantic liners come alongside the stage, and lie there for such time as may be necessary to receive and discharge passengers and mails, for all which traffic the Riverside station, specially constructed alongside the stage, offers a most convenient railway terminus. A very great coasting passenger traffic is also centered at the landing-stage, and in the summer especially the traffic to the Isle of Man and ports on the coast of North Wales reaches immense proportions. The S. end of the stage is more particularly appropriated to passenger and freight ferry traffic between Liverpool and Birkenhead, Seacomb, New Brighton, and other centers of population and recreation on the Cheshire side of the Mersey. At the N. end of the stage a fixed jetty supplements its accommodation, and is more particularly used for the landing of cattle, chiefly from Ireland. In 1900 the number of vessels entered at the port of Liverpool was 20,300 of 9,315,674 tons (4,-107 of 621,493 tons sailing vessels, and 16,-193 of 8,694,181 tons steamers), the number cleared 19,670 of 9,158,332 tons. The total tonnage entered from foreign and colonial ports was 6,001,563; cleared for these ports 5,666,145. The shipping registered as belonging to the port on Dec. 31, 1900, was 1,018 sailing vessels, with an aggregate burden of 614,968 tons, and 1,073 steamers of 1,713,506 tons; total 2,091 vessels of 2,328,474 tons.

Among the imports into Liverpool, cotton holds the chief place, the quantity imported in 1900 being valued at £31,181,635, the total quantity imported into the kingdom being valued at £40,982,594. Immense quantities of wheat, flour, maize, etc., are also imported mainly from North America. Live cattle and fresh meat also form leading imports. Owing to the precautions adopted for preventing the spread of disease, the former are dealt with at a separate place, namely the Foreign Animals' Wharf at Birkenhead. Over 20 acres of ground is devoted to this purpose, and quarters capable of accommodating 7,600 head of cattle and 16,000 sheep at one time are provided, together with slaughter houses, chill-rooms for cooling the meat to allow of its transfer to the country, and other conveniences in suitable proportion. The average number of cattle dealt with in one year is about 250,000, and of sheep 350,-000.

Other extensive imports are provisions, sugar, fruits, hides, palm and olive oil, wine and spirits, timber, tobacco, and wool. Cotton manufactures are the chief export, the value in 1900 being £38,342,891; others are metals and articles in metal, machinery, woolens, etc. The value of the foreign and colonial merchandise imported in 1900 was £124,713,436; of the home and foreign produce exported, £102,572,890; amount of customs revenue, £4,174,793. The manufactures and other industries of Liverpool are varied, among them being hemp and wire rope making, sail making, iron forging, anchor and chain cable making, iron and brass founding, the making of steam engines and other machinery, sugar refining, soap making, alkali making, etc. The manufacture of watches and chronometers is extensive. There are many large steam mills for grinding corn, rice, colors, dyewoods, etc. Shipbuilding is carried on to a small extent.

There are four approaches to the town by railway, namely — by the London and Northwestern railway; the Lancashire and Yorkshire; the Midland, Great Northern and Great Central and the Great Western, to Birkenhead, and thence to Liverpool by ferry boats or by the Mersey Tunnel railway, a great work formally opened for traffic in 1886, 4½ miles in length, including the approaches. The station of the first-named railway, which is the famous Liverpool and Manchester line of Stephenson, is situated in Lime street, opposite St. George's Hall. A tunnel originally 2,230 yards long connected Lime street station with the main line at Edge Hill; but this tunnel has now largely been made into an open cutting, and appreciably shortened by the enlargement and improvement of this terminus. From Edge Hill there are also branch lines (subterranean) for the freight traffic to Wapping at the S. docks and Waterloo at the N. end; and there are likewise branches for passengers and freight via Walton to Bootle. The previous railway accommodation being inadequate to the growing traffic, three other companies — the Midland, the Great Northern, and the Manchester, Sheffield, and Lincolnshire (now the Great Central) — constituted themselves into a special organization to connect their several systems with Liverpool by means of a new extension. This is accomplished by a deep cutting from the S. to the Central Station in Ranelagh street, and from this point direct communication is established with the main lines of the companies. The Lancashire and Yorkshire Company has a principal station close to the Exchange.

Liverpool is, next to London, the largest town in England. A vast number of its inhabitants are unskilled laborers, who resort to it for precarious and fluctuating labor connected with the port. It is among the most densely populated of the large towns of the United Kingdom, and its annual death-rate (about 24 per 1,000) is correspondingly high. The town is divided into 29 wards, which elect each three councillors. There are 29 aldermen and a lord mayor. Previous to 1867 the borough sent

two members to Parliament; it then was given a third member, and in 1885 the number of its representatives was raised to nine, the parliamentary limits being also extended.

Great as Liverpool now is, it is of but comparatively recent growth. A castle is said to have been built here by Roger de Poictiers, to whom William the Conqueror is stated in Domesday book to have given the extensive tract of land between the Mersey and the Ribble. It is also stated that the castle was held by King John, and the custody of it belonged for a long time to the noble family of Molyneux, whose chief seat is still in the neighborhood. Camden in his "Britannia" (1586) speaks of "Litherpoole, commonly called Lirpoole, whence," he says, "there is a convenient passage over into Ireland and much frequented, and in that respect more notorious than for any antiquity." The conquest of Ireland gave the first stimulus to the commerce of Liverpool. Toward the latter part of the 16th century the town declined, and in 1571 it was mentioned in a petition to Queen Elizabeth as "her majesty's poor decayed town of Liverpool." In her reign, however, a mole was formed for laying up ships in the winter, and a quay was constructed.

In 1636, when Charles I. issued writs for the exaction of ship-money, Liverpool was rated at £20, Chester at £25, and Bristol at £1,000. In 1644 it was a small fishing town surrounded by a high mud wall. In that year it was besieged and taken by Prince Rupert, and shortly after retaken by the parliamentary forces under Sir John Meldrum. In September, 1645, the Parliament settled the mill and ferry boats on the corporation as a satisfaction for their losses. From a document belonging to 1667 it appears that the site at that time occupied with buildings was confined to the elevated ground on which Castle street now stands, and a few short streets running N. and N. E. from the ancient town house. In 1699 Liverpool was separated from Walton-on-the-Hill and made a parish by itself. In 1709 a wet dock was constructed, not only the first in Liverpool, but also in the kingdom. From this event may be dated the rapid extension of its commerce and population; its progress being exceedingly rapid during the 19th century. In 1880 Liverpool was made the see of a bishop, and in that year a charter was granted constituting it a city. The population, which in 1801 was only 77,653, in 1871 was 492,935, in 1881, 552,508, in 1891, parliamentary borough, 584,471; in 1901, parliamentary borough, 627,030; county borough, 684,947.

Liverpool, Robert Banks Jenkinson, Earl of, an English politician; born June 7, 1770. He entered Parliament under Pitt's auspices in 1790, and on his father being created Earl of Liverpool in 1796 he became Lord Hawkesbury. As foreign secretary in the Addington ministry he negotiated the treaty of Amiens, and he became home secretary in 1804. On the assassination of Percival in 1812 he became premier, and held that position till 1827. His opposition to all liberal measures, the severity with which he repressed internal disturbances, and his prosecution of Queen Caroline rendered him extremely unpopular. He died in London, England, Dec. 4, 1828.

Livery, a word derived from the custom which prevailed under the Merovingian and Carlovingian kings of "delivering" splendid habits to the members of their households on great festivals. In the days of chivalry the wearing of livery was not as now confined to domestic servants. The duke's son, as page to the prince, wore the prince's livery, the earl's son bore the duke's colors and badge, the son of the squire wore the livery of the knight, and the son of the gentleman that of the esquire. Cavaliers wore the livery of their mistresses. There was also a large class of armed retainers in livery attached to many of the more powerful nobles. The livery colors of a family are taken from their armorial bearings, being generally the tincture of the field and that of the principal charge, or the two tinctures of the field are taken instead where it has two. They are taken from the first quarter in case of a quartered shield. These same colors are alternated in the "wreath" on which the crest stands. The royal family of England have sometimes adopted colors varying from the tinctures of the arms. The Plantagenets had scarlet and white; the House of York, murrey and blue; white and blue were adopted by the House of Lancaster; white and green by the Tudors; yellow and red by the Stuarts, and by William III.; and scarlet and blue by the House of Hanover.

Livia Drusilla, a Roman empress of the Claudian family, who was first married to Tiberius Claudius Nero, and forcibly taken from him by Augustus, who divorced his own wife in order to marry her. Having no children by the emperor, he adopted her sons by her first husband, one of whom, Tiberius, became his successor. Livia died in the 86th year of her age, A. D. 29.

Livia Livilla, a granddaughter of the preceding by her other son, Drusus Germanicus; married her cousin, Drusus, son of Tiberius, and having poisoned her husband in concert with Sejanus, died in a dungeon, A. D. 35.

Livingston, Edward, an American statesman; born in Clermont, Columbia Co.,

N. Y., May 26, 1764. He was a brother of Robert Livingston, was educated at Princeton College, and was called to the bar in 1785. In 1794 he was elected member of Congress, and distinguished himself by his opposition to the Alien and Sedition Bills. He belonged to the party then called Republican, and since Democratic. In 1801 he retired from Congress and accepted the two offices of mayor of New York and attorney-general for the district of New York. In consequence of pecuniary difficulties in the latter office, occasioned by his own negligence and the fraud of an agent, he quitted New York in 1804, thus losing his fair prospects of advancement; and having given up his property to the State settled at New Orleans. He soon took a high place at the bar, served under General Jackson against the English in 1814; and in 1820 became a member of the legislature of Louisiana, and was employed to revise the municipal law. His next task was to draw up a new code of criminal law for the State, the existing laws being a confused mass of French, Spanish, and English. On this code his fame rests. His manuscript was burnt on the night it was finished, and he did the work over again at the cost of two years' labor. In 1829 he became Senator of the United States, Secretary of State under President Jackson, and in 1833 ambassador to France; when he succeeded in recovering compensation for injuries to American commerce during the empire. During his residence in Paris he was elected Foreign Associate of the Academy of Sciences. He died in Rhinebeck, N. Y., May 23, 1836.

Livingston, Philip, an American statesman; born in Albany, N. Y., Jan. 15, 1716. He was graduated at Yale in 1737. He was a member of the Continental Congress and a signer of the Declaration of Independence. He died in York, Pa., June 12, 1778.

Livingston, Robert, an American statesman; born in New York Nov. 27, 1746; in which city he practised the law with great success. He was one of the committee to prepare the Declaration of Independence; was appointed Secretary of Foreign Affairs in 1780; and throughout the War of the Revolution signalized himself by his zeal and efficiency in the cause. He was afterward chancellor of the State of New York; and, in 1801 was appointed by Jefferson minister plenipotentiary to France, where, during a residence of several years, he was treated with marked attention by Napoleon, who, on his quitting Paris, presented to him a splendid snuff box with a miniature likeness of himself, painted by Isabey. He died Feb. 26, 1813.

Livingston, William, an American statesman; brother of Philip; born in Albany, N. Y., Nov. 30, 1723. He was a member of the convention which framed the Constitution of the United States and from 1775 till his death was Governor of New Jersey. He died in Elizabethtown, N. J., July 25, 1790.

Livingstone, David, one of the most famous African explorers; born in Blantyre, Lanarkshire, Scotland, March 19, 1813. His great-grandfather was a native of the Highlands, a zealous adherent of the Stuart cause, for which he fought and fell at Culloden. His grandfather was originally a small farmer in the island of Ulva, but having found the farm insufficient for the support of a numerous family he removed to Blantyre, and obtained employment for himself as confidential messenger and for his sons as clerks in the cotton works of that place. The future traveler's father afterward settled as a tea dealer in Hamilton, and held for the last 20 years of his life the office of deacon in an Independent church there. His circumstances were never flourishing, and David, the second son, at the age of 10, entered the cotton factory as a "piecer." While in this situation, though working from six in the morning till eight at night, he found time to learn Latin, and by the age of 16, thanks to his own energy and such assistance as he could find at an evening school, he was well acquainted with Horace, Vergil, and other classical writers. As he grew up to manhood he read extensively, especially scientific works and books of travel, and his home training being essentially a religious one the idea sprang up within him of becoming a pioneer of Christianity in China. With this end in view he resolved on obtaining, among other qualifications, a good medical education. Promoted in his 19th year to cotton spinning, he was enabled, by working extra hours during the summer, to attend the winter medical and Greek classes at Glasgow University, as well as Dr. Wardlaw's divinity lectures, without a farthing of aid. In November, 1840, he was admitted a licentiate of the Faculty of Physicians and Surgeons of Glasgow.

Having joined the London Missionary Society he made preparations for starting as a medical missionary to China; but as the opium war was raging in that country it was deemed better under the circumstances that he should go to South Africa, where the venerable Robert Moffat had opened an inviting field for missionary labor. After further theological studies under the auspices of the liberal-minded missionary society, he embarked for Africa in 1840, and after a three months' voyage reached Cape Town. His first station was at Kuruman, in the Bechuana territory, 700 miles from the Cape, at which place and in Ma-

botze he remained several years, making himself acquainted with the habits, laws, and language of the natives. About this time he married the daughter of Mr. Moffat, who had founded the station, and shortly afterward moved further N. to Kolobeng.

Here he heard from the natives of a great lake on the N. of the Kalahari desert, and on June 1, 1849, accompanied by Messrs. Oswell and Murray, who had come from India on a hunting expedition, he started for the purpose of discovering it. They had to take a long circuitous route to the E. to avoid the desert, and after a toilsome journey of 300 miles they reached, on July 4, the beautiful valley watered by the Zouga. Hearing that this stream flowed out of the lake of which they were in search, Livingstone and his companions left their wagons to follow the windings of the stream, embarked in a canoe, and were paddled into Lake Ngami (Aug. 1), never till then beheld by European eyes. In the following year he made a second journey, along with his wife and children, to the same region, with the intention of finding a new field for missionary labor and a more favorable site for a station. The whole party, however, were stricken down by fever, and compelled at last to return to Kolobeng.

In 1851 he started N. for the third time, in company with Mr. Oswell, and finally arrived at Linyanti, the capital of the Makolólo territory, a country of rivers and swamps and fertile valleys. The town itself was situated on the Chobe, which, Livingstone was told, joined a still mightier stream. The unwearied traveler set out on horseback to test the truth of this report, and came on the Zambesi, the largest river in South Africa, flowing E. from the center of the continent. On his return to Kolobeng he wrote to the London Missionary Society proposing to devote several years to the exploration of this region, and requesting their consent and coöperation. He received not only the necessary sanction but also the means for carrying out his enterprise, and went to Cape Town with his wife and family for the purpose of sending them to England. On June 8 Dr. Livingstone started from Cape Town on his fourth journey. Being fortunately detained on his way at Kuruman he received the intelligence that Pretorius, the leader of the Transvaal Boers, had sent 400 men to attack the station at Kolobeng. They burned down the village, killed about 60 men, and carried away many women and about 200 of the school children for slaves. Livingstone's house was plundered, his books torn to pieces and scattered about, and all propetry in the village taken away. Having returned to Kolobeng and remained some time among the wretched inhabitants he prepared for his journey N. He set out on Jan. 5, 1853, and on May 23 reached Linyanti after great difficulty, owing to the floods. The chief Sekeletu and the whole population of the town, numbering between 6,000 and 7,000, welcomed him with great enthusiasm and kindness. From the Makolólo capital he first made a voyage to the Zambesi, and returning thence to Linyanti he set out on Nov. 11, accompanied by 27 natives of the Makolólo tribe, on a journey of exploration to the W. part of the continent. They traveled partly by land and partly by water in canoes. They ascended the Leeambye (Upper Zambesi) till they reached its affluent the Leeba, flowing from the N. N. W., which they ascended for some distance, and then journeyed overland to Lake Dilolo. Thence, with much difficulty, caused by repeated fevers, famine, and frequent danger from hostile natives, they proceeded till they reached the Quango, which they crossed, and were then subject to the protection of the Portuguese, who treated them with great kindness, till their arrival at St. Paul de Loanda, the capital of Angola, on the W. coast of Africa, in August, 1854.

The country they traversed is of exuberant fertility intersected with innumerable rivers, densely wooded, and full of mineral wealth. He remained at this place to recruit his shattered health until Sept. 20, when he set out on his return journey to Linyanti, which was reached in about a twelvemonth. Starting on Nov. 3, 1855. from that place again, accompanied by several natives, he struck boldly down the Leeambye on his way to the E. coast. He found the Leeambye and Zambesi to be identical, the river taking the latter name below the Victoria Falls. In May, 1856, he reached Quilimane on the E. coast, where the N. mouth of the Zambesi opens into the Indian Ocean, having thus accomplished in four years the unparalleled feat of crossing the continent of Africa in these latitudes from sea to sea. After this stupendous journey Livingstone returned (Dec. 12, 1856) to England, whither the fame of his discoveries had preceded him, and he was received by his countrymen with great enthusiasm. Pressed to give to the world a record of his travels he at first refused, but yielding at last to repeated demands he published a bulky volume entitled "Missionary Travels and Researches in South Africa" (London, 1857). In March, 1858, he set sail for Quilimane, having been appointed British consul at that place, and furnished by the government with means to pursue his explorations into the interior. The first of these expeditions in which he was accompanied by his brother Charles, Dr. Kirk, and others, added the accurate knowledge of Lakes Nyassa and Shirwa to the map, besides

collaterally enriching natural history and botanical collections by the labors of his colleagues. In this journey he had the misfortune to lose his brave and noble-minded wife, who died April 27, 1862, at Shupanga creek, on the Shiré river. During this journey also he was horrified by the effects of the slave trade, which were terribly evident in the country around Lake Nyassa. After having completed in several other expeditions the survey of the Zambesi river system he returned to England in 1864.

On the following year he again set out for the purpose of making further explorations. One of the principal objects he had this time in view was to set at rest, if possible, the question of the sources of the Nile, left unanswered by the researches of Burton, Speke, Grant, and Baker. Skirting Lake Nyassa, his intention was to explore its N. shores, and pushing forward to investigate the watershed between it and Lake Tanganyika, which had been visited but not explored by Speke. Landing, therefore, at the mouth of the Rovuma, he pushed up the valley, striking direct for Lake Nyassa. Long before reaching the N. extremity of the lake, however, his native followers deserted him, and returned to the coast with an account of the intrepid traveler's death at the hands of a hostile tribe. Dr. Kirk at Zanzibar, and Sir Richard Murchison in England refused to believe the tale, suspecting, rightly, that it was got up by his followers to account for their return. An expedition was sent out at the expense of the government, headed by Mr. Young, the principal result of which went to prove that Livingstone was not killed at the place named by his men, and that he had advanced in safety a five days' journey beyond. This intelligence was confirmed shortly afterward by the arrival of letters from Livingstone himself dated four months later than the time of his supposed death. From these letters it transpired that he had struck round by the S. extremity of Lake Nyassa, and pushing due W. across the watershed which divides the tributaries of the Zambesi from those of the lakes had turned N. at a point about 170 miles W. of the Shiré. Thence he held almost due N., and after leaving the valley of the Loangwe, which joins the Zambesi at Zumbo, ascended what turned out to be the S. edge of an elevated plateau, varying from 3,000 to 6,000 feet above the sea level, well wooded and watered.

Entering the Cazembe's dominions he crossed the Chambeze in lat. 10° 34′ S., arrived in February, 1867, at a place called Bemba, situated on the plateau, at the altitude of 4,500 feet above sea-level, and two months later pushed on till he discovered Lake Liemba. He proceeded to explore a river-like portion of it, which was said to flow into Lake Tanganyika; but a war breaking out between a native chief and some ivory traders he was compelled to desist. Having been supplied with stores by some friendly Arab traders he was enabled to reach (September, 1867) Lake Moero, the second of the lakes through which the Chambeze flows, and about 60 miles W. of Tanganyika. All his attempts to reach Ujiji, which is situated on the E. shore of Lake Tanganyika, and where he knew stores and letters were awaiting him, failed, owing to the inundated state of the country. For about three years after this all communication between the explorer and his friends was cut off, owing to the unsettled state of the country. A second expedition was fitted out from England under the command of Lieutenants Dawson and Henn, accompanied by W. Oswald Livingstone, a son of the great traveler. They arrived at Zanzibar in the early part of 1872, and landed on the neighboring coast at Bagamoyo. But here they were met on May 7 by Henry M. Stanley, the special correspondent of the New York "Herald," who had left the object of their search in good health at Unyanyembe, about 50 days' march from the coast. He had found Dr. Livingstone on Nov. 3, 1871, at Ujiji. They had lived together during the winter exploring the N. coasts of Lake Tanganyika, and Livingstone had accompanied the intrepid American as far as Unyanyembe, half way between the lake and the sea coast. They separated in March, 1872, at which time it was Livingstone's intention to return to Ujiji, and thence to cross over or go around the S. end of Lake Tanganyika, to finish his explorations of the more W. chain of lakes and rivers which he had discovered flowing N. from the Chambeze and Lake Bangweolo. Fully equipped with stores from Dr. Kirk and the relief expedition he set out in the summer to complete his explorations of the Lualaba river. After rounding Tanganyika and visiting Lake Bangweolo he pushed on for Katanga; but stricken down with dysentery, after much painful traveling in the attempt to reach Ujiji, he bade his followers build him a hut to die in at Ilala, near Lake Bangweolo, where he expired May 1, 1873. His body was disemboweled and filled with salt, and carried by his faithful attendants to the coast, whence it was conveyed to England, and solemnly deposited in Westminster Abbey, April 18, 1874.

Livingstone College, a coeducational institution in Salisbury, N. C., for colored students only; founded in 1882 under the auspices of the African Methodist Episcopal Zion Church; has grounds and buildings valued at over $175,000; scientific apparatus, etc., valued at $10,000; volumes in the library, about 7,000; ordinary income, $28,000; average number of fac-

ulty, 15; average student attendance, about 300.

Livingstonia Mission, of which the first settlement is at Cape Maclear at the S. end of Lake Nyassa, and the present chief settlements at Bandawè on the W. shore, was based on a suggestion made by Livingstone that this lake was the best position for the establishment of a mission with a view to the annihilation of the Portuguese and Arab slave trade on the E. of Africa. Acting on this suggestion, an expedition was equipped in 1875 by the Free Church of Scotland, for establishing a mission here. Another station, called Blantyre, was planted by the Church of Scotland in the Shiré Highlands, within easy distance of the lake. As yet the chief industries are iron manufacture, basket making, and cloth manufacture from the bark of trees and cotton. With the exception of the 70 miles of the Murchison Falls, there exists unbroken water communication between the head of Nyassa and the Indian Ocean. Lake Nyassa has been circumnavigated and steamers launched upon its waters by the African Lakes Company, which blasted a road from the N. end of Nyassa up the heights to the plateau between it and Tanganyika. Another road was carried round the rapids of the Shiré. In 1889 the Portuguese authorities at Quilimane obstructed the mission supplies and claimed the mission's territory by force of arms; but since 1890 the country N. of the Ruo river has been under the British flag.

Livius Andronicus, the father of Roman dramatic and epic poetry, was a Greek by birth, probably a native of Tarentum, and was carried a slave to Rome in 272 B. C., but afterward liberated by his master. He translated the "Odyssey" into Latin Saturnian verse, and wrote tragedies, comedies, and hymns after Greek models.

Livonia, one of the three Baltic provinces of Russia to which belong also the islands of Oesel, Mohn, and Küno; area, 18,153 square miles; pop. (1897) 1,300,640. It forms the E. side of the Gulf of Riga, and lies between Esthonia on the N. and Courland on the S., being separated from this latter by the Dwina river. The country is mostly flat, and nearly one-fourth of it is covered with forests. Lakes and streams and marshes are common. The soil is only of moderate fertility; nevertheless agriculture, the chief occupation, is carried on in a skillful manner, rye, barley, oats, flax, and potatoes being the principal crops. Distilling, brewing, iron-founding, oil-pressing, and cork, wool, and paper manufacture are the more important industries. Sawmills are active. The fisheries are valuable. The Livonians proper, a Finnic race akin to the Esthonians, have dwindled. Capital, Riga; other towns, Dorpat, Pernau, Wenden. In the first decade of the 13th century the principality was given to the Knights of the Order of the Sword, who in 1237 were merged in the order of the Teutonic Knights and maintained their sovereignty against the Archbishop of Riga and against Sweden, Poland, Lithuania, and Russia down to past the middle of the 16th century. From that time Livonia was a bone of contention between Poland, Sweden, and Russia, till its incorporation with the last-named country in 1721. Since the middle of the 19th century, and especially since 1881, the Russians have made determined efforts to "russify" the province.

Livy (Titus Livius Patavinus), a Roman historian of the Augustan age; born in Patavium (now Padua), Italy, 59 B. C., according to Varro, or in 61 according to Cato. The records of his life, like those of many others of the literary men of antiquity, are meager and unsatisfactory — the materials necessary to form a connected narrative having been supplied by the imaginations of some of his biographers. After passing the early portion of his life perhaps in his native town, he appears to have gone to Rome during the reign of Augustus, where his literary talents soon obtained for him the favor and patronage of the emperor. As an admirer of the ancient institutions of his country, Livy attached himself in opinion to the party of Pompey, and considered him as the greatest of statesmen and heroes; but Augustus, entertaining a sincere regard for the historian, did not allow his friendship and patronage to be affected by political opinions, though they seemed to call in question the right by which he ruled the destinies of Rome. Having spent the greater part of his life in the metropolis, he returned in old age to the town of his birth, and there died A. D. 18, in the 77th year of his age. The preceding short statement contains all the authentic facts which have descended to us in connection with the personal history of Livy. Many other particulars are related by writers who profess to record the life of the Roman historian; but these are either altogether illusory, or rest upon evidence which will not bear examination. Livy has

LIVY.

erected for himself an enduring monument in his "History of Rome." This great work, which he modestly designated "Annales" (Annals), contained the history of the Roman state from the earliest period till the death of Drusus 9 B. C., and originally consisted of 142 books. Only 35 of these have descended to us; of the others, with the exception of two, we possess "Epitomes," or short summaries, but the books themselves have been entirely lost. The existing books were brought to light at various times; some of them towards the middle of the 16th century, and a fragment of the 91st book appeared for the first time in 1772.

Livre (lēv'r), an old French money of account, now superseded by the franc, to which it was about equal in value.

Lixiviation, the process of separating a soluble from an insoluble material by a washing or filtering action; leaching. Lixiviation removes a soluble material, which is the valuable portion, as in discharging a certain amount of syrup from a bone-black filter, by passing water through it. The leaching of ashes is a familiar instance of lixiviation.

Lizard, the popular English name of numerous reptiles forming the order *Lacertilia* or *Sauria,* and having usually two pair of limbs and an elongated body terminating in a tail. The lizards number more than a thousand species, accommodating themselves to all conditions except cold, and increasing in size and number in tropical regions. In some the tongue is thick and fleshy and in others it is divided, while in most cases it is protrusible. Some lizards are vegetable feeders, but for the most part

LIZARD.

they are carnivorous and live upon small birds, insects, etc. The eggs are deposited and left to be hatched without care from the parents. Of the three species found in Great Britain the common lizard (*Lacerta vivipara*) is the most widely distributed; the sand lizard (*Lacerta agilis*) is confined to portions of England, and the green lizard (*Lacerta viridis*) is found in the island of Guernsey. The chief families of lizards are the *Scincidæ,* or skinks; the *Geckotidæ,* or geckos; the *Iguanidæ,* or iguanas; and the *Chamæleonidæ,* or chameleons. Poison glands are wanting in the lizards; the only exception being the *Heloderma* of Arizona and Mexico, which is capable of inflicting a poisonous bite by means of poison glands connected with grooved teeth.

Lizard Point, a headland of England, in Cornwall, forming the extreme S. point of Great Britain.

Lizard Stone, the serpentine marble stone obtained in Cornwall, in the vicinity of the Lizard Point. It is worked up into chimney pieces, ornaments, etc.

Llama, or **Lama,** an even-toed ungulate of the family *Camelidæ;* habitat the S. parts of Peru. It is larger than the guanaco, of which Burmeister considers it to be a descendant, usually white, sometimes spotted with brown or black and sometimes entirely black. In size it is smaller, and in general form lighter than the camels, standing about three feet at the shoulder; no dorsal hump; feet narrow, toes widely separated, each with a distinct pad; hairy covering long and woolly. In the early days of Peruvian discovery the llama was the only beast of burden employed in the country. Its load rarely exceeds 120 pounds, but its great value consists in its being able to traverse mountainous paths along which less sure-footed animals would be unable to pass. Its usual daily journey averages 12 miles. The llamas are completely domesticated. They live in flocks, which return nightly to the owner's fold of their own accord; and they breed freely in the same state. The flesh is considered very wholesome, especially that of the young animal. The wool is used among the native Indians for the manufacture of textile fabrics. The skin is made into leather. The dried dung is used for fuel, and the milk is also employed as an article of native diet. When irritated these animals have the habit of kicking at their adversaries, and they also eject the food when undergoing re-mastication in the mouth, along with quantities of saliva. The guanaco is a wild species inhabiting the Andes from Peru S. to the Straits of Magellan. In Patagonia they occur in large herds, but further N. the herds number only a few individuals in each. The color is a reddish brown, and the hair is long.

Remains of llamas have been found in the Pleistocene deposits of the Rocky mountains and in Central America. Gradual changes have been traced from the differentiated species now existing down through the Pliocene to the early Miocene. Professor Flower, remarking on the fact that none of these annectent forms have been found in the fossiliferous strata of the Old World, says: "It may fairly be surmised . . . that America was the original home of the

Tylopoda, and that the camels passed over into the Old World, probably by way of the N. of Asia, where we have every reason to believe there was formerly a free way of communication between the continents."

Llandaff (lan-daf'), a small town of Glamorganshire, on the right bank of the Taff. It is the seat of a very ancient bishopric, said to have been founded by St. Dubricius, who died in 612, and among whose successors have been St. Teilo and Bishops Godwin, Shute Barrington, Richard Watson, Sumner, and Copleston. The cathedral church, in virtue of which Llandaff is a "city"—one of the smallest in Great Britain—was built between 1120 and the first half of the 15th century, and is mainly Early English in style. It had fallen into utter ruin in 1575, but in 1735–1752 was patched up into an "Italian temple." In 1843–1869 it was thoroughly restored.

Llandeilo Flags, dark-colored micaceous flags, found in the Lower Silurian formations of Great Britain, frequently calcareous, resting on a great thickness of shales, generally of a black color below them, and these again on black carbonaceous shale of great thickness, frequently containing sulphate of alumina, and sometimes beds of anthracite, resulting probably from the decomposition, not of plants, but of graptolites, about 40 species of which have been found in the Llandeilo flags and the Arenig beds. Among these, graptolites with two rows of cells (Diplograpsus, etc.) are conspicuous. About 47 Brachiopoda are found, and of other mollusks Orthoceras, Cyrtaceras, and Bellerophon. Trilobites abound.

Llandeilo Formation, a formation of Lower Silurian age. As originally marked out by Sir Roderick Murchison, it fell naturally under two divisions, an Upper, containing the Llandeilo flags, and a Lower, now called the Arenig or Stiperstone group. According to Professor Ramsay, the two together are 3,300 feet thick in North Wales, and the lavas (which are felspathic and porphyritic), 2,500.

Llandovery Group, a group of rocks found in the hill of Noeth Grug, near Llandovery. Sir Roderick Murchison divided it into an Upper and a Lower Llandovery, the first sometimes called the May Hill group. Sir Charles Lyell believes that they constitute the base of the Upper Silurian, being at the same time beds of passage to the Lower. The beds of conglomerate, etc., constituting the greater part of the Lower Llandovery Rocks, are from 600 to 1,000 feet thick.

Llandudno, a fashionable watering-place in Carnarvonshire, North Wales; on the level neck of a promontory between the Great and Little Orme's Heads.

Llanelly, a manufacturing town and seaport of Carmarthenshire, Wales. The mineral wealth of the vicinity, and the easy access to the sea, have raised it from a mere village in 1813 to a town of considerable commercial importance.

Llangollen (lan-goth'len), a town of Denbighshire, North Wales. It is visited by tourists on account of the beauty of the famous Vale of Llangollen, and for its antiquities, among which are Dinas Bran or Crow Castle, Valle Crucis Abbey (1200), and Eliseg's Pillar (8th or 9th century). Plas Newydd, 1-3 mile S. of the bridge, was for half a century the residence of the two Irish recluses, the "Ladies of the Vale," or "Maids of Llangollen," Lady Eleanor Butler (1745–1829) and Miss Sarah Ponsonby (1755–1831), who were visited here by Madame de Genlis, Miss Seward, De Quincey, and many other celebrities.

Llanos, vast plains in the N. portion of South America, in some parts barren and sandy, in others covered with luxuriant grass and stocked with innumerable herds of cattle. Over great portions, however, there is a heavy growth of timber. The llaneros resemble the Gauchos farther S.

Llanquihue, a province of Chile; between the Andes and the Pacific Ocean; area nearly 8,000 square miles; is extremely fertile, yielding abundant harvests to its inhabitants, who are mostly Germans; capital, Puerto Montt. Pop. (1901) est. 80,000.

Llerena, a town of Spain, 83 miles N. of Seville. Near here the British cavalry routed the French cavalry on April 11, 1812.

Llorente, Juan Antonio Don (lyō-rān'-tā), a Spanish historian; born in Rincon de Soto in Andalusia, March 30, 1756. He was ordained priest in 1770; was commissary of the Inquisition at Logrono in 1785, and general secretary of the Inquisition at Madrid in 1789. He was commissioned in 1793 to draw up plans for a general reform of the procedure of the court. His greatest work is the celebrated "Critical History of the Spanish Inquisition" (4 vols. 1815–1817). He wrote also "Political Portraits of the Popes"; "Memoirs Relating to the History of the Spanish Revolution" (3 vols. 1815–1819). He died in Madrid, Feb. 5, 1823.

Lloyd, David Demarest, an American playwright; born in New York city in 1851. He graduated at the College of New York, and soon after was attached to the staff of the New York "Tribune." As a correspondent at Albany in 1875 he was prominent in exposing the canal ring. Besides contributions to magazines he wrote four plays: "For Congress" (1883); "The Woman Hater" (1885); "The Dominie's Daughter" (1887); "The Senator" (1889). He died in Weehawken, N. J., in 1889.

Lloyd, Henry Demarest, an American writer on economics, brother of David; born in New York, May 1, 1847. He received his

education at Columbia College, studied law, and was admitted to the bar in 1869. From 1872 to 1885 he was connected with the Chicago "Tribune." His chief work is the notable book "Wealth against Commonwealth" (1894), an examination of the Standard Oil Co., prepared from court records and other first-hand sources. He also wrote "A Strike of Millionaires against Miners" (1890); "A Country without Strikes" (1900); "Newest England: Notes of a Democratic Traveller in New Zealand" (1900); etc. He died in Winnetka, Ill., Sept. 28, 1903.

Lloyd's, an association of marine underwriters, so named from a coffee house kept in the seventeenth century by Edward Lloyd, in Tower street, London, where merchants met for business, etc. In 1692 Lloyd removed to Lombard street, and there he issued "Lloyd's News," and later "Lloyd's List." In 1774 the concern moved to the Royal Exchange. The interest of it was afterward purchased of the proprietor, and from that time it has been under the management of a committee of members. The establishment is devoted entirely to marine insurance (*q. v.*) and business subsidiary thereto, as the classification and registration of vessels, etc. It was incorporated by act of Parliament in 1871.

Lloyd's Bond, a form of security in England, from 1850 onward, devised by John Horatio Lloyd, for enabling corporate bodies whose powers of borrowing money were regulated and limited by statute to incur greater pecuniary liabilities than they were authorized to do under their borrowing powers. It consisted of an acknowledgment of debt under the company's seal, with a promise to pay at a certain date, and bore a certain rate of interest. The parliamentary restrictions especially affected railway companies; but as under the statutes such companies now have as much borrowing power as they require, they have ceased to issue Lloyd's bonds.

Lloyd's List, a newspaper published daily in London, containing the latest information on shipping matters.

Lloyd's Register, a register of ships, of all nations, published annually. It contains the names of all ships, arranged alphabetically, and classed according to their qualifications, as A1, etc., the class being determined by the reports of surveyors and the construction, materials, and state of repair of the vessels. "Lloyd's Register" is issued by an association called "Lloyd's Register of British and Foreign Shipping," managed by a committee of merchants, shipowners and underwriters, who are members of Lloyd's (*q. v.*).

Loach, or **Loche,** a malacopterygious fish of the family *Acanthopsidæ*. It is found all over Europe, except in Denmark and Scandinavia. It delights in small, shallow, clear streams, and swims rapidly when disturbed by the moving of the stone under which it secretes itself. The loach is an animal feeder; it seldom exceeds four inches in length, but, spite of its small size, it is highly prized for food. Dr. Günther refers the loach to the genus *Nemachilus*. In the plural: (1) The genus *Cobitis*. (2) The group or sub-family *Cobitidina*. Mouth surrounded by six or more barbels; dorsal fin short or of moderate length; anal fin short; scales small, rudimentary, or entirely absent; pharyngeal teeth in a single series, in moderate number; air-bladder partly or entirely inclosed in a bony capsule; pseudobranchiæ, none.

Load Line, a line drawn on the side of a vessel to show to what depth she sinks when loaded; also a line to indicate the maximum depth to which a vessel may legally be immersed by loading; sometimes called the "Plimsoll mark" (see PLIMSOLL, SAMUEL).

Loadstone, an ore of iron, consisting of the protoxide and peroxide in a state of combination, and frequently called the magnetic oxide of iron. It was known to the ancients, and they were acquainted with the property which it has of attracting iron.

Loam, alluvial soil, consisting of sand and clay soil in considerable quantity. If either largely predominates, the soil ceases to be loam. (See SOIL.) In founding, a mixture which essentially consists of sand and clay, the former largely predominating, with a certain quantity of horse-dung added, or some equivalent for the same, such as chopped straw, sawdust, or cow-hair. Beds of loam are sometimes found of nearly suitable composition, but it is more commonly made up by blending different sorts of sand, clay, etc., in a mill resembling a pug-mill. In molding it is always used quite wet, but is dried before pouring.

Loan, anything lent or given to another on condition of return or payment. In law loans are considered to be of two kinds — *mutuum* and *commodate;* the former term being applied to the loan of such articles as are consumed in the use, as provisions or money; the latter to the loan of such articles as must be individually returned to the lender. Between these two classes of loans an important distinction should be understood. In the first the title to property lent passes to the borrower; in the other class the borrower acquires possession only, the lender retaining the title to the property borrowed. The acknowledgment of a loan of money may be made by giving a bond, a promissory note, or an I. O. U., the last of which requires no stamp. See BAILMENT and CONTRACT.

Loan and Trust Company. See TRUST COMPANIES.

Loanda, Saint Paul de, chief town of the Portuguese possessions on the W. coast of Africa; on a small bay, 210 miles S. of the mouth of the Kongo. It has broad, tree-shaded but dirty streets, several churches, forts (1578), and the residences of the governor and bishop. The harbor is gradually sanding up, so that vessels lie 1¼ mile from shore to load and unload. Pop. (1901) over 15,000, of whom about 2,500 are Europeans.

Loango, a coast district of West Africa, stretching N. from the mouth of the Kongo to about lat. 4° S. By the Berlin conference of 1885 it was divided between the Kongo Free State, Portugal and France. The natural features and productions do not differ from those of the adjacent parts of Africa. The inhabitants, who call themselves Bafiotes, are fetich-worshipers. The town Loango, formerly a place of 15,000 people, consists now of only a few mercantile establishments.

Loasaceæ (lō-as-as′ē-ī), a natural order of calycifloral exogens, natives of America, and chiefly from the temperate and warmer parts of it. There are about 70 known species, herbaceous plants, hispid with stinging hairs. The genus *Loasa* sometimes receives the popular name of Chile nettle.

Lobau, George Mouton, Count de (lō′-bou), a French soldier; born in 1770. In the campaign of 1809 he defended the little island of Lobau, from which he took his subsequent title, against the Austrians, completely beat them off, and took his troops, comparatively unhurt, across the Danube. Being wounded at Waterloo, he was sent prisoner to England, where he remained till 1818. Having returned to France, he took part in the revolution of 1830, and was the successor of Lafayette as commander of the National Guard. He was made a peer and marshal of France in 1831. He died in 1839.

Lobbyists, a term applied to men who make a business of corruptly influencing legislators, by means of money paid to the members, or by any other method that is considered feasible. Many women engage in this work as well as men. The term lobby, which literally means the ante-rooms of legislative halls, has come to be applied to these people who frequent them, and they are sometimes styled the Third House.

Lobelia, the typical genus of the order *Lobeliaceæ.* The calyx is irregular, two-lipped, cleft longitudinally on the upper sides, the upper lip smaller and erect, the lower spreading; three cleft; the anthers united, the two lower ones bearded at the apex; capsule two- or three-celled, the upper part free, two-valved loculicidal. Many species are very beautiful.

L. urens blisters the skin, *L. cardinalis* is acrid and is considered anthelmintic, *L. inflata* is a powerful emetic, sudorific, and expectorant. The infusion of the leaves of *L. nicotinæfolia,* an Indian species, is used by the natives as an antispasmodic, the dry herb when handled irritates the throat and nostrils like tobacco. The flowering herb of *L. inflata* (Indian tobacco), indigenous to the United States, is used in British practice. The medicinal preparations of it are two — the tincture and the ethereal tincture of lobelia. In small doses lobelia is expectorant and diaphoretic; in large ones, emetic or cathartic. It has been used in spasmodic asthma, and in dyspnœa, etc., as a diuretic.

Lobipedidæ, a family of wading birds, having the anterior toes lobed or semi-palmated. By many naturalists this family is merged in *Scolopacidæ.*

Loblolly Bay, an elegant evergreen shrub or small tree, from the S. States of America. Its bark is sometimes used in tanning.

Lob Nor, a lake of Central Asia, in the desert of Gobi, receiving the Tarim river. Prjevalski in 1885 found 400 persons, mixed Turks and Mongols, settled on its confines.

Lobo, Francisco Rodrigues (lō′bō), a Portuguese poet. Practically nothing is known of his life. He is one of the most admired of Portuguese poets, among his popular works being: "Romances" (1596); "Eclogues" (1605); "Court in the Country" (1610), long deemed his masterpiece; and various others. He died about 1623.

Lobo, Jeronimo, a Portuguese missionary; born in Lisbon, Portugal, in 1593. He went out to India in 1621, but traveled back to Abyssinia in 1625, and was for nearly 10 years superintendent of missions in Tigre. He died in Lisbon, Jan. 29, 1678.

Lobos Islands, two small groups of rocky islands, about 12 miles off the coast of Peru, famous for the great quantity of guano which they produced.

Lobster, the largest and, with the crab, best known of decapod crustaceans, valuable and delicate as a food closely allied to the crawfish (*q. v.*). Besides having five pairs of walking legs, it is characterized by a subcylindrical shell, and an elongated abdomen ending in a long tail. It is further distinguished by the possession of two great nipperlike claws (chelipeds), one employed for seizing prey, the other for crushing and combative purposes, and by a serrated beak called the rostrum. Like the first big claws the second and third pairs of legs are provided with chelipeds, while the fourth and fifth pairs simply terminate in single and pointed extremities. These abdominal legs are called swimmerets. There are two pairs of antennæ or feelers, the outer ones very long and single, the shorter pair being bifid, or divided. Twenty segments compose the

body of a lobster, of which seven in the abdomen are distinct, while the remaining thirteen form the thorax and head, and are more or less fused together. In the common lobster the head and thorax are united into one region; the eyes are spherical and large and situated at the end of a movable stalk. The color of an ordinary lobster is bluish black, variegated with pale or yellowish spots. Clumsy as the lobster may appear, it moves about freely by walking, and it can shoot backward while in water to no mean distance by suddenly flexing the abdomen, covering, according to a well-known authority, twenty-five feet in less than a second. Matured lobsters change their shell or crust annually and when about to molt retire into a dark or sheltered nook. The upper shell or carapace generally is the first part to separate and slough off, and then the other parts of the body become uncovered, the entire process ordinarily occupying but a few minutes. This period of shedding is a precarious one and sometimes results in death. For a short time afterwards the surface of the animal remains soft, but gradually the deposition of lime forms the new shell within a few weeks, and during the change (ecdysis) the crustacean increases its size. The big claws when lost are reproduced. The sense of hearing is fairly developed in lobsters; the sense of smell is evidently acute and guides them to their food; but their visual powers are comparatively weak, and they are curiously sensitive to light, and are much more active in darkness.

Lobsters are very prolific, the number of eggs produced by a female varying from 3,000 to occasionally 100,000 according to its size and age, the average number of eggs laid by an eight-inch lobster being 5,000. Eggs may be laid at almost any season, but the breeding season is during July and August. After extrusion the eggs are carried on the under side of the body and tail, and undergo a slow development, lasting from ten to eleven months, then they are deposited in the sand, where they are afterwards hatched. On hatching, the young, which are scattered by a fanning motion of the parent, rise to the surface only to be devoured in immense numbers by fish and other water animals. Those that escape destruction pass through three stages before assuming their first adult shape. After about six weeks or more of surface life, and having attained miniature adult form, they sink to the bottom and seek shelter in shallow water by hiding under rocks or burrowing in sand. This period of development is one of constant danger and comparatively few survive it. Though it is difficult to judge the age of lobsters, as the rate of growth is not definite, a lobster with a length of 10½ inches is supposed to be about five years old. Sometimes a specimen reaches a great age and size, upward of forty pounds having been recorded, but one of twenty-five pounds is a rarity to-day. Several species of lobsters are found in various parts of the world, such as the yellow variety (*Nephrops Norvegicus*) of the Norwegian coast, the clawless spiny lobster (*Palinurus vulgaris*) of Europe, and the large and handsome species abundant in West Indian waters. But those of the greatest commercial importance are the common lobster of North America (*Homarus Americanus*) and its near relative the European lobster (*Homarus vulgaris*). In spite of the fact that both species are large and prolific, they have been diminishing in numbers for some years, owing to the natural hardships attending growth, combined with wholesale and unchecked capture. In the United States many protective laws have been passed to prevent the extermination of the lobster, forbidding the catching and selling of those under a certain size. At present no State permits the sale of lobsters less than nine inches long, the measurement to be from the beak or rostrum to the tip of the telson or terminal point. The State of Massachusetts places the limit at 10½ inches. Artificial hatching and planting of the young on a large scale have been resorted to by the Canadian and United States governments.

The American lobster is found along the coast of the Atlantic from Delaware to Labrador, close to shore, and to a depth of 100 fathoms. In the regions of Maine and Nova Scotia lobsters are most plentiful, while the waters about New Jersey are almost barren of them. About 75 per cent. of the annual yield in the United States comes from the waters of Maine. In 1880 the total yield of the United States was over 20,000,000 pounds, and in 1889 it had reached more than 30,000,000 pounds—the high-water mark of production. Since then there has been a steady decrease. In 1898 the yield was only a little over 15,000,000 pounds, and the scarcity continues to date (1907). With decrease in production, and ever-growing demand, the price has been relatively raised. The United States lobster fisheries are now worth about $1,500,000 annually. Lobster-fishing is very simple and uniform. "Traps" or "pots," usually three or four feet long, are made of laths placed an inch or so apart and with a funnel-shaped opening of coarse netting placed in one end. The trap is baited with meat or fish and lowered to the bottom, being held there by stone weights until the owner draws it up again, usually in a day or two, to remove the beguiled lobsters. They are kept alive in floats until time for shipment to market.

Lobworm. See LUGWORM.

Local Action, chemical action which does not generate current in the external circuit of a voltaic cell, and is a source of loss.

Local Attraction, in magnetism, attraction exerted on a magnet by objects in its immediate vicinity (as, for instance, by iron on board a ship), with the effect of deflecting it from its proper direction.

Local Option, the right of each locality of a State, such as each county, township, or city, to determine for itself whether or not some particular measure of legislation shall be enforced therein, applied more especially as to whether the liquor traffic shall be licensed and carried on.

Lochaber Ax, the battle-ax of the Highlanders. Axes of the description named, made with a long curved blade and mounted on a pole ending in a hook, were formerly carried by the Edinburgh City Guard.

Lochleven, a beautiful oval lake of Kinross-shire, Scotland, 23 miles N. N. W. of Edinburgh. Lying 353 feet above sea-level, and engirt by Benarty (1,167 feet), the West Lomond (1,713), and other hills, it measures 3⅝ miles by 2; discharges by the Leven, flowing 16 miles E. to the Firth of Forth; is 10 to 90 feet deep; and has an area of 3,406 acres, drainage operations having reduced its size by one-fourth in 1826–1836. Of seven islands, the largest are sandy, treeless St. Serf's Inch, an early seat of the Culdees, and Castle Island, with the 14th-century keep of a castle which in 1567–1568 was for 10 months the prison of Mary Queen of Scots. Since 1633 and earlier the loch has been famous for its delicate pink-fleshed trout, and since 1856 for its fly-fishing.

Loch Lomond. See LOMOND, LOCH.

Loch Long. See LONG, LOCH.

Loch Ness. See NESS, LOCH.

Lock, an inclosure in a canal, with gates at each end, used in raising or lowering boats as they pass from one level to another. When a vessel is descending, water is let into the lock till it is on a level with the higher water, and thus permits the vessel to enter; the upper gates of the lock are then closed, and by the lower gates being gradually opened, the water in the lock falls to the level of the lower water, and the vessel passes out. In ascending the operation is reversed, that is, the vessel enters the lock, the lower gates are closed, and water is admitted by the upper gates, which, as it fills the lock, raises the vessel to the height of the higher water. See HYDRAULIC LIFT.

Lock, an appliance used for fastening doors, chests, drawers, etc. A good lock is the masterpiece in smithery, and requires much art and delicacy in contriving and varying the wards, springs, bolts, and other parts of which it is composed, so as to adjust them to places where they are serviceable, and to the various occasions of their use. The principle upon which all locks depend is the application of a lever to an interior bolt, by means of a communication from without, so that by means of the latter the lever acts upon the bolt, and moves it in such a manner as to secure the door or lid from being opened by any pull or push from without. The security of locks in general, therefore, depends on the number of impediments that can be interposed between the lever (the key) and the bolt which secures the door, and these impediments are known by the name of "wards" (which slip into corresponding grooves of the key), the number and intricacy of which are supposed to distinguish a reliable lock from one that may be easily picked.

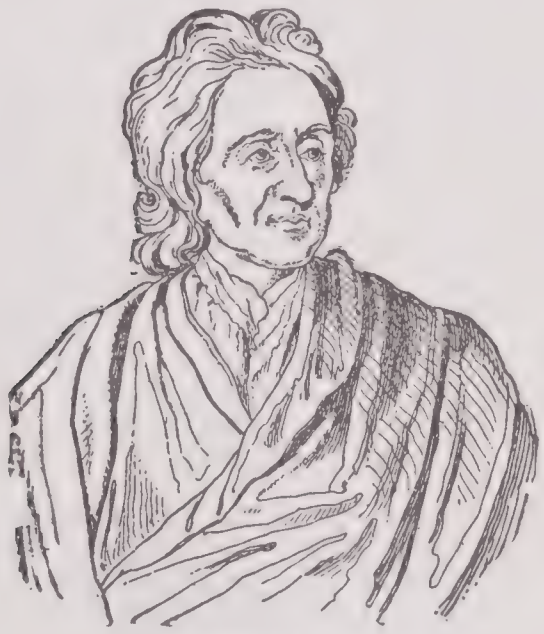
Locke, David Ross, pseudonym PETROLEUM V. NASBY, an American humorist; born in Vestal, Broome co., N. Y., Sept. 20, 1833. He learned the trade of printer. After being connected with several newspapers he took charge of the Toledo "Blade" in 1865, and at once became popular as a humorous writer and later as a lecturer. He began his "Nasby" letters in 1860 and continued them throughout the war. They were very amusing and were mainly hits at political characters and situations, written in a peculiar dialect. They were collected and published in book form in 1868, under the title of "Swingin' Round the Circle" and "Letters from Confederit X-Roads." He died in Toledo, O., Feb. 15, 1888.

Locke, Jane Ermina, an American writer; born in Worthington, Mass., April 25, 1805. Her contributions appeared in the "Ladies' American Magazine." "Poems" was published in 1842; "The Recalled, or Voices of the Past," 1855; a "Eulogy on the Death of Webster," in rhyme, 1855. She died in Ashburnham, Mass., March 8, 1859.

Locke, John, an English philosopher; born in Wrington, in Somersetshire, in 1632. He was educated at Westminster and Christchurch College, Oxford. In 1666 he was introduced to Lord Ashley, afterward Earl of Shaftesbury, and when in 1672, Lord Shaftesbury was appointed lord-chancellor, he made Locke secretary of presentations, and at a later period, secretary to the Board of Trade. On his patron retiring to Holland, to avoid a state prosecution, Locke accompanied him, and remained there several years. So obnoxious was he to James's government, that the English envoy demanded Locke of the States, on suspicion of his being concerned in Monmouth's rebellion, which necessitated his temporary concealment. At the revolution he returned to England and was made a commissioner of

appeals, and in 1695 a commissioner of trade and plantations. He resided the last few years of his life with his friends, the Mashams, at Oates, in Essex. As a philosopher, Locke stands at the head of what is called the Sensational School in England. His greatest work is the "Essay on the Human Understanding," in which he endeavors to show that all our ideas are derived from experience, that is, through the senses, and reflection on what they reveal to us. He also investigates the general character and the association of ideas; the reality, limits, and use of knowledge; the influence of language, and the abuses to which it is liable. His other works are the "Treatise on Civil Government," "Letters on Toleration," "On the Conduct of the Understanding," "Vindication of the Reasonableness of Christianity." He died in 1704.

Locke, John Staples, an American writer; born in Biddeford, Me., in 1836. Among his works are: "Picture Rhymes



JOHN LOCKE.

for Happy Times"; "A Brave Struggle," a novel; "Shores of Saco Bay"; "Historical Sketches of Old Orchard." He died in 1906.

Locker=Lampson, Frederick, an English versifier; born in 1821. He served some years as précis-writer in the Admiralty office, and made his name widely known as a writer of unusually bright and clever society verses by his "London Lyrics" (1857), collected from the various papers in which they had appeared. Later books are "Lyra Elegantiarum" (1867) and "Patchwork" (1879). In 1850 he married a daughter of the 7th Earl of Elgin, who died in 1872; and in 1874 the daughter of Sir Curtis Lampson, when Locker added the name of Lampson to his own. Eleanor, his daughter by the first marriage, in 1878 married Lionel Tennyson. He died May 30, 1895.

Lockhart, John Gibson, a Scotch biographer and editor; born in Cambusnethan, Lanarkshire, Scotland, July 14, 1794. He was educated at Glasgow University; gained an exhibition at Baliol College, Oxford; studied for the Scottish bar, but never practised; and began his literary career in 1817 as a contributor to the newly-established "Blackwood's Magazine." In 1820 he married the daughter of Sir Walter Scott, and in 1826 succeeded Gifford as editor of the "Quarterly Review," a position which he occupied for 27 years. As the author of the life of Sir Walter Scott he will be remembered. He died in Abbotsford, Nov. 25, 1854.

JOHN G. LOCKHART.

Lock Haven, a city and county-seat of Clinton co., Pa.; on the West Branch canal, and the Philadelphia and Erie railroads; 25 miles W. S. W. of Williamsport; in a beautiful mountain valley. The manufacture and shipment of pine and other lumber is the chief business interest. It has churches of the leading denominations, National bank, newspapers, public and private schools, State normal school, hotels, gas works, foundries and tanneries, machine shops, planing-mills and sawmills, and an assessed property valuation of $500,000. A bridge crosses the river here. Pop. (1900) 7,212; (1910) 7,772.

Lockjaw. See TETANUS.

Lockout, the discharge and keeping out of employment of artisans and laborers by their employers. It is a retaliatory measure adopted by some capitalists to resist the demands for shorter hours, more pay, etc., made by their workmen. See STRIKES: BOYCOTTING: LABOR, COURT OF: LABOR LEGISLATION.

Lockport, a city and county-seat of Niagara co., N. Y., on the Erie Canal and the New York Central railroad; 25 miles N. N. E. of Buffalo. The 10 massive locks of the canal, which here makes a descent of 66 feet, give name to the town. The canal affords great water-power, which is utilized in a large number of flour and lumber mills, machine shops, foundries, cotton and woolen mills, and other establishments, some of which are of great extent.

The canal here passes through a deep cut several miles in length, excavated in the solid rock. The city is the trade center for the county, with an annual trade of $5,000,000; has churches, public schools, National and other banks, female seminary, and daily and weekly newspapers. Large quantities of Niagara limestone and sandstone are here quarried for building purposes. Pop. (1890) 16,038; (1900) 16,531; (1910) 17,970.

Lockroy, Edouard Etienne Antoine Simon (lok-rwa'), a French journalist; born in Paris, France, July 18, 1838. He was prominent as a journalist before and after the war with Germany, and suffered several months' imprisonment for his radical articles published in "Figaro," "The Recall," and "The Sovereign People"—a popular political journal, of which he was editor. He figured conspicuously in political life, having been Minister of Commerce and of Public Instruction. His published volumes are composed mainly of articles contributed to various journals, and include: "The Eagles of the Capitol" (1869); "Down with Progress" (1870); "The Commune and the Assembly" (1871); "The Rebel Island" (1877); "Von Moltke" (1891), memoirs; "A Mission in the Vendée, 1793" (1893).

Lockwood, Belva Ann Bennett (Mrs.), an American lawyer; born in Royalton, N. Y., Oct. 24, 1830; was graduated at Genesee College, Lima, N. Y., in 1857. Later she was instrumental in inducing Congress to pass an act giving women in the employ of the government equal pay with men for the same work. She studied law in Washington and was admitted to the bar in 1879; and was connected with numerous important law cases, including several before the United States Supreme Court; was nominee of the Equal Rights Party for President of the United States in 1884 and 1888; was appointed United States representative to the Congress of Charities and Corrections in Geneva in 1896. In 1900 she had a bill before Congress to prevent encroachment upon the Cherokee Indians of North Carolina. She was elected president of the Women's National Press Association, Jan. 18, 1901.

Lockwood, James Booth, an American military officer; born in Annapolis, Md., Oct. 9, 1852; entered the army as 2d lieutenant in 1873 and served till 1880 in the West, where he became proficient in telegraphy, surveying, and phonography; volunteered to accompany the Lady Franklin Bay expedition to the Arctic regions and was made second in command. His fame rests upon the discovery of Lockwood Island, in lat. 83° 24′ N., the farthest N. point of land or sea that had been reached up to that time. He died at Cape Sabine, April 9, 1884. His body was brought to the United States by the relief expedition under Capt. Winfield S. Schley, and interred in the grounds of the Naval Academy.

Lockyer, Joseph Norman, an English astronomer; born in Rugby, England, May 17, 1836. In 1869 he was elected an F. R. S., and in 1870 was appointed secretary to the Royal Commission on Scientific Instruction, made Lecturer on Astronomy at the Normal School of Science at South Kensington, and sent out to Sicily as head of the eclipse expedition. In the following year he headed a similar expedition to India and was elected Rede lecturer at Cambridge. He had already in 1866 discovered a new method of observing the sun; and in 1874 he gained the Rumford medal of the Royal Society and was appointed editor of "Nature." He was an able popular lecturer on astronomical physics, and wrote "Elementary Lessons in Astronomy" (1868); "Studies in Spectrum Analysis" (1878); "Contributions to Solar Physics" (1873); "The Spectroscope and its Applications" (1873); a primer on "Astronomy" (1875); "Star-Gazing" (1878); "The Chemistry of the Sun" (1887); "The Meteorite Hypothesis" (1890); "Dawn of Astronomy" (1894); etc. He was knighted in 1897.

Locofoco, a lucifer match, a self-lighting match. A name formerly given to a faction of the Democratic party, because at a grand meeting in Tammany Hall, New York, in 1834, when the chairman left his seat, and the lights were suddenly extinguished, in the hope of breaking up the turbulent assembly, those who were in favor of extreme measures instantly drew from their pockets their locofocos, relighted the lights, and continued the meeting to the accomplishment of their object.

Locomotive, a movable steam engine used for the traction of cars on a railway. The history of its remarkable development and the peculiarities of its construction are narrated in the two following articles.

Locomotive, American. It would be difficult to find a form of mechanical construction in the United States which bears more strongly the imprint of our national characteristics than the American locomotive. In its general appearance, constructive details, and unquestionable convenience of operation, it stands entirely distinct as a type among the hundred and one styles of locomotives that are manufactured in the shops of the world. This national individuality is seen even more strongly in the great industrial establishments in which our locomotives are made, where labor-saving machinery and carefully thought out methods of shop management have enabled us to build at a speed and price which can-

Locomotive

not be approached by any other nation. The magnitude of the locomotive industry in this country was emphasized in the festivities which attended the completion of their 20,000th locomotive by one of our great locomotive works, an event which occurred in the spring of 1902. The early founding of the Baldwin Locomotive Works, its rapid growth, the many standard types of locomotives which have been originated in the shops of the company, and the fact that its locomotives have been for years finding their way to the four corners of the earth render the works thoroughly representative of the locomotive industry in this country.

Mathias W. Baldwin, who founded the establishment, started in business as a jeweler in a small shop in Philadelphia in the year 1819. In 1830 the steam railroad was beginning to make its appearance and establishing itself in this country, and to gratify public interest the proprietor of a Philadelphia museum gave an order to Baldwin for the construction of a miniature locomotive for exhibition. In the spring of 1831 the work was completed and the toy was set in motion on a circular railroad track at the museum. The success of the model brought an order to Baldwin for a locomotive from the Philadelphia, Germantown and Norristown Railroad Company. Guided by his experience with the little model, and by some memoranda which he had taken of a locomotive recently imported from England by the Camden and Amboy Railroad Company, Baldwin completed the curious and historical locomotive known as "Old Ironsides." The engine was tried Nov. 23, 1832, and did duty on the Germantown road and later on other roads for a period of more than 20 years.

The "Ironsides" was a four-wheeled engine, modeled after the English pattern of those days, and it weighed in running order something over five tons. The cylinders were placed beneath the smokebox and connected to a pair of cranks on the rear axle, which was pl ced in front of the firebox. The driving wheels were 54 inches in diameter, and the front wheels 45 inches in diameter. The cylinders were 9½ inches in diameter by 18 inches stroke, and they were carried beneath the smokebox, as is done today with modern inside connected engines. The wheels had cast-iron hubs, wooden spokes and rims, and wrought-iron tires. The frame was of wood. The boiler was 30 inches in diameter and contained 72 copper flues 1½ inches in diameter. The valve motion was given by a single loose eccentric to each cylinder, and the engine was reversed by changing the position of the eccentric on the axle by a lever operated from the firebox. The contract price was $3,000.

The second engine, built in 1834 for the Charleston and Hamburg Railroad Company, was a six-wheeled engine with a single pair of drivers, 4½ feet in diameter, carried behind the firebox, with a half-crank axle of Baldwin's design. The wood and iron wheels used on the "Ironsides" having proved faulty, the driving wheels in this case were cast in solid bell metal. The "Miller" had cylinders 10 inches in diameter by 16 inches stroke, and weighed in working order about 8 tons. The boiler was constructed with a high circular dome over the firebox, a form of construction which was consistently followed for many years afterward. The next engine, the "Lancaster," built in 1834, weighed about 8½ tons, and in that year five locomotives were completed. In the following year the business having outgrown the works, a location was found on Broad and Hamilton streets, the site of the present works, then in the suburbs of the city. From that time on the growth of the plant was rapid, 14 engines being built in 1835 and 40 in 1836. Without attempting to go into the details of the progress of the works, it is sufficient to state that several standard American types had their origin in the Baldwin shops, and of these, perhaps, the most notable are the "Consolidation," the "Mogul" and the "Atlantic" types. The "Consolidation," from which the type of this name was named, was built in July, 1866, for the Lehigh Valley railway. She was a remarkably powerful engine for that day, with cylinders 20 by 24; four pairs of drivers connected, and a Bissell pony truck equalized with the front drivers. The engine in working order weighed 90,000 pounds. The "Mogul" class took its rise from an engine built for the Louisville and Nashville railroad in 1861. The "Mogul" had three pairs of drivers connected, and a swinging pony truck, which was later equalized with the forward drivers. The first "Atlantic" type of locomotive was built in 1895 for the Atlantic Coast Line, which was followed by engines of the same type for the Atlantic City trains of the Philadelphia and Reading railroad. The 1,000th locomotive was built in 1861. The 5,000th locomotive, built in 1880, was designed for fast passenger service between Philadelphia and New York, and to run with a light train at a speed of 60 miles per hour; its cylinders were 18 by 24, and it was carried on a four-wheel truck, one pair of 6½-foot driving wheels, and a pair of 45-inch trailing wheels equalized with the drivers. The 10,000th locomotive was completed in 1889; the 15,000th in 1896; and the 20,000th in 1902.

A banner year in the history of these works was the season of 1889, when the first of the now celebrated compound locomotives was completed and placed on the

Locomotive

Baltimore and Ohio railroad. It was of the four-cylinder type designed by S. M. Vauclain, the general superintendent, a high and a low pressure cylinder being carried on either side of the smokebox, the high pressure above and the low pressure below, though in some later engines the positions are for convenience reversed. The two pistons on either side are connected to a common crosshead and each pair of cylinders is cast in one piece with the piston, steam-chest and one-half of the saddle. The arrangement is shown very clearly in the accompanying perspective view of the cylinders. The valve which is double and hollow controls the steam admission and exhaust of both cylinders. The exhaust steam on the high pressure cylinder becomes the supply steam for the low pressure cylinder; and as the steam for the high pressure cylinder enters the steam chest at both ends the valve is in practically perfect balance. A by-pass valve is provided to admit live steam to the low pressure cylinder in starting.

In view of the fact that there is even today a rather widespread though mistaken idea among railroad men that the superiority of the compound to the single expansion locomotive is doubtful, it is well to draw attention here to two facts: First, that the scientific tests which have been made in experimental engineering laboratories, such as those at Purdue University and Columbia University, have shown that the compound locomotive is decidedly more economical than the single expansion; and, second, that where the management, engineers and firemen of a railroad have taken hold of the compound with the determination to give it a perfectly fair trial, it has not proved more costly in repairs and has maintained what we might call its laboratorial reputation for economy. We quote from a paper on the performance of a four-cylinder Baldwin compound locomotive, by Richard A. Smart, Assistant Professor of Experimental Engineering at Purdue University, in which he draws the following conclusions: First, that there was with an increase of speed an increase of horse power and economy up to 270 revolutions per minute; second, the indications were that the power would increase for speeds considerably above 270 revolutions per minute; third, the increase in economy with increase of speed was chiefly due to a decrease of cylinder condensation; fourth, the average steam consumption of the compound was much lower than the lowest consumption shown by the single expansion engine; fifth, the saving in steam shown by the compound locomotive would result in a saving in coal of from 18 per cent. to 33 per cent.

Perhaps the most celebrated locomotives turned out by these works are those which have been built to haul the extremely fast trains which are running between Camden, across the Delaware river from Philadelphia, and Atlantic City. These are of the celebrated "Atlantic" type in which the cylinders drive the rear pair of four-coupled drivers and the weight of the firebox is carried by a pair of trailers. Engine 1027 was built under guarantee to haul a train of eight cars (four coaches and four Pullmans) to Atlantic City, a distance of 55.5 miles, in 60 minutes; or to haul six cars over the same distance in 50 minutes, with a development of an estimated horse power of 1,400. In practice, however, this locomotive exceeded the guarantee by about 10 per cent. Another of the "Atlantic" type was built for the Chicago, Milwaukee and St. Paul railroad, under contract to haul nine cars between Milwaukee and Chicago in 1 hour and 45 minutes, with an estimated development of maximum horse power of 1,600. One of the latter engines exceeded the guarantee by four cars, hauling 13 cars in the specified time, the train and locomotive together weighing 600 tons. Following on these excellent results the company proceeded to make accurate tests of 1027 to determine just what the locomotive was capable of. It was found that with an experimental train of 12 coaches the horse power increased directly with the speed until it reached 1,450 horse power at 70 miles an hour, and even at this speed the locomotive had a reserve of power to overcome grade resistance or to enable it to accelerate the train to a higher speed.

It is a well-known fact that at the higher speed the single expansion locomotive is subject to drawbacks in the shape of wire drawing of the steam, back pressure in the cylinders and overforcing of the fire, which are absent in the compound with its wider range of expansion and its milder exhaust. Careful tests have shown over and over again that there is about 25 per cent. economy in a compound as compared with a single expansion locomotive doing the same work. This is due to the less evaporation required to develop the necessary energy, together with the slower rate of combustion of fuel resulting from exhausting the steam at lower tension. Of course it is understood that these results are only obtained, as we have before remarked, where the management and operatives of the road are in thorough sympathy with the compound and are desirous of giving it every facility to show its best results.

The 20,000th locomotive of this plant is a further improvement in which it is sought to secure a more perfect balance of the reciprocating parts than is possible on the ordinary type. The high and low pressure cylinders, instead of being arranged above one another in a vertical plane are all carried in one horizontal plane, the high

pressure cylinders within the frames beneath the smokebox and the low pressure cylinders on the outside of the frames. The low pressure crossheads are connected with the main driving wheels by outside connecting rods as in ordinary practice. The main driving axle has two cranks which are set at right angles to each other on each side of the center of the locomotive and each crank is coupled to the crosshead of one of the high pressure pistons. The crank on the axle and the crank pin in the wheel for the corresponding high and low pressure cylinders are set at an angle of 180 degrees, and the two axle cranks being set at 90 degrees results in the action of each high and low pressure cylinder on one side of the locomotive quartering with the equivalent cylinders on the opposite side.

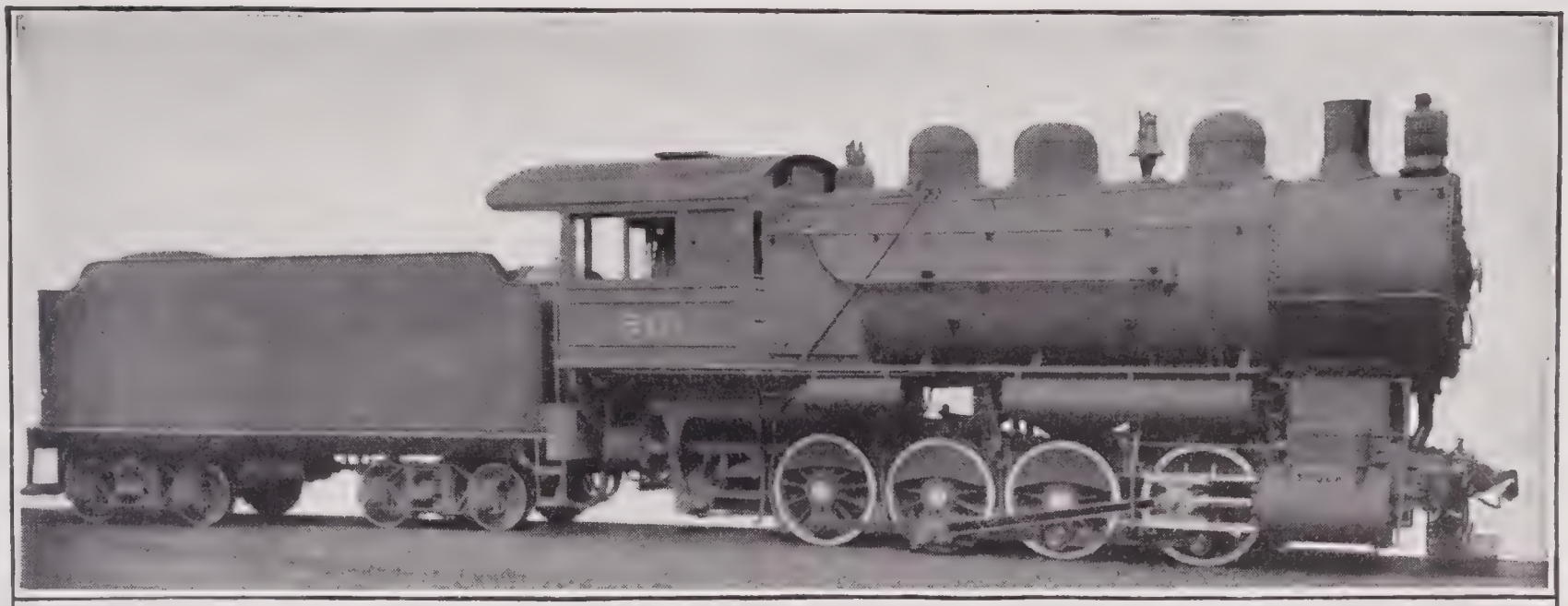
As a consequence, an almost perfectly balanced engine is secured and the amount of counterbalance required is reduced to a very low limit. The arrangement is the same as was used by Strong in his locomotive that attracted so much attention a dozen or more years ago and it has lately been adopted with very good results on two or three of the English roads. Other special features of No. 20,000 are that it carries the Vanderbilt boiler and tender. In the former the firebox is cylindrical and corrugated, and in the tender the water tank is cylindrical and the coal box is built at the front end of the tender and is, therefore, very conveniently placed for the fireman. The locomotive weighs in working order 176,510 pounds, of which 127,010 pounds are on the driving wheels. The weight of the tender loaded is 99,000 pounds. The driving wheels are 73 inches in diameter and the cylinders are 15 and 25 in diameter by 26 inches stroke. The boiler has a total heating surface of 2,793 square feet, of which 128 square feet are in the firebox.

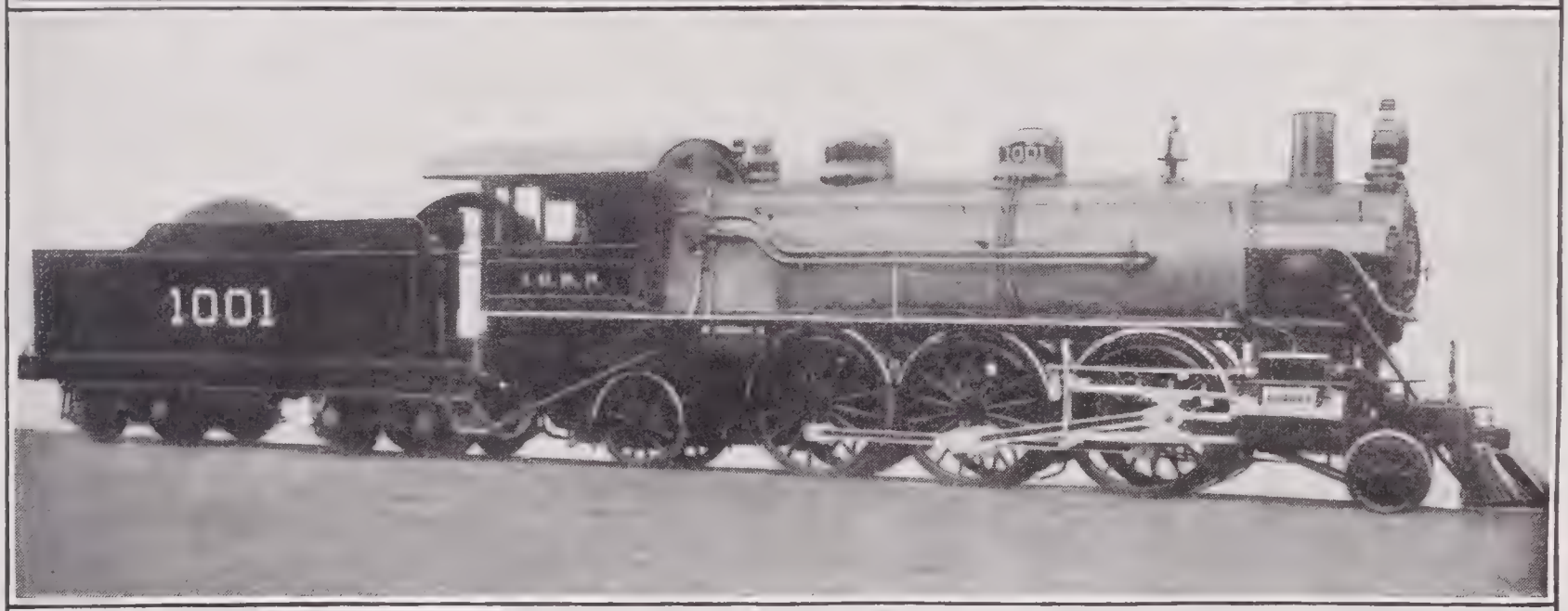
Locomotive, Development of the. Statistics compiled for the year 1901 show the total output of the eight principal locomotive building plants in the United States as 3,384. This was the largest output on record and 7.3 per cent. more than in 1900. For the year ending June 1, 1902, the record of locomotive building exceeded even the year 1901. The reports of five locomotive manufacturing companies indicate an output of 3,638, a total beyond what had ever before been reached. Of these locomotives about 540 were for passenger service, 2,380 freight and the remainder for switching and miscellaneous uses. Eighty per cent. were for use of bituminous coal, 10 per cent. for anthracite and 10 per cent. for oil or other fuels. Of the bituminous coal-burning standard gauge engines about 50 per cent. were constructed with so-called wide fireboxes, extending beyond the outside of frames. During the year ending June 1, 1902, about 30 per cent. of the total of passenger and freight engines built by the largest locomotive manufacturing companies were of the compound type. The heaviest engine built during the year weighed, not including the tender, 267,800 pounds; 237,800 pounds of which were on the driving wheels. This was a locomotive of the decapod type.

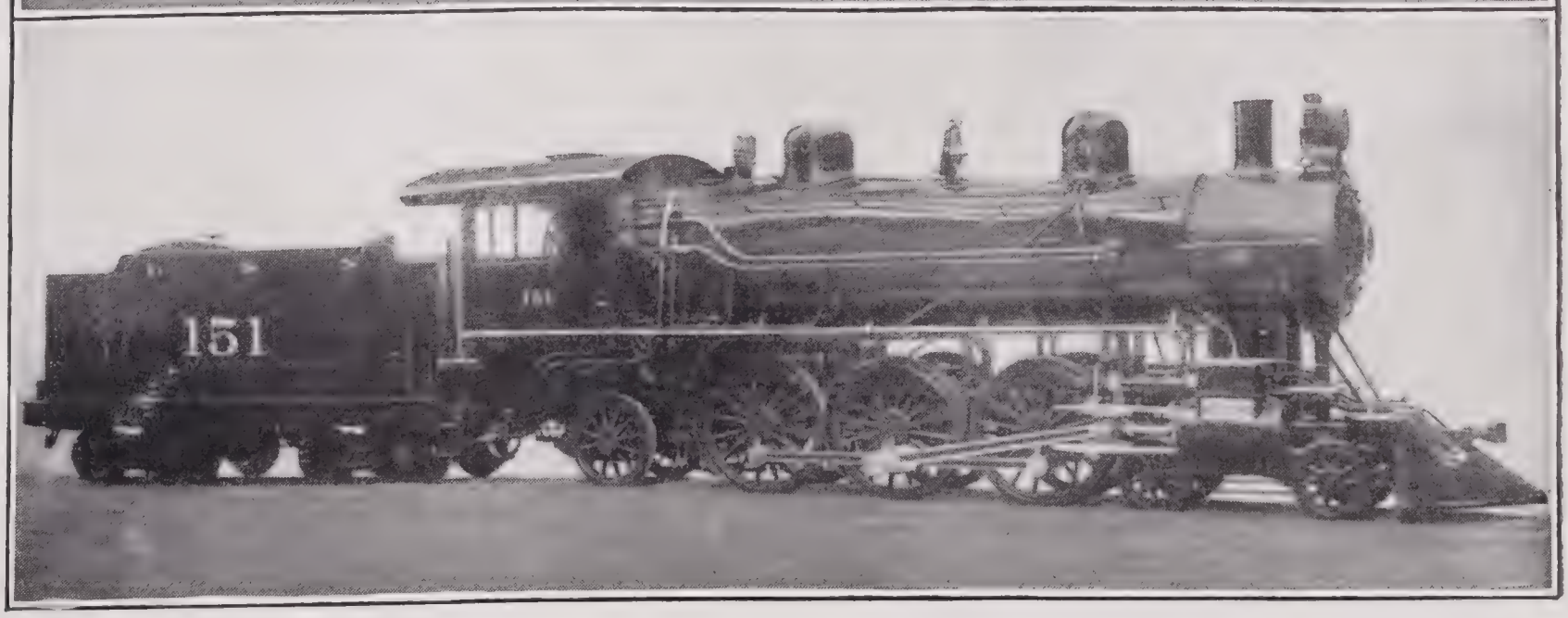
The preceding five years showed a wonderful development in the main features of locomotive design and construction. No longer ago than 1897 passenger engines with 2,200 square feet of heating surface and freight engines with 2,900 square feet were spoken of as marvels of progress, and comment was made at that time of the fact that boiler pressures were being raised to above 150 pounds and might possibly reach 180 pounds on simple locomotives. The 1902 engines constructed for passenger service and freight engines had over 3,500 square feet of heating surface and freight engines had 5,390 square feet. Most of the simple engines constructed carried 200 pounds pressure and some had been designed for 225 pounds. At this time it seemed a conceded fact that with 200 pounds pressure the economical limit for simple engines had been reached, and that for higher pressures the compounding feature was necessary for economy in fuel consumption.

During 1900–1902 the limitations of the two-cylinder compound engine were reached and passed. The required dimensions for the low pressure cylinders for two-cylinder type on the heavy engines of recent construction exceed the possible clearance limits for side tracks and switch stands and the space between the necessary location of the center of cylinder and top of rail. In the present state of the art two alternatives seem to be presented, namely, the tandem, or the four-cylinder compounds, both of which types have enthusiastic adherents and ardent opponents. The tendency in locomotive design at present is toward a greatly reduced ratio of the grate surface and heating surface to the weight on drivers for engines burning bituminous coal. It is an uncontroverted fact that greater attention is now being given the careful designing and proper proportioning of locomotives than ever before and during the last three years the American locomotive has taken long strides ahead as a steam producer and speed maker.

In past years failures to make steam in sufficient quantities to handle reliably heavy passenger trains at high speeds were rather frequent. This condition developed the fact that there was some error in the basis of design of locomotives for heavy or fast service. A little examination of the relation between the heating surface and the work expected from the locomotive will readily indicate the necessity for very different







By courtesy of the Rogers Locomotive Works.)

SOME SPECIMENS OF PRESENT-DAY CONSTRUCTION

ratios than have been used in past years. It is a conceded fact that the weight on the driving wheels gives the limit to the power that can be exerted by a locomotive in handling a train. It is a known fact that engines designed 10 years ago fail for lack of steam when assigned to haul at fast speeds trains which they are abundantly able to start. It is known that locomotives designed during 1900–1902 have overcome this difficulty and make an abundance of steam, so that even with coal poorer in quality than ordinary and with head winds and an extra car or two, little difficulty is experienced in producing plenty of steam and maintaining a fairly uniform pressure.

Taking the weight on the drivers as an indicator of the power expected from the locomotive and assuming a proper proportioning of the cylinder and diameter of drivers for the work to be performed, we must naturally look to the source of steam production, which is the boiler. The amount of steam produced, of course, depends on the coal consumed (either economically or otherwise) and the evaporative efficiency of the boiler. Assuming a boiler of reasonably good design the evaporative efficiency will be closely proportionate to the amount of effective heating surface provided to conduct the heat from the incandescent fire and hot gases to the water. An analysis of the vital proportions of engines that were considered marvels in their day, 10 years ago, shows the ratio of heating surface in square feet to the weight on drivers in pounds as about 1 to 45 for passenger service. The once famous 999 of the World's Fair period had the ratio of 1 to 43.5.

Engines built with the same weight on drivers for heavy or fast passenger service during 1900–1902 have this ratio, 1 to 30.5. Though both are capable of starting trains of corresponding weight, the 1893 class fails in the long run, consumes more coal per unit of work performed and as a consequence has been consigned to services without either honor or good record. The 1901 class, with the 1 to 30 ratio and same driving wheel weight, does more work with less fuel and with rare failures and is naturally the idol of the hour. As a suggestion worthy of consideration and the result of no small amount of observation and computation let me recommend that in new locomotives designed for the best results under present conditions that, for passenger service, engines burning bituminous coal should have a ratio of heating surface to weight on drivers of not more than 1 to 30. Some of the best working locomotives now in service have this ratio as low as 1 to 27. For heavy freight service, where the speed in going over a division of from 100 to 150 miles averages from 15 to 20 miles per hour, the ratio should not exceed 1 to 50. For switching service, where demands for steam are less continuous, a ratio of 1 to 75 will produce excellent results.

Locomotive

For some years many of the railroad companies have been giving considerable attention to the tonnage rating of engines until it had for a time become almost a fad and was overdone. It frequently happens in reform movements that they are carried to extremes. In the excess of zeal to load engines up to their full rated capacity the factor of average speed and resultant time in getting trains over the road was many times lost sight of and engines were loaded to a point where they could only drag the train slowly over the line, resulting in frequent stalling, breaking in two and greatly increased wear and tear on both power and equipment. Better judgment has shown that slightly lighter loading has resulted in an increased gross engine ton mileage, more satisfactory time record in delivery of freight, greater contentment of enginemen and trainmen and much less expense for maintenance of engines and for repairs of cars.

As has been frequently stated, the cost of coal consumption is the largest single item of expense that the motive power department has to deal with. In order to handle this question to the best advantage it is necessary to make a careful study of the production and treatment of the coal in detail from the mine to the tender. On many large systems the work of an A1 man as a specialist devoting his time to a study of the quality of coal and its handling, would, without doubt, effect a saving of from 5 to 10 per cent. It is a known fact that the size of locomotives of recent design is such that the limit has almost been reached for the capacity of a single fireman to fire the engines properly. If any further increase in the size of the firebox is contemplated it may be necessary to install an automatic method of stoking. In many of the engines put in service during the last three years an automatic stoker would undoubtedly be the means of considerable economies in the burning of coal.

Experiments during 1902 clearly and fully demonstrated that there are one or two practicable devices in actual operation by means of which the poorest grades of bituminous coal can be burned with absolute freedom from black smoke and with only an occasional trace of light brown smoke, regardless of whether the engine is working steam or is shut off.

The recent discovery of large quantities of petroleum in the Southwest and on the Pacific coast has almost revolutionized the type of fuel for locomotives on roads in the extreme West, and it has started pointed inquiries and investigations as to the possible economies and advantages of liquid fuel on roads in the Middle and Eastern States.

A. M. WIATT.

Locomotive Engineers, Brotherhood of, an American railway benefit organization. It was first conceived at a meeting of engineers in Marshall, Mich., in April, 1863. They issued a call for a meeting in Detroit, Mich., on May 5, and on May 8 Subdivision No. 1 was organized, under the name of The Brotherhood of the Footboard. When ten subdivisions had been organized, delegates were called to Detroit by No. 1, when a Grand National Division was formed. The first convention was held in Indianapolis, August 17, 1864, when 44 subdivisions were represented. In 1866 a monthly "Journal" was established, which in the years that have followed has had a large circulation. In 1867 a mutual insurance was established. Policies have a considerable range in value, and many million dollars have been paid to beneficiaries of deceased engineers. With their mottoes, "Sobriety, Truth, Justice and Morality," "Vigilance, not Violence," their growth has been steady and their influence upon organized labor beneficial. The order has been of incalculable benefit to its members in moral, educational, and financial results, and is dealt with on a business basis, through written contracts for service made with nearly all the railroads on the American continent.

C. H. Salmons.

Locomotor Ataxia, or **Tabes Dorsalis,** a disease of the nervous system characterized by want of power to coördinate voluntary movements, shooting pains, especially in the legs, atrophy of the optic nerve, partial loss of sensibility, and sometimes paralysis of certain muscles. It is often complicated with many functional disorders. The patient endeavors to guide his feet and legs by means of his sight, but in spite of his efforts the feet are jerked outward and brought violently down. In advanced stages the patient is confined to his chair or bed. The causes of the disease are obscure, but syphilis and alcoholism are often at least contributing factors. It usually develops—most commonly in males—from the age of thirty to fifty, and in many cases its progress continues for years.

Locri. See Gerace.

Locus. In geometry, the locus of a point is the line generated by the point when moving according to some determinate law. The locus of a line is the surface generated by a line moving according to some fixed law. Thus, if a point moves in the same plane in such a manner that the sum of its distances from two fixed points of the plane is constant, the locus of the point is an ellipse.

Locust, any migratory species of the orthopterous family *Acridiidæ*, specially *Œdipoda migratoria*, the migratory locust. An allied species, *Œ. cinerascens*, is found in the S. E. of Europe. The females excavate holes in the earth and deposit their eggs in a long mass enveloped in a glutinous secretion. The larvæ commence their destructive career almost as soon as they are hatched. The migrations of locusts are probably in search of food, and extraordinary accounts are on record of the vast swarms that from time to time invade particular districts. They clear everything off the surface of the ground, and have on several occasions caused disastrous famines. Their range in the Old World stretches from Spain and the S. of France, through Russia to China; S. of this boundary line they are equally destructive. The Rocky Mountain locust is *Caloptenus spretus*. There seems to be no special periodicity in the appearance of swarms of locusts, but in this country keen observers have noted that the years in which such visitations take place are nearly multiples of 11. Locusts are by preference vegetable-feeders; but they will attack dry animal substances, and even become cannibals when other food fails. Next to man, their chief enemies are insectivorous birds, parasitic beetles of the family *Cantharidæ*, and dipterous flies of the family *Bombyliidæ*. See Cicada.

Locust Tree, a name given in different parts of the world to different trees of the natural order *Leguminosæ*. The Carob tree is often so called in the countries bordering on the Mediterranean, and its pods are the locust beans of the stores. The locust tree of the United States (*Robinia pseud-acacia*), also called the false acacia, or thorn acacia, and on the continent of Europe and in Great Britain very generally the acacia, is a valuable and extremely beautiful tree. The wood, known as locust wood, is useful for all purposes in which great strength, and especially toughness, is required; "locust," indeed, is the slang term in the United States for a policeman's baton. The honey locust tree of the United States is a gleditschia. The locust tree of the West Indies is *Hymenæa courbaril*, a gigantic tree whose pods also supply a nutritious matter, a mealy substance in which the pods are embedded. The bark of the tree is anthelmintic; it yields a kind of resin called anime, and it is valuable as a timber tree, the timber (also known as locust wood) being close-grained and tough.

Loddon, a river of Victoria, Australia, rising on the N. slopes of the Pyrenees, flowing N. N. W. for 200 miles, and joining the Murray at Swan Hill. It drains a basin of about 5,000 square miles. Good cod and bream abound in it. In its lower course it traverses vast flat plains, which in the wet season are inundated for many miles.

Lode, the technical name for a metalliferous or ore-producing vein. These differ in their length, width and depth, and

also in the richness of mineral they contain.

Lodestar, or **Loadstar** ("leading star") a name given to the polar star.

Lodge, Edmund, an English author; born in 1756. Successively Lancaster, Norroy, and Clarencieux herald, he published "Illustrations of British History" (3 vols. 1791), a "Life of Julius Cæsar" (1810), and an annual "Peerage"; but is best known as author of the "Portraits of Illustrious Personages of Great Britain" (4 vols. fol. 1821–1834), the cost of engraving and printing which exceeded $200,000. He died in 1839.

Lodge, Henry Cabot, an American statesman and author; born in Boston, Mass., May 12, 1850; was lecturer on history at Harvard College in 1876–1879, and editor of the "North American Review" in 1873–1876. He then entered political life, and was elected United States Senator from Massachusetts in 1893, 1899, 1905, and 1911. He is the author of a "Life of Daniel Webster," and of lives of Alexander Hamilton and George Washington; also of "Boston" in the series of "Historic Towns"; of a "Short History of the English Colonies in America"; "Studies in History" (1884); "Historical and Political Essays"; "Hero Tales from American History"; "Certain Accepted Heroes, and Other Essays"; "The Spanish-American War." In 1900 he was chairman of the Senate Committee on the Philippines and a member of the Senate Committee on Foreign Relations.

Lodge, Thomas, an English dramatist, romance-writer, and poet; born in West Ham, near London, England, about 1556. After studying at Trinity College, Oxford, he entered at Lincoln's Inn, but seems to have led a wild and rollicking life, using his pen occasionally, as in a duel with Gosson, against whom he defended stage plays in a couple of pamphlets (edited by D. Laing for the Shakespeare Society in 1853). In 1589–1591 he varied his life by taking part in two sea expeditions against the Spaniards, in the neighborhood of the Azores and Canary Islands. On the first of these voyages he wrote an euphuistic romance, "Rosalynde" (1590; reprinted in Hazlitt's "Shakespeare's Library," vol. ii., and again, separately, in 1887), which supplied England's great dramatist with the chief incidents, and even more than the chief incidents, of "As You Like It." Lodge himself wrote two dramas, "The Wounds of Civil War" (1594; reprinted in Hazlitt's Dodsley's "Select Collection of Old Plays," vol. vii.), and "A Looking-glass for London and England" (1594), written in collaboration with Robert Greene. He died in 1625.

Lodger, a tenant who holds part of a house in his exclusive possession, while the landlord or his agent holds possession over the house as a whole. The lodger's rights vary greatly in the several States, there being no uniformity of practice and legislation on the subject.

Lodging House, a house other than an inn, hotel, or boarding house, in which travelers lodge; a house in which lodgings are let. A common lodging house is one in which persons of the poorer classes are received for short periods; and they, though promiscuously brought together, are allowed to inhabit one common room. Hotels, inns, public-houses, or boarding-houses, are not common lodging houses.

Lodi (lō′dē), a town of North Italy; on the Adda, 18 miles from Milan. It has a Romano-Gothic cathedral dating from the 12th century; manufactures of linens, silks, and Majolica porcelain; and a great trade in Parmesan and Stracchino cheese and wine. Pop. (1901) est. 20,000. Lodi Vecchio, a ruined village, 4 miles W., was destroyed by the Milanese in 1111–1158. Here Bonaparte, May 10, 1796, forced the long and narrow bridge in the face of a tremendous fire from the Austrian batteries.

Lodomeria, formerly an independent principality in Volhynia, has, since the division of Poland in 1772, constituted an integral part of the Austrian "kingdom of Galicia and Lodomeria."

Lodz, sometimes called "the Manchester of Poland," 76 miles S. W. of Warsaw on a branch railroad. It consists chiefly of one main street, 6 miles or more long, and has more than 120 manufactories making cotton and woolen stuffs. Pop. (1901) est. 120,000.

Loeb, Jacques, an American educator; born in Germany, April 7, 1859; was graduated at the Ascanisches Gymnasium, Berlin; studied medicine and in 1886 became Assistant Professor of Physiology in the University of Würzburg. He was Professor of Biology at the University of Strassburg in 1888–1890; at Naples in 1889–1891; at Bryn Mawr College, Pa., in 1891–1892; and assistant professor in the University of Chicago in 1892–1895, when he became full professor there. He was the author of "The Heliotropism of Animals and its Identity with the Heliotropism of Plants"; "Introduction to the Comparative Physiology of the Brain"; "Comparative Psychology"; etc.; and in January, 1902, presented a new hypothesis in relation to the dynamics of the nervous system.

Loess, mud deposited by the Rhine along its banks, and occupying a great part of the valley of the river. It consists of a

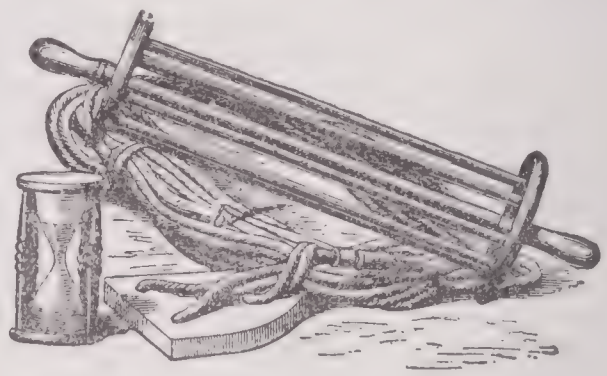
finely-comminuted sand, or pulverulent loam of a yellowish-gray color, chiefly of argillaceous matter combined with a sixth part of carbonate of lime and a sixth part of quartzose and micaceous sand. Sometimes it contains sandy and calcareous concretions or nodules. In some places it is 200 or 300 feet thick. It contains river and fresh-water shells of existing species. Interstratified with it are layers of ashes, thrown out by some of the last eruptions of the now extinct, or at least dormant, Eifel volcanoes. In Alsace it is called lahm. There is a corresponding loess on the Mississippi. Both are Post-Tertiary.

Loewe, Johann Carl Gottfried (luh'-ve), a German composer; born Nov. 30, 1796. He became a choir-boy at Köthen, later studied music and theology at Halle, and in 1821 settled at Stellen, where he became successively professor in the gymnasium, musical director to the city, and organist. He made visits to Norway, Sweden, and France, and in 1847 sang and played before the English court in London. He composed five operas (of which only one, "The Three Wishes," was performed), 16 oratorios (several of them for voices only, without accompaniment), and numerous symphonies, concertos, duets, and other works for the pianoforte. But his ballads are his most notable bequest to posterity; they are, many of them, remarkable dramatic poems, and in some respects Loewe may claim to have done for the ballad what Wagner did for opera. He died April 20, 1869.

Loewy, Maurice (luh'wē), a French astronomer; born in 1833. He became noted for his invention of the *Equatorial-coude*, or Elbow-equatorial, in which, in its various forms, the observer remains seated at the upper end of the polar axis of the telescope, where he controls the means of directing his view to any part of the heavens. He also devised improved methods of determining the constants of astronomical refraction and aberration, and for many years was director of the Paris Observatory. He died Oct. 15, 1907.

Lofoden, or **Lofoten,** a chain of islands on the N. W. coast of Norway, stretching S. W. and N. E. for 150 miles. They include the Lofoten proper and the Vesteraalen, lying further N. The largest islands are Hind, And, and Lang in the Vesteraalen group, and East Vaag, West Vaag, Flakstad, and Moskenäs in the Lofoden proper. Total area, 2,247 square miles. All of them are rugged and mountainous, many of the summits being crater-shaped. In several places they present walls of bare rock rising sheer from the ocean. The highest point is 3,090 feet above sea-level. The waters on the E. side of these islands are visited in January to March every year by vast shoals of codfish, which attract a large fleet of fishermen. The average number of boats is 5,000 to 6,000, manned by 28,000 to 30,000 men; and the produce of the fishery is about 30,000,000 fish, 24,000 barrels of cod-liver oil, and 25,000 to 26,000 barrels of roe. The fishing is attended with considerable danger, on account of the sudden and violent storms from the W., and of the strong currents which set in between the islands. Besides fishing, sheep-farming is also carried on, as, owing to the influence of the Gulf Stream, the winters are mild and grass grows abundantly. The permanent population number about 20,000.

Log, an apparatus for ascertaining the rate of a ship's motion. In its common form it consists of a triangular piece of wood, called the log-chip, curved at the bottom, which is loaded so that it may float upright in the water. To its corners



LOG AND REEL.

is attached a cord, termed a log-line, which is wound around a reel, the axis of which projects, allowing it to turn freely when held in the hollow between the thumb and forefinger. The line is long enough to measure the distance sailed by the ship at her greatest speed during a given time, usually 30 seconds, and is divided into knots, corresponding to a proportionate part of the nautical mile, that is, 51 feet. The line is knotted at such intervals that the spaces bear the same relation to a nautical mile that a half minute does to an hour, that is, the knots must be the 120th of a nautical mile apart. The English geographical or nautical mile is one-sixtieth of a degree of latitude, about 2,025 yards. A certain length of line — not marked — intervenes between the chip and the first division on the line. This is termed the stray line, and serves to allow the chip to drift beyond the dead-water in the wake of the ship. Each knot is made sensible to the feeling as well as to the sight, and is subdivided into 10 fathoms so called. The time is measured by a small sand-glass. In heaving the log, the observer, usually an officer or petty officer, throws the chip over the taffrail, and as the first mark on the line passes over the reel, calls out "turn" to the assistant, who immediately inverts the glass. When the sand has all run out,

the latter calls out "out," when the observer checks the line, noting the knots and fathoms which have passed out. This operation, in well-regulated vessels, is performed every hour, and the result, as well as the course by compass which the vessel is steering at the time, is entered in the log-book, to serve as a basis for the dead reckoning.

In a steam engine, a tabulated summary of the performance of the engines and boilers, and of the consumption of coals, tallow, oil, and other engineers' stores on board a steam vessel.

Log, a Hebrew measure for liquids, containing, according to some, three-quarters of a pint; according to others, a quarter of a cab, and consequently five-sixths of a pint. According to Arbuthnot it was a liquid measure, the seventy-second part of the bath or ephah, and twelfth part of the hin.

Logan, Cornelius Ambrosius, an American dramatist; born in Baltimore, Md., in 1806. He made a vigorous reply to Lyman Beecher's attack upon the stage from the pulpit; wrote successful plays: "Yankee Land" (1834); "A Hundred Years Hence," a burlesque, etc.; and also wrote tales and poems. He died near Wheeling, W. Va., in 1853.

Logan, George, an American statesman; born in Stenton, near Philadelphia, Pa., Sept. 9, 1753. He went to Paris in 1798 to try to avert war with France, and being a private citizen his act was denounced in Congress and led to the passage of the Logan bill. He was elected to the United States Senate in 1801. He died in Stenton, April 9, 1821.

Logan, James, an American colonial official; born in Lurgan, Ireland, Oct. 20, 1674. In 1699 he accompanied William Penn to Pennsylvania as secretary. He afterward was chief-justice and president of the council, discharging in the latter capacity the duties of governor of the province for two years after the demise of Governor Gordon in 1736. He bequeathed his collection of 2,000 books to the Philadelphia library, and died near Germantown, Pa., Oct. 31, 1751.

Logan, John, a name given Tah-gah-jute, an American Indian chief; born about 1725. He was very friendly to the whites, among whom he lived for many years near Reedsville, Pa. In 1770 he removed to Ohio, where in 1774 his family were massacred by a party of whites. He retaliated by instituting a war against the white settlers, and in one of the skirmishes was killed near Detroit in 1780.

Logan, John, a Scotch poet; born in Soutra, Midlothian, Scotland, in 1748. His father was a small farmer, but was able to send his son to college. In 1773 he was licensed as a preacher, and from his eloquence and fervor in the pulpit soon became so popular that he was chosen minister of the second charge of South Leith parish that same year. In 1786, however, owing to intemperate habits and for kindred reasons, he was constrained to resign his charge, after which he proceeded to London and there engaged in literary work. His name is best known now in connection with that of Michael Bruce and the controverted authorship of the "Ode to the Cuckoo" and certain of the Paraphrases. That Logan is entitled to a place among the minor poets of Scotland is sufficiently attested, though there were nothing more, by his exquisite lyric, "The Braes of Yarrow." He died in London, England, Dec. 28, 1788.

Logan, John Alexander, an American soldier and statesman; born in Jackson co., Ill., Feb. 9, 1826. The Mexican War broke out when Logan was 20, and he at once enlisted and was made a lieutenant. After the war he commenced the study of law in the office of his uncle, Alexander M. Jenkins, who had formerly been lieutenant-governor of the State. In 1849, before he had completed his law course, he was elected clerk of Jackson county, and at the expiration of his term went to Louisville, Ky., where he attended law lectures and was admitted to the bar in the spring of 1851. In the fall of the same year he was elected to represent Jackson and Franklin counties in the Legislature, and from that time was almost uninterruptedly in the public service, either civil or military. He was twice reëlected to the Legislature, and in 1856 was a Democratic presidential elector. He enlisted on the outbreak of the Civil War, and rose to the rank of Major-General, being distinguished throughout the struggle for valor and patriotism; elected United States Senator from Illinois 1871–1877–1883–1889; was nominated for the vice-presidency on the ticket headed by James G. Blaine, 1884, but was defeated. He died in Washington, D. C., Dec. 26, 1886.

Logan, Mount, a peak in the Alaskan Alps, said to be the highest point in North America. Its altitude is 19,500 feet.

Logan, Olive, an American miscellaneous writer; born in Elmira, N. Y., April 16, 1841. She began her career as an actress in Philadelphia, 1854; retired from the stage in 1868; since then has been a lecturer on social topics and a contributor to newspapers and magazines. She married W. W. Sikes, a journalist. She is the author of lectures, plays, and books. Among the latter are: "Château Frissac"; "Photographs of Paris"; "Women and Theaters"; and "Before the Footlights

and Behind the Scenes: a Book about the Show Business." She died April 27, 1909.

Logan, Sir William Edmond, a Canadian geologist; born in Montreal, Canada, April 20, 1798. For 10 years he worked in a commercial counting-house in London, and was then, about 1828, sent to Swansea to take charge of the finances of a copper-smelting company. While living in South Wales he prepared geological maps of the coal basins in that part of the country, and his work was so well done that it was incorporated in the 1-inch maps of the Geological Survey. In 1842–1871 Logan was director of the Canadian Geological Survey. He was the discoverer of the Stigmaria underclays and of the *Eozoön Canadense*. He was knighted in 1856, and died in Wales, June 22, 1875.

Loganiaceæ, a natural order of corolliflorai exogens, consisting of trees, shrubs, and herbaceous plants, with opposite entire leaves, and usually with stipules, which adhere to the footstalks or form sheaths. A few species of this order occur in Australia and in the temperate parts of North America; the rest are all tropical or subtropical. No natural order of plants is more strongly characterized by poisonous properties. It includes the genus *Strychnos* and the curari poison.

Logansport, a city and county-seat of Cass co., Ind.; at the confluence of the Wabash and Eel rivers; and on the Wabash, the Terre Haute and Logansport, and several other railroads; 100 miles S. E. of Chicago. It is the farming trade center for a region having a population of 100,000 and an annual trade of $7,000,000; manufactures flour, paper, pumps, galvanized iron, linseed oil, carriages, and agricultural implements. It is the seat of a Universalist college, a college for women, and a Roman Catholic academy, and the Northern Indiana Hospital for the Insane. Logansport has a large trade by rail in lumber, pork, and agricultural products. There are electric light and street railroad plants; an improved water system; several banks; daily, weekly and monthly periodicals, and an assessed property valuation of $5,800,000. Pop. (1890) 13,328; (1900) 16,204; (1910) 19,050.

Logarithm, a mathematical term. The logarithm of a number is the exponent of the power to which it is necessary to raise a fixed number, called the base, to produce the given number. The logarithm of N. to the base a is thus expressed, $\log a\ N$. The logarithm of any number depends upon the value of the base a, and different systems of logarithms are found by taking different values of a; but since $a^0 = 1$, in every system $\log a\ 1 = 0$. By taking different values of N in each system, different values of x will be found in each system, and such numbers being registered will form tables of logarithms. The common, or Briggs', tables of logarithms are calculated to base 10. The Napierian tables, invented by Lord Napier, are calculated to base e (*epsilon*), which $= 2.7182818$. In the common system of logarithms, the logarithm of 100 is 2, because 10 raised to the second power $= 100$; similarly, the logarithm of $1000 = 3$, of $10000 = 4$, and so on. When the logarithms form a series in arithmetical progression, the corresponding natural numbers form a series in geometrical progression thus:

Logarithms . .	0	1	2	3	4	5
Natural numbers	1	10	100	1000	10000	100000

The logarithms of numbers between 1 and 10 consist of decimals; of numbers between 10 and 100 consist of the integer 1 and a decimal; of numbers between 100 and 1000 of the integer 2 and a decimal, and so on. The integral part of a logarithm is called the index, and it is always less by 1 than the number of integer places in the corresponding natural number: thus the index of the logarithm of 3 is 0, of 30 is 1, of 300 is 2, and so on. The logarithms of decimals have negative indices, and the number of units in the index is always greater by 1 than the number of ciphers immediately following the decimal point: thus the index of the logarithm of .3 is -1, of .03 is -2, of .003 is -3, and so on. The decimal part of a logarithm is called the mantissa. Logarithms are of great service in shortening and facilitating the arithmetical operations of multiplication and division; for since the sum of the logarithms of two numbers is the logarithm of the product of those numbers; and since logarithms are the indices of powers of the same basis, the difference of the logarithms of two numbers is the logarithm of the quotient; also the multiple of the logarithm of a number is the logarithm of the power of that number, and a fraction of the logarithm of a number is the logarithm of the corresponding root. Hence a complete table of logarithms would enable us to perform multiplication by addition, division by subtraction, involution by multiplication, and evolution by division. Logarithms were invented by Lord Napier of Merchiston, in Scotland, in 1614, and improved by Henry Briggs, Savillian Professor of Geometry at Oxford in 1624.

Arithmetical complement of a logarithm, the difference between the given logarithm and 10.

Hyperbolic logarithms, the Napierian system of logarithms, so called from their relation to certain areas included between the equilateral hyperbola and its asymptotes.

Logarithmic Scale. See GUNTER'S SCALE.

Loggia (lōd'jē-ä), an Italian word signifying an open arcade enclosing a passage or open apartment. It is a favorite class of building in Italy and other warm countries. The Loggia de' Lanzi at Florence is one of the finest examples extant; and the Loggie of the Vatican, which are arcaded passages round the interior of the cortile of the palace, ornamented with beautiful paintings and arabesques by Raphael and his pupils, are well-known specimens.

Logging-Stone. See ROCKING-STONE.

Logic, as known in the present day, is a development and modification of the *techné dialektikē* = art of reasoning, which Aristotle, utilizing the labors of his predecessors, and notably those of Zeno of Elea, molded into something like consistent shape. The first development of Aristotelian logic was by the Scholastics; and Lewes mentions it with praise of Abelard, that "he brought forward logic as an independent power in the great arena of theological debate." At the time of the Reformation, probably as a protest, Scholasticism was deprecated, and at some of the Scotch universities it was discarded for Ramism. The subtle distinctions and keen disputations of the Schoolmen led in the next century to Bacon's condemnation of the perversion — not of the cultivation — of logical pursuits. Locke was not so moderate, as may be seen in his "Essay." Generally speaking, down to the first half of the 19th century there was little dispute as to how logic should be defined. The Port Royalists had certainly called it the Art of Thinking; but the Art or Science of Reasoning, or the Art and Science of Reasoning met with little opposition as a definition. This is how Whately defines it, and a writer of such opposite opinions as Tongiorgi, S. J., has substantially the same words; and a parallel passage to Whately's explanation, as to how logic is at once a science and an art, occurs in Liberatore, who is read in many of the ecclesiastical colleges in Rome. Sir W. Hamilton says that logic

"Is the Science of the Laws of Thought as Thought or the Science of the Formal Laws of Thought, or the Science of the Laws of the Forms of Thought; for all these are merely various expressions of the same thing."

Mill's definition is far wider in its inclusion, for he makes logic co-extensive with proof:

"Logic, then, is the science of the operations of the understanding which are subservient to the estimation of evidence; both the process itself of advancing from known truths to unknown, and all other intellectual operations in so far as auxiliary to this. It includes, therefore, the operation of Naming; for language is an instrument of thought as well as a means of communicating our thoughts."

Deductive logic, syllogistic logic; in which no more is inferred in the conclusion than is implicitly contained in the premises.

Equational logic, a system of logical notation in which propositions are expressed in the form of equations.

Inductive logic, the science which treats of inductive reasoning, by which, broadly speaking, a general proposition is inferred from a number of particular propositions.

Modified logic, that logic which is concerned in the investigation of truth and its contradictory opposite error; of the causes of error, and the impediments to truth and their removal, and of the subsidiaries by which human thought may be strengthened and guided in its functions.

Logogram, a complicated or multiplied form of the anagram, where the puzzle-monger, instead of contenting himself with the formation of a single new word or sentence out of the old by the transposition of the letters, racks his brain to discover all the words that may be extracted from the whole or from any portion of the letters, and throws the whole into a series of verses in which synonymic expressions for these words must be used. The puzzle lies in ascertaining what the concealed words are, and, through them, what is the primary word out of which they have all been extracted. A specimen is given in Henry B. Wheatley's book on "Anagrams" (1862), in which, out of the word "curtains," no less than 93 smaller ones are framed.

Logography, a method of printing in which a type represents a whole word, or a termination of a word, instead of a single letter. A system of taking down the words of a speaker without making use of shorthand, by a number of reporters, each of whom took down three or four words. It was invented by H. Barlow about 1784.

Logomania, a disease of the faculty of language generally associated with organic disease of the nervous structure, as in paralysis. In this disease, while conceptions and ideas remain clear, the power of associating these with the words by which they are expressed is lost, and the patient can either not give any names to his conceptions at all or expresses them erroneously. Sometimes one class of words is lost and others retained. Thus a patient may forget his own name or nouns only, and remember all other words. Sometimes he forgets only parts of the word, as terminations, and not infrequently in another form of the disease he inverts his phrases.

Logos, a Greek term denoting the word by which the inward thought is expressed. The word logos has a philosophical as well as a religious history. It first becomes prominent in the theories of Heraclitus of Ephesus, where it appears as a law of nature, objective in the world, giving order

and regularity to the movement of things. The logos formed an important part of the Stoic system. The active principle living in the world and determining it they called both logos and God. The Divine Reason, operating upon matter, bestows upon it the laws which govern it, laws which the Stoics called *logoi spermatikoi*, or productive causes. They also taught that in man there was a special logos, which they called *endiathetos*, so long as it was resident within the breast; *prophorikos*, when it was expressed.

"The Logos, a being intermediate between God and the world, dwells with God as His Wisdom. The Logos is diffused through the world of the senses as divine reason revealing itself in the world. . . . The Logos does not exist from eternity like God, and yet its genesis is not like our own and that of all other created beings; it is the first-begotten Son of God, and is for us, who are imperfect, a God; the wisdom of God is its mother. . . . Through the agency of the Logos God created the world and has revealed Himself to it. The Logos is also the representative of the world before God, acting as its high-priest, intercessor, and Paraclete."— Ueberweg, "Hist. Philos.," i: 224, 225.

In the New Testament (John's Gospel), a Being who was in the beginning, was with God, and was God; made all things, had in himself life, which was the light of men; became flesh, and dwelt among men. (John i: 1, 3, 4, 14; see also I John i: 1, where the logos is called the "Word of Life.") The reference is evidently to Jesus Christ, viewed as having existed from the beginning, and at a certain period becoming incarnate and dwelling among men.

Logria, a name given to England by mediæval romancers.

Log=rolling, the rolling of logs to the river after they are cut and trimmed, as is the custom with lumbermen in many of the States. Also a term used for maneuvers of politicians, by which they seek to secure coöperation in carrying favorite measures through legislatures and other bodies.

Logwood, the wood of *Hæmatoxylon campeachianum*. It is used as a red dye stuff. The decoction of logwood and the extract of logwood are officinal preparations. Logwood is used as an astringent in diarrhœa, chronic dysentery, and atonic dyspepsia. It colors the urine of those who use it pink.

Lohengrin (lō'en-grin), the hero of an old High German poem, written in the end of the 13th century. He was the son of Parzival, and a knight of the Grail. At King Arthur's command he was taken by a swan through the air to Mainz, where he fought for Elsa, daughter of the Duke of Brabant, overthrew her persecutor, and married the lady. Then he accompanied the emperor to fight against the Hungarians, and subsequently warred against the Saracens. On his return home to Cologne, Elsa, contrary to his prohibition, persisted in asking him about his origin. After being asked a third time he told her, but was at the same time carried away by the swan back to the Grail. Rückert's edition (1857) of the poem is the best. The poem is a continuation of Wolfram von Eschenbach's "Parzival." Wagner made it the subject of his great opera, "Lohengrin" (1848).

Lohenstein, Daniel Casper von (lō'en-stīn), a Silesian poet; born in Nimpsch, Silesia, Jan. 25, 1635. He wrote a volume of lyric verse, "Flowers"; six tragedies; and a long hero-romance, "The Magnanimous General Arminius or Hermann, with his Most Illustrious Thusnelda," etc. (new ed. 1889–1890). This mammoth work, of 3,076 double-column pages, and unfinished at that, was in its day regarded as the consummate model of the heroic-gallant romance. He died in Breslau, April 28, 1683.

Löher, Franz von (luh'er), a German writer; born in Paderborn, Oct. 15, 1818. He visited the United States and Canada in 1846 to gather material for a history of the Germans in America, and wrote "Significance of the German Race in the World's History" (1847); "History of the Germans in America" (1848). He wrote also: "Land and People in the Old and New Worlds" (1854); "The Magyars and Other Hungarians" (1874); "Cyprus" (1878); and many other sketches of history and notes of travel. He died in Munich, March 1, 1892.

Loin, a popular rather than a scientific term for the soft part of a vertebrate, lying between the false ribs and the hip-joint. Scientifically this is called the lateral part of the lumbar region.

Loire (lwär), the longest river in France, rising in the Cévennes, in the department of Ardèche, at an elevation of 4,511 feet, flowing in a N. and N. W. direction through the center of France as far as Orleans, where it bends round to the S. W. and continuing on to Tours; thence following, in general, a W. course to its embouchure in the Bay of Biscay. It is tidal to Nantes, 35 miles from its mouth; entire length, 620 miles. It becomes navigable a little above Roanne, 550 miles from the sea. At one time the depth of the water at its mouth was 19½ feet at ebb-tide; now it is much less, due to the vast quantity of sedimentary matter the river brings down with it. To the same cause are due the numerous islands that obstruct its lower course and the sandbanks that lie athwart its mouth. The Loire is notorious for the destructive inundations it causes, though the lower part of its course is protected by large dykes or *levées*, 20 feet high. The principal tributaries are the Nièvre and the Maine (which is formed by the Sarthe, its affluent the Loir, and the Mayenne) on the right; and the Allier, Cher, Indre, and Vienne, on the left.

The Loire is canalized along considerable stretches of its course, and is connected with the Seine, the Saône, and the harbor of Brest by canals. Its valley is extremely fertile. Area of drainage basin, 44,450 square miles.

Loire, a department in the S. E. of France, formerly part of the province of Lyonnais and the county of Forez, comprises the arrondissements of Montbrison, Roanne, and St. Etienne, with St. Etienne for its capital; area, 1,838 square miles; pop. (1906) 643,943. The basin of the Loire in this department is a rather unfruitful valley, but the mountains yield iron and lead, and the coalfields are the richest in France. Some 17.000 miners are employed in the extraction of near 3,000,000 tons of coal annually, 25,000 in the iron industries, 12,000 in the silk, and 5,500 in the cotton industries. Woolens, linen, glass, paper, leather etc., are likewise manufactured. Wine, fruit, fodder, and potatoes are the principal agricultural products. Timber and turpentine are yielded by the pine woods. Mineral springs abound, as at St. Galmier, St. Alban, etc.

Loire, Haute, a department of Central France, formed out of the former province of Languedoc, the duchy of Auvergne, and the district of Forez, and bounded on the S. by Lozère and Ardèche. The Loire crosses it going N., the Allier going N. W.; area, 1,915 square miles; pop. (1906) 314,770. The surface forms a plateau, deeply trenched by river courses; it ranges in elevation from 2,000 to 3,000 feet, and rises in peaks and domes up to 5,755 feet above sea-level (Mount Méznec). In spite of the ungenerous nature of the soil, agriculture is the chief calling of the inhabitants. But about 120,000 persons find employment at home in making lace from wool, cotton, flax, silk, gold, and silver. Some thousands of the inhabitants leave their houses for a time every year, to work in other parts of France. Coal and building-stone are worked. Capital. Le Puy.

Loire Inférieure (*ang*-fā-ryur′), a maritime department in the W. of France, formed out of the S. portion of the old province of Brittany, and comprising the arrondissements of Nantes, Ancenis, Paimbœuf, Châteaubriant, and St. Nazaire, with Nantes for its capital; area, 2,654 square miles; pop. (1906) 666,748. It has a coastline of 78 miles. The Loire flowing W. intersects it and forms a wide estuary; the Vilaine skirts its N. W. boundary. In the S. of the department lies the lake of Grand-Lieu, 26 square miles in extent. The interior is on the whole flat, and the soil fertile, producing cereals, potatoes, beet roots, hemp, and fodder. Bees are kept. There are fine oak and pine forests. Salt marshes are numerous along the shore. The vineyards yield annually about 30,000,000 gallons of wine, and the orchards some 4,500,000 gallons of cider. Granite, slate, and limestone are quarried. The industrial establishments include iron works, sugar refineries, glass works, factories for tinning fruits and sardines, etc. St. Nazaire has grown into an important seaport, having taken the place formerly occupied by Nantes. Shipbuilding is carried on at Nantes. The coast fisheries and general export trade are extensive.

Loiret, a department of Central France, formed out of the old provinces of Orléannais and Berri, and comprising the arrondissements of Orleans, Montargis, Gien, and Pithiviers; on the N. loop of the Loire; area, 2,614 square miles; pop. (1906) 364,999. The country is for the most part an elevated, fertile plain, producing corn and wine in abundance, except in the sandy district of Sologne, lying S. of Orleans, the chief town. Loiret contains several large forests. Cattle, sheep, and bees are extensively reared. Pottery and porcelain, sugar, vinegar, and soap are the principal industrial products.

Loir-et-Cher (lwär-ā-shār′), a department of France, formed out of the old province of Orléannais, and comprising the arrondissements of Blois, Vendome, and Romorantin. The Loire flows through it S. W., almost bisecting it. The S. E. portion belongs to the infertile district of Sologne. The Loir crosses it parallel to the Loire farther to the N. W.; area, 2,452 square miles; pop. (1906) 276,019. The department is almost a uniform plain. The chief products are corn, fruits, wine, beet root, and timber. Fish, poultry, and bees abound. Principal town, Blois.

Loiseau, Jeanne (lwä-zō′), pseudonym DANIEL LESUEUR, a French poet and romantic writer; born in Paris in 1860. She ranked among the best of French contemporary poets, being compared to Meurne, Ackermann, and Sully-Prudhomme. Her "Flowers of April," "Dreams and Visions," and a translation of the "Works of Lord Byron," were crowned by the French Academy. Among her successful romances are: "The Neurotic"; "Passion's Slave"; "Woman's Justice"; "The Hatred of Love."

Lokao, a crude dye, originally imported from China under the name of Chinese green, but now extracted from the berries of the common buckthorn. It contains 30 per cent. of mineral matter. Pure lokao, obtained by treating the crude dye with solution of ammonia carbonate, filtering, and precipitating with alcohol, is a compound of ammonia with a pure blue coloring matter called lokaïn, $(NH_4)_2C_{56}H_{66}O_{34}$. On treating ammonium-lokaïn with dilute sulphuric acid, it splits up into glucose and an insoluble residue, lokaëtin, $C_{18}H_{16}O_{10}$. An aqueous solution of crude lokao dyes cotton a pale

green, but gives to wool and silk a pale bluish-gray.

Loki (lō′kē), the god of strife and spirit of evil. He artfully contrived the death of Balder, when Odin had forbidden everything that springs "from fire, air, earth, and water" to injure him. The mistletoe not being included, was made into an arrow, given to the blind Höeder, and shot at random; but it struck the beautiful Balder and killed him. This evil being was subsequently chained with 10 chains, and will so continue till the twilight of the gods appears, when he will break his bonds; then will the heavens disappear, the earth be swallowed up by the sea, fire shall consume the elements, and even Odin, with all his kindred deities, shall perish.

Lola Montez. See MONTEZ, LOLA.

Lollard, a name given to a religious association which arose at Antwerp about the beginning of the 14th century. By some, Walter Lollard, who was burnt alive at Cologne in 1322, is said to have been the founder, but it seems to have existed before his time. The members were unmarried men and widowers, who lived in community under a chief, reserving to themselves, however, the right of returning to their former mode of life. In 1472 the Pope constituted them a religious order. In 1506 Julius II. increased their privileges. They continued to the French Revolution. The name, having become one of contempt, was applied to the followers of Wyclif, and especially to the poor preachers whom he sent out. Lechler states that "a monkish zealot, Henry Cromp, of the Cistercian Monastery of Bawynglas, in the county of Meath," preaching before the University of Oxford, on Saturday, June 14, 1382, "indulged in violent attacks upon the Wyclif party, and applied to them the heretic name of Lollards, which had recently come into use, but till that time had never been publicly employed." While Richard II. reigned, the persecution of the Lollards was not heartily favored by the court, though proceedings against them were authorized, and in 1395 they presented a petition to Parliament for the reform of the Church. But on the accession of the House of Lancaster in 1399 a change for the worse took place. The clergy had assisted Henry IV. to the throne, in return for which he followed their directions as to the Lollards, and the Act *de hæretico comburendo* was passed as 2 Henry IV., c. 15. The first Lollard martyr was William Sautre, who was burnt in London, Feb. 12, 1401. The second was Thomas Badby, a mechanic in the diocese of Worcester, who was burnt in 1409 or 1410. Henry V., who carried out the ecclesiastical policy of his father, became king in 1413. On Sept. 25 of the same year, Sir John Oldcastle (Lord Cobham), who had edited the works of Wyclif, was adjudged to be "a most pernicious and detestable heretic." Early in 1414 a conspiracy of Lollards under the leadership of Lord Cobham was alleged to have been detected, and he was committed to the Tower of London, but escaped into Wales. Being recaptured, he was put to death by cruel torture in St. Giles' Fields, London, on Dec. 25, 1418.

Lollardism, the tenets of the followers of John Wyclif. The views of Wyclif underwent a process of development as his researches and experience extended, and were by no means the same at all periods of his life. In so far as they departed from Roman Catholicism, they approached, and, in some cases, went beyond what subsequently became the doctrine and discipline of Calvinism or Puritanism, commingled with an antagonistic element, Erastianism. Among the articles of his pronounced "heretical" by an assembly of ecclesiastical notables, convened in London in 1382 by Wm. Courtnay, Archbishop of Canterbury, were these:

"1. That the substance of material bread and wine doth remain in the Sacrament of the Altar after consecration.

"3. That Christ is not in the Sacrament of the Altar truly and really in His proper corporeal person.

"5. That if a man be only contrite, all exterior confession is to him superfluous and invalid.

"7. That it hath no foundation in the Gospel that Christ did ordain the mass.

"8. That if the Pope be a reprobate and an evil man, and consequently a member of the devil, he hath no power over the faithful of Christ given to him by any, unless, peradventure, it be given him by the emperor.

"9. That after Urban VI. none other is to be received as Pope, but that Christendom ought to live after the manner of the Greeks under its own laws.

"10. That it is against the sacred Scriptures that ecclesiastical persons should have any temporal position."

Among 14 articles adjudged to be "erroneous" were the following:

"13. That a prelate or bishop excommunicating a cleric who hath appealed to the king or the council of the realm, in doing so is a traitor to the king and the realm.

"15. That it is lawful for any deacon or presbyter to preach the Word of God without the authority or license of the Apostolic See, or of a Catholic bishop or of any other recognized authority.

"17. Also that temporal lords may at will take away their temporal goods from churches habitually delinquent.

"18. That tithes are pure alms, and that parishioners may for the offenses of their curates detain them, and bestow them on others at pleasure, and that tenants may correct delinquent landlords at will.

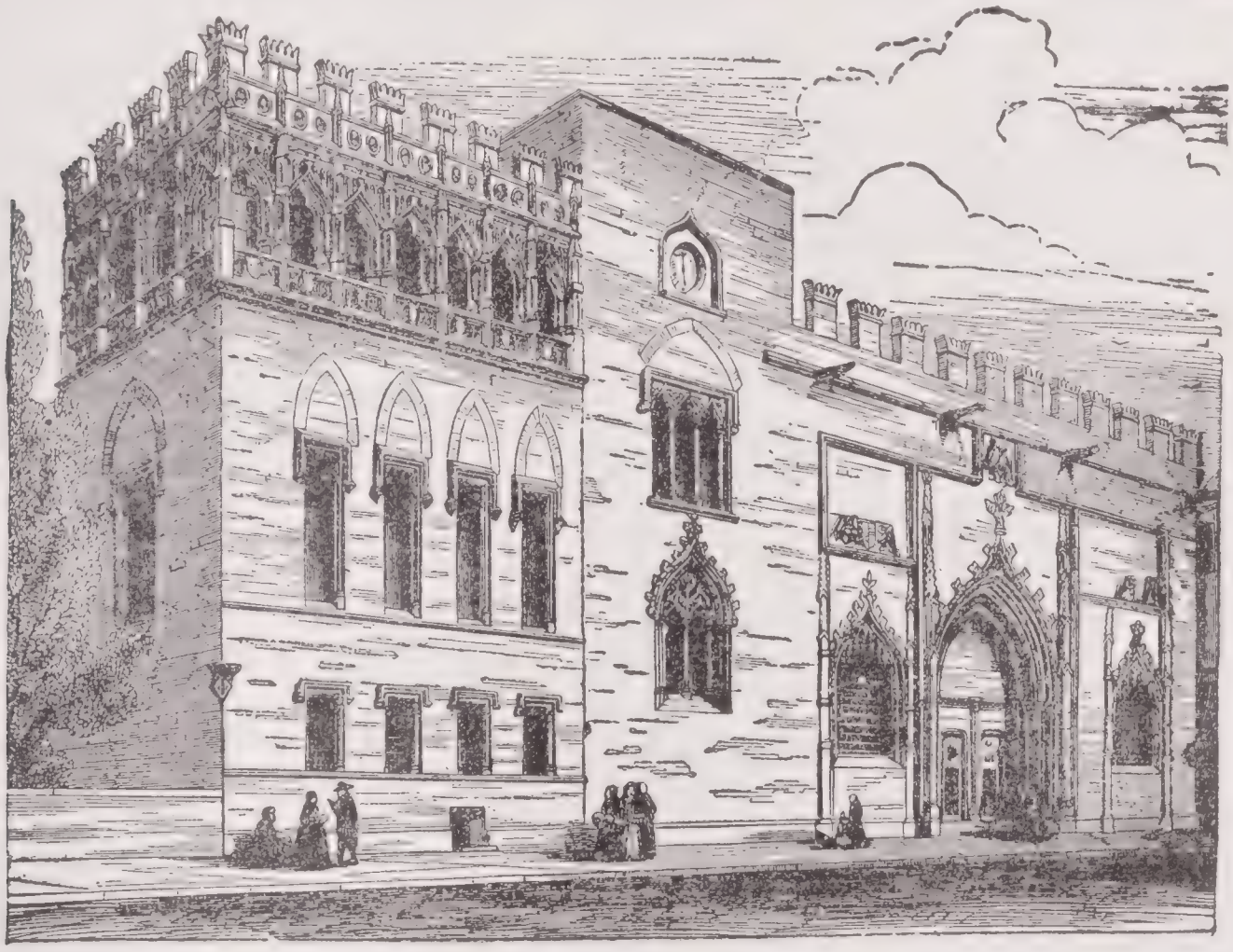
"24. That friars are bound to get their living by the labor of their hands, and not by begging."

Lolos, a fair-complexioned aboriginal people on the frontiers of China and Tibet, mainly in Szechwan and Yun-nan.

Lomami, a river of Southern Africa, an important navigable tributary of the Kongo, which it enters a little below Stanley Falls, after flowing nearly parallel to its upper course.

Lombard, Peter, a French philosopher; born about the beginning of the 12th century at a village near Novara in Lombardy. He was educated at Bologna, and came to France with recommendations to Bernard of Clairvaux. His uncommon talents soon procured him a chair of theology in Paris. In 1159 he was appointed Bishop of Paris, but he died in the following year. He was very generally styled *Magister Sententiarum,* or the "Master of Sentences," from his work "Four Books of Sentences," an arranged collection of sentences from Augustine and other fathers, on points of Christian doctrine, with objections and replies, also collected from other authors of repute. The first book treats of God; the second of the creature; the third of the incarnation, redemption, and the virtues; the fourth of the seven sacraments and eschatology. A subtle heresy, "Nihilianism," was detected by some in Peter's teaching, and the theological doctors of Paris in 1300 denounced it in 16 propositions culled from his writings. Peter Lombard's work was the subject of many commentaries down to the time of the Reformation.

Lombardic Architecture, the style of architecture that prevailed in Lombardy and part of Upper Italy, and which for a long time was recognized as a distinct Lombard style, presenting essential points of difference from the other later Romanesque styles. In the Lombard churches the type of early Christian architecture was abandoned, and the vaulted basilica was introduced in its stead, although this system was subjected to several necessary modifications. Many peculiarities assert themselves in which the vaulted basilicas of Lombardy differ from those of other countries. This occurs particularly in the façades, which have not, as is usually the case, a higher central portion and low side divisions, but which present one mass, terminating in a gable above, under the slopes of which, as well as in the choir and dome, are introduced arcade galleries. The separation into central and side divisions, as marking out the nave and aisles, is only effected in a way that harmonizes but indifferently with the whole by means of pilasters and half-columns. Besides the small arcade galleries below the gable the whole of the façade is frequently decorated with one or more of these rows of arcades one above another, either continuous or grouped, with pilaster-strips between the groups. The W. front is sometimes embellished with a large and elegant rose window, which in fact forms one of the chief beauties of the façades of many of the churches in Italy, which are built in the Later Romanesque style.



LOMBARDIC ARCHITECTURE: LONJA PALACE, VALENCIA.

Lombardo, Pietro, an Italian architect; born about 1438. He designed cathedrals and chapels in Italy and was a fine sculptor. He died about 1511.

Lombards, a people of Germanic descent, who were called by the Latin writers Longobardi or, more correctly, Langobardi, a name which is differently derived by different authorities. "Long beard," *Lange Börde* = "a long fertile plain beside a river," *börde* being used in that signification in the Lower Elbe district, and *longa parta* or *barte* = "a long battle-axe," have all been suggested as original forms of the name. The people so designated first appear in history as settled about the Lower Elbe, in Hanover and Western Prussia, at the dawn of the Christian era. In the two centuries that followed they came more than once into conflict with the Romans; and then till the end of the 5th century nothing more is known about them. When next mentioned (about 455) the Longobardi were settled in Moravia and were tributary to the Herulians. The oppression of these masters stung them into revolt; they subdued the Herulians, and after them the Gepidæ, and established themselves as the ruling race in Pannonia. Under Albion, their king, they invaded Italy in 568, and at the end of three years had possessed themselves of the greater part of Northern and Central Italy, Pavia being the last city to submit. They subsequently extended their power as far S. as Spoleto and Benevento, both of which duchies were held by Lombard dukes. His second successor, Authari, assumed the Roman title of Flavius, and under the influence of his queen, Theodelinda, a Frankish princess, the nation began to change its Arian faith for the Catholic. The Longobardi, though never a numerous race, were distinguished above most of their Germanic brethren for their fierce love of war and their rude manners. But in Italy they soon fell under the influence of the existing civilization: they adopted the Latin language, began to build churches and found monasteries, and gradually became assimilated with the Italians. King Rothari in 643, and his successors, embodied the legal customs of the Lombards in a code, written, however, in Latin — "*Leges Longobardorum.*" Luitprand, king from 712 to 744, made an unsuccessful attempt to subdue all Italy. His strongest opponent was the Pope, who summoned the Franks to his assistance. Charlemagne in 774 overthrew the Lombard dynasty and had himself crowned King of the Franks and the Lombards; and thenceforward the Lombards were entirely merged in the Italians. The only traces extant of the Longobard language are a few names. Their earliest historian whose works survive, Paul the Deacon, wrote in Latin.

Lombard College, a coeducational institution in Galesburg, Ill.; founded in 1851 under the auspices of the Universalist Church, but now non-sectarian in control; has grounds and buildings valued at over $125,000; endowment exceeding $200,000; volumes in the library, about 8,000; scientific apparatus, etc., $10,000; ordinary income, about $15,000; average number of faculty, 15; average student attendance, 110; graduates, over 500.

Lombardy, that part of Upper Italy which lies between the Alps and the Po, having the territory of Venice on the E., and Piedmont on the W. Its history begins with the conquest by the Romans in 222, who called it Gallia Cisalpina. After the break up of the Roman empire it was successively in the hands of Odoacer, the Ostrogoths, the Byzantine emperors, and the Lombards. Charlemagne incorporated it in his empire, but from 843 it was ruled by a separate line of kings, though before the kingdom ended (961) it had broken up into a number of independent duchies and civic republics. The Lombard cities, like those of Flanders at a later epoch, grew wealthy by industry and trade, and nurtured a vigorous love of freedom and independence. They resisted sturdily and successfully the attempts of the Emperors Frederick I. and II. to curtail their liberties, forming themselves into strong leagues which were powerful enough to rout the emperors in pitched battles. But, freed from threatening danger, they began to quarrel among themselves, and the country was for many years more or less distracted by internal dissensions. After the death (1447) of the last Duke of Milan, whose ancestor, Count Azzo, had acquired the sovereignty over nearly all Lombardy in 1337, the country was made an object of contention between the King of France and the emperor. The last named having got the better in the contest, Lombardy passed through Charles V. to Spain, which held possession of it till 1713, when the duchies of Milan and Mantua came into the hands of Austria and were designated "Austrian Lombardy." Napoleon made it a part of the Cisalpine republic, the Transpadane republic, and the kingdom of Italy successively. But in 1815 it was restored to Austria, and annexed politically to the newly-acquired Venetian territory under the name of the Lombardo-Venetian Kingdom. This union was dissolved in 1859, when Lombardy was given up to the new kingdom of Italy, which divided it into the provinces of Bergamo, Brescia, Como, Cremona, Mantua, Milan, Pavia, and Sondrio.

Lombok, an island, belonging to the Dutch, in the Indian Archipelago; between Bali on the W. and Sumbawa on the E.; area, 2,393 square miles. Between the two ranges which traverse the island, one of them rising to the height of 11,500 feet, there is a plain fertile in rice, cotton, maize,

coffee, and tobacco. There are several active volcanoes. The ruling class are Brahmans, the mass of the people, Moslem. The capital is Mataram on the W. coast.

Lombroso Cesare (lōm-brō'sō), an Italian scientist; born in Venice, Italy, November, 1836. He attained world-wide celebrity as an investigator of pathology, psychiatry, nervous diseases, criminology, etc. He wrote: "Genius and Insanity" (1864); "Clinical Studies on Mental Diseases" (1865); "The Criminal as related to Anthropology, Jurisprudence, and Prison Discipline" (4th ed. 1889); "Female Criminals" (1893); "The Anarchists" (1894); etc. He died Oct. 19, 1909.

London, the capital of the United Kingdom of Great Britain and Ireland and the largest city in the world; on the Thames, about 40 miles from its mouth; lat. (St. Paul's Cathedral) 51° 30′ 48″ N.; lon. 0° 5′ 38″ W. London consists of the city of London, having an area of 670 acres, and the county of London, having an area of 74,772 acres, the total area of London being therefore 75,442 acres. The foundation of this great community was of course the ancient city of London, but now that the surrounding parts have the status of a county and by the Local Government Act of 1888 have been made to form the county of London, the term London is properly and legally applicable to the entire area. For parliamentary purposes the county of London comprises the city and 27 boroughs.

The administrative county of London contains the parishes, districts and places constituted for sanitary purposes by the Metropolis Management Act of 1855. It is also the area of administration of the London School Board, and the Metropolitan Poor Law system now embraces the whole of London. It extends N. of the Thames to Bow and Hackney on the E.; to Islington, St. Pancras, Hampstead, and St. Marylebone on the N.; to Paddington and Hammersmith on the W.; S. of the Thames it extends to Putney and Wandsworth on the W., Streatham, Tooting, Penge, Lee, and Lewisham on the S., and Plumstead on the E. All the center parts are fully occupied, and the border parishes are now rapidly filling up. In 1891 the population was 4,228,317, in 1901 it was 4,536,063. The metropolitan and city police districts together, extending to 15 miles round Charing Cross, embrace an area of 443,421 acres, with a population of 5,633,806 in 1891, and of 6,580,616 in 1901. London is one of the healthiest of the large cities of Europe. The average annual rate of mortality per 1,000 in 1840–1850 was 26.6; 1850–1860,, 24.4; 1860–1880, 23.2. The death-rate for the year 1896–1897, was 17.9, and is now little above that of all England.

General Features, Main Thoroughfares, etc.— London stands on alluvial deposits, consisting of beds of clay and gravel, below which is the hard clay stratum known to geologists by the name of the "London clay"; in the middle of the great chalk basin extending from Berkshire to the E. coast. On the N. bank of the Thames where the principal part of London stands, the site rises gradually at the rate of 36 feet per mile, while on the opposite bank the houses cover a nearly uniform and extensive flat, lying in some places several feet below the highest tides. The prevailing wind is the S. W., and there are few places in the kingdom where less rain falls. The mean annual temperature is about 50°, and the general range of the thermometer is from 20° to 81°; the highest and lowest markings being, for the most part, in August and January respectively. In the beginning of winter London is occasionally enveloped in fogs, which are especially dense in the lower parts. Since the passing of the Metropolis Management Act of 1855 great changes have been made in the condition of London. The gigantic operations connected with the sewerage of London and the embankment of the Thames, from Blackfriars to Chelsea on the N. side, and from Westminster Bridge to Lambeth on the S., have produced great changes, while important lines of streets have opened up districts formerly almost inaccessible. But these improvements are not ended. Further extensive main drainage works are required, which are estimated to cost £3,000,000, and extensive street improvements have been sanctioned by Parliament, among which the most important is the street from Holborn to the Strand through the Soho district. In all the districts of London, and particularly in the City and West End, there has latterly been great improvement in the quality of architectural decoration and in public buildings, and stone has to a considerable extent replaced brick and plaster, though not so far as to change the aspect of some localities. Though some of the leading streets are wide, others are narrow and irregular. The decorative character of the streets about Lombard street and the Mansion House in the City has been fostered by the growth of numerous banking and insurance companies, while the rebuilding of the Grosvenor estate has added an entirely new style of brick architecture.

"The City"—the historic center of London—at the present day is bounded S. by the Thames; it extends N. to Charterhouse Square, E. to Middlesex street, and W. to the New Law Courts. Till 1878 this last boundary was marked by an old gateway, which was called Temple Bar, crossing Fleet street near the Temple; but in that year this structure was removed, as forming an impediment to traffic which could no longer be suffered, and a memorial

was erected on the site. The portion of the City inside the area of the mediæval walls is known as "London within the walls"; and all the wards are bounded by the site of the old walls; the portion outside extends irregularly all around, and is known as "London without the walls."

Of the streets that run through modern London the most important from W. to E. is that which enters from Kew into Hammersmith, and passing through Kensington, forms the finest of all the approaches to London. It stretches on through Knightsbridge and Piccadilly, with Kensington Gardens and Hyde Park on the N., and with Apsley House and numerous other palatial edifices facing the Green Park, which constitutes its S. boundary for about half the length of Piccadilly. This line is broken at the E. end of Piccadilly, but passes by Regent street (or by the Haymarket) and Trafalgar Square into the Strand, which continues it farther E. and much nearer the river, and it stretches on past the Temple, along Fleet street, Ludgate Hill, St. Paul's Churchyard, where it runs into Cannon street, leading to the Tower on one side, and on the other into Cheapside, Poultry, Lombard street, Fenchurch street, Aldgate, Whitechapel road, and Mile-end road to the county boundary at Bow. The next great artery between the W. and E. extends along the Uxbridge road from Acton, entering the county boundary at Shepherd's Bush and passing through Notting Hill, along Oxford street, through Holborn and Newgate street, where it joins the more S. line above described, at the W. end of Cheapside. Farther N. is a third line, extending from near Kensington Gardens, through Oxford and Cambridge Terrace along the Marylebone and Euston road to Islington, and thence by the Pentonville and City road to Finsbury Square. Among the leading thoroughfares running N. and S. the extreme W. is Edgeware road, which enters the county at Kilburn, terminating at its S. extremity in Oxford street, from which it runs N. W., but communicating through Park lane with Piccadilly, a little to the W. of which, from Hyde Park Corner Place, Grosvenor Place leads down to Buckingham Palace road, from which Vauxhall road forms a connecting line with the river. Park lane and Grosvenor Place on this line contain many of the most select residences of the aristocracy. East of Edgeware road Regent street with Portland Place, Tottenham Court road with St. Martin's lane, and other connecting lines leading to Westminster Bridge; Gray's Inn road, and the line of Chancery lane, Farringdon street, etc., leading to Fleet street and Blackfriars Bridge, form some of the most important communications in this direction. Piccadilly and Pall Mall, running E. and W., Bond street, Regent street, and St. James' street, N. and S., are among the most fashionable streets in the W. end, each with its own distinctive character. Bond street contains the shops most patronized by the aristocracy. Regent street, according to some tastes the handsomest street in London, is the fashionable promenade and has some of the finest shops. It unites with Portland Place in the N., and intersects Oxford street and Piccadilly, and reaches S. to Waterloo Place, by which it communicates with St. James' Park. The greatest and most picturesque thoroughfare in London, not of an exclusively mercantile character, is the line of the Strand and Fleet street. In the E. there are the great roads leading through Mile End to the Docks, and S. of the Thames great roadways lead from the center into Kent and Surrey.

The Thames Embankment is one of the modern features of London. The Victoria Embankment on the N. side, consists of a wide roadway, with a granite retaining wall, surmounted by a parapet broken by pedestals for lamps. There are well contrived landing-stages and recesses, these features of the Embankment being rendered highly ornamental by balustrades, pedestals for sculpture, etc. From the Temple to Charing Cross portions of land reclaimed from the Thames, have been laid out in public gardens. The Chelsea Embankment extends from the Albert Suspension Bridge along Cheyne Walk to Chelsea Hospital. From the fine building of St. Thomas' Hospital next Westminster Bridge, on the S. side of the river, extends the Albert Embankment, continuous with the old quay at Lambeth. A very valuable improvement in the City was the Holborn Valley Viaduct, extending from Newgate street to the end of Hatton Garden. Broad roads also lead to the Central Meat Market, and to the lower level of Farrington street, which is crossed by the viaduct obliquely, with three Gothic arches supported on 12 hexagonal columns of polished red granite. Great improvements have been effected in the City during the last few years, especially in the neighborhood of the Bank of England and the Exchange, by the opening up of new streets of considerable breadth. The streets of London are regularly kept clean, and are well lighted and paved. The carriageway is frequently paved with granite. Wood and asphalt pavements are, however, gradually displacing stone in the more crowded thoroughfares. The estimated length of streets in London is over 2,000 miles.

The Chief Districts or Quarters.— The N. bank of the river from the City as far as Blackwall is occupied by docks, wharves, and warehouses, and inhabited by slopsellers, laborers, and small shopkeepers. T

London

the N. of this district lie Spitalfields and Bethnal Green. Clerkenwell, to the N. W. of the City, is the seat of the watch trade, of a large artisan population, and of numerous workshops and factories. On the N. the parish of Islington, placed on a salubrious elevation, is mostly inhabited by the middle classes. On the S. side Southwark and Lambeth are occupied generally with manufactories. Bermondsey is the great seat of the tanning trade. Poplar, Wapping, and Shadwell on the N. side of the river, and Rotherhithe on the S. side of the river, are the sites of extensive docks and the headquarters of sailors. Deptford and Greenwich on the S. E. contain many interesting features of their past history, while stretching still further to the S. E. are Woolwich, Plumstead, Charlton Lee and Kidbrook, now the residential places of London merchants of all descriptions. Lewisham and Camberwell, lying W. of these places, are of the same character. West of this the extensive Wandsworth district extends, including Clapham, Tooting, Streatham, and Putney. Battersea almost intersects this district. Coming back to the N. of the river, Westminster is the seat of government, including within its area the Houses of Parliament, Buckingham and St. James' Palaces, Marlborough House, Westminster Abbey, and many other places of interest. Finsbury and Tower Hamlets form a continuous line lying in the N. of the city. The "West End," when used in the sense of the fashionable part of London, may be described generally as including the district between Oxford street on the N., Hyde Park on the W., Regent street on the E., and Piccadilly on the S.; the district (Belgravia) W. of Buckingham Palace Gardens between Grosvenor Place and Sloane street; and that between Regent street and the Green Park (including St. James' Square, etc.). It may even be said to extend as far as Kensington Gardens, embracing part of South Kensington, Bayswater, and the district immediately to the N. of Hyde Park.

The West End proper, comprising Paddington, Kensington, West Brompton, Bayswater, and Notting Hill, is one of the most modern parts of London, and the numerous streets, terraces, and squares are laid out with monotonous regularity and symmetry in striking contrast with many of the older portions, but the buildings are chiefly brick covered with plaster. Still further W. is Hammersmith, which includes the district of Shepherd's Bush, and is chiefly occupied by small-sized residential houses; and Fulham, to the S. W., is of the same character. Marylebone, lying to the N. of Paddington, was not long since fashionable, but has greatly declined since the rise of Belgravia, though a few ducal and other aristocratic residents are still to be found in Cavendish and Portman Squares. Still further N. lies the Regent's Park district, containing some fine terraces and crescents, and numerous pretty villas. Those who dwell here belong chiefly to the middle classes, among whom are many artists and a number of city merchants. Further N. still are Camden Town, Kentish Town, Hampstead, Islington, Holloway; and N. E. are Clapton, Stoke Newington, Hackney, and Dalston. East of Marylebone lies the Bloomsbury district, in which stands the British Museum. Its well-built houses and squares were erected toward the latter part of the 18th century. Still further E. we recognize the architecture of the era of Anne, in the still beautiful houses in Great Ormond street and Queen Square, where fashion reigned near the beginning of the 18th century. To the S. of this line is the Strand district, which is strictly trading, though the streets running out of it toward the river are chiefly occupied by private hotels. These, however, are now being supplemented by enormous hotels such as the Savoy, which faces the river, and the Cecil, which faces the Strand. Pimlico, Chelsea, and Brompton, the districts lying to the W. of Westminster and immediately N. of the river, are chiefly residential, and contain a population of a very mixed character. The N. W. portion of Pimlico comprises the fashionable district of Belgravia already mentioned. Brompton lies N. of Chelsea, in a low situation.

The Parks.— Of these the finest and most fashionable is Hyde Park, which lies between the Uxbridge and Kensington Roads, and contains about 400 acres. It has toward the S. side a large artificial lake, called the Serpentine (one part of the Westbourne river), which is spanned by a handsome bridge of five arches, at the entrance to Kensington Gardens. The principal entrance to the park on the S. side is by a triple archway close to Apsley House, and within a few yards of that point is the beginning of Rotten Row, a narrow strip railed off for equestrians and stretching about 1 mile toward Kensington. Somewhat further N., and on the other side of the Serpentine, is a fashionable drive called the Ladies' Mile, which extends nearly to the bridge before mentioned, and here, on the summer afternoons, may be seen vast numbers of splendid equipages driving up and down. The principal entrance on the N. side is at the end of Oxford street, and is adorned with an elegant arch of white marble which formerly stood in front of Buckingham Palace. Kensington Gardens, with which Hyde Park communicates at several points, are beautifully wooded and finely laid out. Here carriages are not admitted. St. James' Park (83 acres) extends from Buckingham Palace to the Horse Guards,

London

and in its center is an ornamental sheet of water, studded with islets covered with trees and shrubs, and around which swim a great variety of aquatic fowls. The Green Park, 71 acres in extent, lies between St. James' Park on the S. and Piccadilly on the N. Regent's Park, on the N. side of London, covers an area of over 400 acres. Round the park is a drive nearly 3 miles long, and an inner circular drive incloses the Botanic Gardens. At the N. end are the Zoölogical Gardens, to which a fine broad avenue leads along the center of the park. Battersea Park is on the S. bank of the Thames, opposite to Chelsea Hospital. Victoria Park is on the N. E. of London, laid out and planted as a place of recreation for the poorer inhabitants of this part of London. Southwark Park is another artificially formed recreation ground. Greenwich Park is one of the most delightful features of South London, and has great natural beauties. The famous Greenwich Observatory is situated here. There are many other parks acquired for the use of the public during late years. Brockwell Park in Camberwell, Ravenscourt Park in Hammersmith, Finsbury Park and Clissold Park on the N. borders of London, are the most extensive. But even more typically a part of modern London are the numerous and beautiful heaths and commons preserved for the public. Hampstead Heath on the N., Blackheath and Plumstead Common on the S. E., and Totting and Streatham commons on the S. are the most extensive.

Squares and Public Monuments.— The squares of London are very characteristic, and many of them are of great beauty and extent, and well planted with shrubbery, which usually thrives well. Among them are: St. James' Square, N. of Pall Mall; Eaton, Belgrave (10 acres), Grosvenor, Portman, Cavendish Squares, all in the W. end; Russell Square (10 acres), Bedford, Bloomsbury, Tavistock, and Euston Squares, in the W. central part of the town; Trafalgar Square, at Charing Cross, fronting one of the principal thoroughfares and adorned with public buildings, fountains, the Nelson Column, and statues of Charles I., George IV., and others. The most conspicuous public monuments are: "The Monument," on Fish Street Hill, London Bridge, a fluted Doric column 202 feet high, erected in 1677 in commemoration of the great fire of London; the York Column, at the S. end of Waterloo Place, a plain Doric pillar of granite 124 feet high, surmounted by a bronze statue of the Duke of York; a fluted Corinthian column in Trafalgar Square, 176½ feet high, raised in honor of Nelson, and surmounted with a colossal bronze statue of the hero, having the pedestal decorated with bronze sculptures in high relief, and four magnificent lions, by Sir E. Landseer, at the angles; and the Albert Memorial, Hyde Park, the most splendid and costly monument of recent times, being a Gothic structure 176 feet high, with a colossal seated statue of the prince under a magnificent canopy elaborately sculptured and adorned. There is a statue of the Duke of Wellington in front of the Exchange, and a statue of Sir Robert Peel at the top of Cheapside. Statues of Sir Charles J. Napier, Sir Henry Havelock, and General Gordon stand in Trafalgar Square. On the Thames Embankment, not far from the Temple, now stands the Egyptian obelisk known as Cleopatra's Needle; and W. of it are statues of Robert Raikes, the founder of Sunday-schools, General Outram, John Stuart Mill, and others. In Waterloo Place is a memorial to the Guards who fell in the Crimea, and here is also a statue of Sir John Franklin. An equestrian statue of the Duke of Wellington at Hyde Park corner was erected in 1888. A monument to Sir Hugh Middleton, who brought the New River water to London, has been erected on Islington Green. Among other memorials are: The Westminster Crimean Memorial, in the open space at the W. of the Abbey; the Peabody statue behind the Royal Exchange; an equestrian statue of Prince Albert in Holborn Circus, a statue of Carlyle on Chelsea Embankment, and of Lord Beaconsfield in Westminster Palace Yard.

Gas, Sewerage, and Water.— London is now supplied with gas by eight separate companies, whose aggregate capital is £23,183,254. These companies include in their area of supply a considerable district outside London. The sewerage works of London, with which the Metropolitan Board was charged, were formally opened on April 4, 1865. The system consists of lines of intercepting sewers on both sides of the Thames intersecting the old outlets which are retained for service during heavy rainfalls. It consists of three main lines on the N. of the river, at different levels, called respectively the High Level, Low Level, and Middle Lever Sewers; and of two on the S. side, called High and Low Level Sewers. The lines on the N. side converge at the Lea river, whence, after the Low Level sewage has been pumped to a higher level, the whole flows in three parallel brick culverts, built in an embankment upward of 5 miles in length, on to the Northern Outfall and reservoir, about 14 miles below London Bridge. On the S. side the Low Level sewage is pumped to the higher level at Deptford, whence the whole is conveyed to a point near the mouth of the river. The system was designed and carried out by Sir J. W. Bazalgette. The total length of the sewers is 82 miles, and the area drained is 120 square miles, together with sundry small districts, accom-

London

modated by the London system. The whole system has cost about £6,000,000, and considerable extensions are now in progress. Extensive works have been established for precipitating the sewage; the deposit after precipitation, amounting to 5,000 tons daily, is carried out to sea and deposited several miles from land. The metropolitan water supply has been considerably amended of late years. There are eight companies supplying London and an extensive area around extending into Middlesex, Essex, Kent and Surrey. The total quantity of water supplied by these companies amounts to over 200,000,000 gallons daily. The largest quantity is supplied by the East London Company. Rather more than 113,500,000 gallons of this total is supplied from the Thames river, 55,250,000 from the Lea river, 33,500,000 from springs and wells. By an act passed in 1852 all the companies making use of the Thames are obliged to draw from above the limit of the tidal flow. Even above this point the water is not free from pollution by the sewage of numerous populous towns, and by the drainage of richly-manured land. Means are adopted for storing the water, and it is all filtered through layers of gravel and sand before entering the mains; but the system of supply is liable to various objections, and the total quantity is inadequate to meet the entire wants of the population. Commission after commission, and committee after committee, have examined and reported on this important subject, but in 1896, 1897, and 1898, the whole E. end of London and much of the S. suffered from want of proper water supply.

Bridges and Cross-river Tunnels.— Within the limits of London the Thames varies considerably in width. At Putney it is 550 feet, at Battersea 960, at Vauxhall 630, at Westminster 275 feet, at Waterloo 1,140 feet, while at Blackfriars it narrows down to 830 feet. At London Bridge it is 800 feet wide, and at Woolwich 1,470 feet wide. The bridge farthest down the river is Tower Bridge — a bascule bridge which allows the passage of large vessels. This bridge crosses the Thames just below the Tower of London. The foundation stone was laid by the Prince of Wales in June, 1886. London Bridge, connecting the city at King William street with Southwark at the junction of Wellington street and Tooley street, is an elegant structure of Aberdeen granite, built by Sir John Rennie after his father's designs. About 500 yards further up the river stands Southwark Bridge, connecting the city and Southwark. It is an iron bridge of three segmental arches resting on stone piers, erected by the elder Rennie. About half a mile further W. Blackfriars Bridge connects the city at Bridge street with Southwark at Great Surrey street. It has five segmental arches of iron springing from granite piers, the center arch being of 185 feet span. Waterloo Bridge, nearly half a mile above the former, is esteemed by many to be the finest in the world. It was constructed of Aberdeen granite by the elder John Rennie, and, including its approaches, supported on semicircular arches, is 2,456 feet long; it is perfectly level, and connects the Strand with the Waterloo road. Westminster Bridge crosses the river at the N. end of the Houses of Parliament from Westminster to Lambeth. It has seven elliptical arches of wrought and cast iron. Further up the river Westminster and Lambeth are again connected by Lambeth and Vauxhall Bridges. Lambeth Bridge is a hideous engineer's structure obstructing a most picturesque part of the river, with the Houses of Parliament on one side and Lambeth Palace on the other, but it is now being rebuilt. The Chelsea Suspension Bridge connects Chelsea and Pimlico on the N. side with Battersea Park on the S. The Albert Bridge connects the Chelsea Embankment with Battersea to the W. of Battersea Park; and the Battersea Bridge unites Chelsea and Battersea a little further W. Putney Bridge, a magnificent structure of granite, connects Fulham and Putney; and Hammersmith Bridge, the last in London, connects Hammersmith with Barnes. There are also six railway bridges across the Thames. One of them, at Charing Cross, displaced the old Hungerford Suspension Bridge, but is provided with a footway on one side, so that the original communication is preserved. Another bridge, belonging to the same line of railway, crossing the river from Cannon street, City, is similarly provided. The two railway bridges at Pimlico, which look like one, belong to the London, Brighton, and South Coast Railway Company, and the London, Chatham, and Dover. The latter company owns a bridge close to Blackfriars Bridge. The once famous Thames tunnel, 2 miles below London Bridge, was opened in 1843 as a roadway under the river, having cost £614,000, but it proved a financial failure, and now serves as a railway tunnel. A subway under the river, lined with iron hoops, connects Tower Hill and Tooley street, Southwark; and there is a great tunnel for foot-passengers and vehicles between Blackwall and East Greenwich. An underground electric railway to South London passes under the river at London Bridge. Besides these there are steamboat ferries between Greenwich and the Isle of Dogs, and between North and South Woolwich.

Palaces.— St. James', erected by Henry VIII. from a design by Holbein, at the foot of St. James' street, is an irregular and picturesque brick building. It is well adapted internally for royal levees and drawing rooms, which are held here during

London

the fashionable season. Buckingham Palace, facing the W. end of St. James' Park, was built by George IV., and consists, since the erection of the E. front, of a quadrangular range of buildings. In the gallery, which is 160 feet long, are some good pictures. The king resides here occasionally in the spring and summer. Whitehall—the Banqueting House—designed by Inigo Jones in the Palladian style, is the only remnant of the ancient palace of Whitehall; the ceiling, painted by Rubens, is the most extensive work of that artist existing in the country. Kensington Palace, situated in Kensington Gardens, is a brick building of the Jacobean period, and was thrown open to the public by Queen Victoria shortly before her death. It was the birthplace of Her Majesty. Lambeth Palace, on the Surrey side of the river, opposite the Houses of Parliament, has been for many centuries the residence of the Archbishops of Canterbury. It is a brick edifice, and comprises a great variety of styles in architecture, from Early English downward, and contains a library of 30,000 volumes. Fulham Palace, the residence of the Bishops of London, is a building of no architectural pretension. It is pleasantly situated on the Thames, and at one time had extensive and well-timbered grounds. Greenwich Palace, once the home of the Tudor and Stuart sovereigns, is a stone building of considerable beauty, now used as a training school for the navy.

The Houses of Parliament.—These consist of the House of Peers and the House of Commons, with the connected apartments and offices, the whole practically forming one structure. It is a highly-decorated structure in the Tudor Gothic style, after designs by Sir Charles Barry. It stands on the left bank of the Thames, between the river and Westminster Abbey, and extends over an area of about 8 acres. The façade which overlooks the river is 900 feet in length. The walls are of brick, faced externally with magnesian limestone, and the whole edifice is separated from the river by a terrace of Aberdeen granite. It is paneled with rich tracery, and profusely decorated with statues and shields of arms of the Kings and Queens of England from the Conquest to the present time. In the S. W. angle is the Victoria Tower, supported on four pointed arches 60 feet in height; it is 75 feet square and 340 feet in height. There is also a tower in the center, 300 feet high by 60 feet, surmounted by a lantern; and the clock tower, at the N. end of the edifice, with its richly-decorated spire, rises 320 feet. The House of Peers is an apartment 97 feet long, 45 feet wide, and 45 feet high; magnificently decorated throughout with carved oak paneling, a profusion of gilding, paintings in fresco, and richly stained glass windows. The House of Commons is a somewhat smaller apartment, fitted up in a much plainer style. Paintings in fresco and the water-glass medium, and statues of great statesmen have been added to the internal decorations; and a statue of the architect has been placed on the staircase leading up to the committee rooms. Westminster Hall, the most magnificent hall in the kingdom, 290 feet long, was built by William Rufus and improved by Richard II. It has recently been exposed on the W. side, the ground laid out as an ornamental garden, and a fine statue of Cromwell erected therein. The hall is now not used except as a member's entrance to the House of Commons. In Old Palace Yard is an equestrian statue of Richard Cœur de Lion by Baron Marochetti, and a statue of Canning.

Government Offices.—These are mostly situated in and near Whitehall. The Treasury, Home Office, and Education Department occupy one range of buildings, which have been improved by a uniform and handsome façade. The India Office and the Local Government Board faces St. James' Park. The Horse Guards and Admiralty, which are somewhat nearer Charing Cross, have little to admire in their external appearance. An extensive pile of government offices, for the Foreign Office and the Colonial Offices, has been erected in Downing street. The style is Italian, and the building exhibits a large amount of decorative detail, part of it in red and other colored marbles and granites. Some of the public offices are in Somerset House, once a royal palace and occupied by the queen in the reign of Charles II. It has a spacious and handsome quadrangle, finished in 1782, from designs by Sir W. Chambers; its N. façade, 200 feet in length, faces the Strand; and its S. front, 800 feet long, overlooks the river, and contains two or three river entrances, constructed, of course, before the Thames Embankment separated it from the river bank. It has also a front toward Wellington street, designed by Mr. Pennethorne. The postoffice near St. Paul's, is a spacious and handsome building, completed in 1829, from the designs of Smirke. It is 390 feet long, 130 feet wide, and 64 feet high. Its façade, which is toward St. Martin's-le-Grand, has three Ionic porticoes. A supplemental building for telegraph and other business occupies the opposite side of St. Martin's-le-Grand. The Mint, a stone building of the ordinary Georgian architecture, finished in 1810, stands on Tower Hill, and occupies about 10,000 square yards. The royal arsenal and dockyard for military stores is at Woolwich.

The Tower.—This celebrated fortress, which formed the dominating feature of Norman London, stands on the N. bank of the Thames, immediately adjoining the

London

boundary of the city. Besides its use as a fortress the tower was likewise the temporary residence of several kings and queens of England, but it is now only used as a storage for armor and as the headquarters for certain military matters. It occupies an area of 12 acres, inclosed within a wall surrounded by a ditch, now dry, and laid out as a garden. On the S. side is an archway called the "Traitors' Gate," through which State prisoners were brought from the river. The most ancient part of the existing edifice is the keep, now known as the White Tower, which was erected about 1078 for William the Conqueror by Gundulph, Bishop of Rochester. It stands near the center of the quadrangle, around which are placed several other towers, each having its distinctive name. The Tower contains the Wellington Barracks, erected on the site of the grand storehouse burned down in 1841; the jewel room, a modern edifice, in which are preserved the regalia of Great Britain; the horse armory, Queen Elizabeth's armory, and the Church of St. Peter-ad-Vincula.

Places of Worship.— St. Paul's Cathedral stands on the summit of Ludgate Hill, on a site which was formerly used for pagan worship, and has been occupied by a church from early Saxon times. Old St. Paul's, a vast Gothic building, was destroyed by the great fire of 1666, and only a few columns of the chapter house now remain to view. The present church, on the same site, the greatest and most conspicuous architectural ornament of London, planned and carried out by Sir Christopher Wren, was begun in 1675, and completed in 1710. It is 510 feet in length from E. to W., while the transept is 250 feet, exclusive of the semicircular portico at each end; the breadth of the W. front is 180 feet, and the height of the walls 110 feet. The building is crowned with an immense dome, surmounted by a lantern with ball and cross, the height of the latter being 404 feet from the ground. It is built of Portland stone, and cost £747,954, which was paid by levying a tax on coal. The interior has been decorated at great cost by voluntary means, according to the original intentions of Wren. Among the monuments it contains are those of Wellington, Nelson, Sir Ralph Abercromby, Sir John Moore, Dr. Johnson, Howard, Sir Joshua Reynolds, and eminent men of more modern times. Near together, under the center of the dome, lie interred Lord Nelson and the Duke of Wellington. Westminster Abbey, one of the finest specimens of the Pointed style in Great Britain, dates from the reign of Henry III. and Edward I., when it was erected on the site of the Saxon minster founded by Sebert. The beautiful chapel at the E. end was added by Henry VII., and at the beginning of the 18th century the upper parts of the two towers at the W. end were erected from designs of Sir Christopher Wren. It is 360 feet long, and 195 feet wide within the walls. Here kings and queens have been crowned, from Edward the Confessor to Edward VII.; and here many of them are buried, some with and others without monuments. In the S. transept are the tombs and honorary monuments of great poets, from Chaucer down to Tennyson, whence it is called "Poet's Corner"; and in other parts are numerous sculptured monuments to statesmen, warriors, philosophers, divines, patriots, and eminent individuals generally, many of whom are interred within its walls. Of the other sacred edifices in London the most remarkable are: St. Bartholomew's in West Smithfield, which consists of the chancel and lady-chapel only of the original church, and contains some beautiful specimens of Norman, Early English, and later styles of architecture; St. Saviour's in Southwark, which boasts of the best Early English architecture in London in its choir and lady-chapel, the only portions of the old church which remain; St. Giles, Cripplegate, a beautiful pre-Reformation church; St. Stephen's, Walbrook, the interior of which is extremely fine, and generally regarded as one of Wren's best works; and the Temple Church, which is one of the very few round churches now remaining in England, and combines transition Norman architecture with Early English, the latter in the choir, which was founded in 1240. Besides these there are very few of the older churches left, among the most interesting of which is Bow Church. Of the remainder, Wren's churches are very beautiful, and perhaps St. Bride's in Fleet street, and St. Martin's-in-the-Fields may be specified. During the Georgian period the most hideous specimens of architecture were erected, and these still predominate. Among Roman Catholic Churches in London are St. George's Cathedral, in Southwark, finished in 1848, and the magnificent new cathedral now being erected at Westminster. Many of the Nonconformist Churches are handsome structures. Among the finest of them are the City Temple on the Viaduct, opened in 1874; Christchurch in Westminster Bridge road; the Apostolic (or Irvingite) Church in Gordon Square; and the Tabernacle, Newington Butts, originally erected for the Rev. C. H. Spurgeon.

Public Buildings in the City.— A number of the most important buildings in London are situated within the city. The nucleus of the whole is formed by the Bank of England, the Royal Exchange, and the Mansion House, which all face toward an open area; the center of bustle and business, near the middle of the city, adorned with the handsome offices of several assurance companies. The Bank of England, in

London

Threadneedle street, was built in 1732, and now forms a low flat, insulated, irregular parallelogram covering four acres of ground. The Royal Exchange is an extensive and ornate building, having a portico surmounted by a pediment enriched by sculpture. It surrounds an open interior quadrangle, in the center of which is a marble statue of Queen Victoria. In this court, which is surrounded by covered arcades, the meetings of the merchants on 'Change are held. An equestrian statue by Chantrey of the Duke of Wellington occupies the area in front of the building. The Royal Exchange was originally founded by Sir Thomas Gresham in 1567, and having been burned down in 1666 it was rebuilt, and opened in 1669. This second exchange having been also burned down on Jan. 10, 1838, the present edifice was erected on its site. The exchanges for special purposes are: The Stock Exchange in Capel Court; the Coal Exchange, Lower Thames street, built by J. B. Bunning, opened in 1849 by Prince Albert, a sumptuous, though rather incongruous building, the great hall of which is circular, 60 feet in diameter, and 74 feet to the apex of the glazed dome; the Corn Exchange, in Mark Lane, opened in 1747, enlarged and partly rebuilt in 1827 and now again almost entirely rebuilt. The Mansion House, the official residence of the lord-mayor, was built in 1739–1753 from the designs of Dance, the city surveyor. It has a portico in front. The Guild-hall, at the N. end of King street, Cheapside, is where the principal business of the corporation of the city of London is conducted. The civic banquets are given here. A splendid new council chamber was completed in 1885. The hall itself is now covered with a decorative open timber roof of the Perpendicular Gothic style; the old front has been replaced by a new Gothic front. The hall is capable of seating 3,000 persons, and contains some monuments of ordinary sculpture; and at the W. end, raised on pedestals, are colossal figures of Gog and Magog. In 1872 a handsome suite of rooms was added to the Guildhall for the Corporation Library and Museum. The library consists of upward of 40,000 volumes. Of late years some of the city companies have remodeled or rebuilt their halls. Of these the Clothworkers' Company have produced the most elaborate street façade, but its confined situation in Mincing lane does not permit it to be seen to advantage. The Goldsmiths' Hall, behind the postoffice; the Fishmongers' Hall near London Bridge; and the Ironmongers' Hall, in Fenchurch street, are the principal structures. In the city many old and familiar landmarks have been removed. The once famous East India House in Leadenhall street, and the Excise Office in Broad street, have been replaced by immense piles of offices; Doctor's Commons has been cleared away for the new street to the Mansion House; Sir C. Wren's College of Physicians is supplanted by meaner buildings; the site of the Steel-yard, memorable in the history of old London, is absorbed by the city terminus of the Southeastern railway; old churches have been leveled, and old inns and hostelries have disappeared; while outside the city a whole region full of good and bad memories has been cleared away for the new Law Courts; the State-paper Office is displaced by the Foreign Office; Tattersall's is crossed by streets; chambers occupy the ground of the Old Thatched House; and a gymnasium has supplanted the British Institution.

Courts of Law.—London is the seat of the supreme courts of the kingdom. Several of these were long accommodated at Westminster Hall (formerly sitting in the hall), but in 1883 were removed to the New Law Courts at the junction of the Strand and Fleet street. This great building, from the design of the late G. E. Street, occupies an area of nearly 4 acres. It is of a somewhat heavy mediæval character, a large W. tower being a chief feature. The Old Bailey, adjoining Newgate, is the central criminal court for the trial of prisoners who have committed serious offenses in the metropolitan district. One or more of the judges of the law courts sit here also in the old court, while the new court is presided over by the recorder and common sergeant of the City of London. The present building is now about to be demolished. There are numerous county courts within London for the trial of small debt cases. Besides the above there are also the Clerkenwell Session house; the city police courts, which are held at the Mansion House and Guildhall, and are presided over by the lord-mayor and one of the aldermen; and numerous police courts, each of which is presided over by a barrister of at least seven years' standing. The Inns of Court as they are called are four, the Inner Temple, Middle Temple, Lincoln's Inn, and Gray's Inn. Every law student, before he can be called to the bar, has to be entered as a member of one of these inns, and to dine a certain number of times in the common hall. The Inner and Middle Temple are close to Temple Bar, between Fleet street, and the river. The roof of Middle Temple Hall, built in 1572, is considered the best specimen of Elizabethan architecture in London. Lincoln's Inn is situated between Chancery Lane and the extensive square called Lincoln's Inn Fields, now open as a public garden. A handsome hall and library in the Tudor style, from the designs of Hardwick, have been erected in the gardens. Gray's Inn stands on the N. side of Holborn. The gardens, first planted about 1600, were a fashionable

London

promenade in the time of Charles II., and for some time after. The other "inns", Staple Inn, Barnard's Inn, Furnival's Inn, Clifford's Inn, New Inn, Sergeant's Inn, are now all in private hands and not connected with the law.

Prisons.—There are altogether about a dozen criminal prisons. The most celebrated of these is Newgate, near St. Sepulchre's Church, a gloomy and massive structure, the scene of a great many executions, but now only occasionally used as a prison and about to be pulled down by the city corporation. Among others that may be mentioned are Clerkenwell prison, the Wandsworth prison, Holloway prison, for females, debtors, etc.; the Westminster House of Correction, for female prisoners, in Tothill Fields, built on the Panopticon principle, with a courtyard in the center 250 feet in diameter, and conducted on the silent system; the Model prison, Pentonville, containing 1,000 cells, in which the inmates are taught useful trades; Wormwood Scrubs prison, a large building standing, almost isolated on the borders of London. Millbank penitentiary, or prison, an immense brick edifice with external walls inclosing upward of 16 acres, designed by Jeremy Bentham, has been demolished, and the site utilized partly for workmen's dwellings and partly for the Tate picture gallery.

Clubs.—Many of these establishments, having most elaborate and ornate buildings, are among the principal architectural features of West London. They are situated chiefly in and near Pall Mall and vie with each other in elegance and luxury. The principal are: the Athenæum, possessed of a fine library, and having a great many artists and men of science and letters among its members; the Army and Navy, the United Service, the Guards', and the Junior United Service; the Carlton, the great Tory club, standing side by side with the Reform club in Pall Mall, the former numbering 1,800 and the latter 1,400 members; the Junior Carlton; the Oriental; the Travelers'; Brooks', one of the oldest of the clubs; White's, a still older club, much frequented by the Conservative nobility; the Conservative; the Devonshire; the Oxford and Cambridge; the Garrick, frequented by lovers of the drama; and four political clubs, which have the largest numbers of members, the Constitutional having 6,500, the National Liberal 7,000, the Junior Conservative 5,500, and the Junior Constitutional 5,000. Clubs are rapidly extending in London, and many have been established of late years to meet special purposes.

Theaters, Public Halls, etc.—The principal theaters are Covent Garden (the Royal Opera House), opened in 1858; Her Majesty's Theater, Haymarket, the historic Drury Lane, the Haymarket, the Princess', the Lyceum, the Strand, the Adelphi, the Surrey, the Gaiety, the Globe, the Opera Comique, the Pavilion, the Standard, the Vaudeville, St. James', the Savoy, the Avenue, the Comedy, Criterion, Terry's, the Lyric, the Garrick, the Shaftesbury, the Duke of York's, the Prince of Wales', Wyndham's, and the Court. Local theaters are now being built in many of the outlying parts of London. Exeter Hall, in the Strand, is occupied by the Young Men's Christian Association, and is used also for the annual May meetings of the different religious societies. St. James' Hall, remarkable almost entirely for its interior, is chiefly devoted to musical entertainments of a hign class. The Queen's Hall in Portland Place, and the Albert Hall at Kensington, are devoted to high-class music. Hanover Square Rooms were once famous as concert rooms. The Freemasons' Hall in Great Queen street, is well known, and Olympia, at West Kensington, is a large and imposing hall in an extensive area. The Congregational Memorial Hall, and the Agricultural Hall, Islington, the largest covered area in London, are also important erections of this kind. There are numerous music halls in London, where of course the entertainment is not of a very elevated description, though the improvement of late years is marked.

Museums, Galleries, Libraries.—The British Museum, founded in 1753, in Great Russell street, is a spacious and imposing edifice, with a classical façade and sculpture in the pediment, built between 1823 and 1857. It contains an immense collection of books, manuscripts, engravings, drawings, sculptures, coins, minerals, stuffed animals, fossils, preserved plants, etc. and a magnificent collection of ethnographical objects, Egyptian, Assyrian, Etruscan, Greek, and other antiquities. The reading room is a noble building of a circular form, 140 feet in diameter, with a domed roof 160 feet high. An extensive building (about 650 feet long) has been erected in the South Kensington quarter for the accommodation of the natural history collections. The museum of the Royal College of Surgeons, on the S. side of Lincoln's Inn Fields, a rather handsome building, contains a magnificent collection of human skulls from all parts of the world, and many curious surgical preparations. The Soane Museum, on the N. side of Lincoln's Inn Fields, possesses many valuable objects, consisting of books, paintings, prints, MSS., drawings, maps, models, plans, etc. The Dulwich College gallery contains many interesting pictures left by Alleyne, the contemporary actor of Shakespeare's age. The great South Kensington or Victoria and Albert Museum contains most valuable collections, carefully arranged for purposes of instruction, in connection with which are the schools and

London

headquarters of the Department of Science and Art. Museums have also been established at Bethnal Green and in South and North London, and quite recently Hertford House, with its priceless art treasures, the gift of Sir Richard Wallace, and the Horniman Museum at Forest Hill, the gift of P. J. Horniman, have been added to the London museums. The chief picture gallery in London is the National Gallery, on the N. side of Trafalgar Square. It contains about 1,200 paintings, acquired partly from donations, partly by purchase. The National Portrait Gallery is a collection of over 1,100 portraits, busts, and medallions brought together since 1858. For this collection a new building besides the National Gallery has been provided by private munificence; and the Tate Gallery of British Art, on the Thames Embankment has been similarly acquired. The Royal Albert Hall of Arts and Sciences, a memorial to the late prince consort, is a huge building between the Horticultural Gardens and Kensington road. It was erected for the purposes of science and art, musical performances, exhibitions, etc. It is chiefly used for concerts and is capable of accommodating an audience of 8,000, while the orchestra itself accommodates 1,000 performers. The building also contains a picture gallery. In Hyde Park, immediately opposite this building, is the Albert Memorial. The N. wing of Burlington House, Piccadilly, has been granted to the Royal Academy and a suite of rooms built in the rear of it for exhibitions. The E. and W. wings of Burlington House are occupied by various learned societies, the Royal Society, the Society of Antiquaries, and others. Near the South Kensington Museum and the Albert Hall is the building formerly used by the Imperial Institute, and now adapted for the London University. Besides the British Museum library, the chief libraries are: Lambeth Palace library, the Guildhall library, Sion College library, the London library (subscription), London Institution library, and in addition large circulating libraries and many free public libraries supported by taxes.

Places of Popular Resort.— There are various places of popular resort in London. The Exhibition at Earl's Court, a vast open-air entertainment accompanied by exhibits of special descriptions arranged in courts and buildings within the grounds, is the largest. Olympia at Kensington is of less magnitude. The Zoölogical Gardens and the Botanical Gardens, both in Regent's Park, are very largely frequented. The People's Palace, established by contributions of the benevolent, in the East End of London (Mile-end road), and opened in 1887, provides a hall for concerts and other entertainments, a library and reading rooms, swimming baths, gymnasiums, social meeting rooms, winter garden, technical schools, etc., its object being the moral and intellectual improvement of the working classes of East London. Outside London there are other places of this description. The most important is the Crystal Palace at Sydenham. It was formed to a considerable extent of the materials of the exhibition building of 1851, removed from Hyde Park. The nave has an arched roof, and there are three transepts, the center one 120 feet wide and 194 feet high. The building, which is situated in extensive grounds, is 1,608 feet in length. It was originally designed as a great educational museum of art, natural history, and ethnology; and its gardens and fountains were to rival or surpass those of Versailles. This intention has not been carried into effect, but the finest collection of casts of architectural ornament and sculpture in the world was brought together chiefly by Owen Jones and M. Digby Wyatt, who designed the principal "courts"— Egyptian, Greek, Roman, Alhambra, Byzantine, Mediæval, Renaissance, and Italian — and arranged the specimens in them. There is an orchestra, extending over the entire breadth of the center transept, and for years music has taken an important place in the arrangements of the palace. Entertainments of merely amusing character have also been largely introduced. A somewhat similar building is the Alexandra Palace, occupying a conspicuous site on Muswell Hill on the N. Then there are Kew Gardens on the W., and Hampton Court Palace and grounds, built by Cardinal Wolsey and enlarged by William III., further out toward the S. W.

Scientific Associations, etc.— Associations for promoting science, art, learning, etc., are exceedingly numerous. We can only mention: The Royal Society, Burlington House, founded in 1660; the Society of Antiquaries, in the same building, originally founded in 1572; the Royal Academy (of painting, etc.), in Trafalgar Square, founded in 1768; the Royal College of Physicians, founded by Linacre, physician to Henry VIII., in 1518; the Royal College of Surgeons; the Royal Geographical Society, with a choice geographical library and large collection of maps; the Institution of Civil Engineers; the Royal Institute of British Architects, possessing a good library of architectural works; the Royal Institution of Great Britain, established in 1799; the Royal Horticultural Society, which possesses the botanic gardens in Regent's Park, as also at South Kensington and at Chiswick; the Royal Astronomical Society; the Royal Asiatic Society; the British Association; the Zoölogical Society, with its collection of animals in Regent's Park; the Geological Society, and the Anthropological Institute.

Educational Institutions.— At the head of these stands the University of London, with which are associated University College and King's College. This has now been made by act of Parliament a teaching university. It embraces besides the two above-named colleges, the Inns of Court, the various medical schools attached to the hospitals, the London School of Economics, and other institutions, and promises to become the foremost scientific university in the kingdom. Other institutions are denominational colleges for theology (in some combined with general education); the Royal Naval College, Greenwich; the Royal Military Academy, Woolwich; the Royal College of Science; the medical schools attached to the hospitals; Royal Academy of Music; Royal College of Music; Trinity College, chiefly for music; several colleges for ladies, etc. Among the grammar and secondary schools are: St. Paul's School, founded in 1509, which provides a free education for 153 boys, the most advanced of whom are sent to Oxford and Cambridge, with exhibitions of about £50 to £120; the Merchant Tailors' School (now in the Charterhouse School Buildings), founded in 1561, which furnishes a very efficient education gratis to 100 boys, and to 150 others at low fees, and has 43 scholarships at Oxford University and 7 at Cambridge; Christ's Hospital (1552); Westminster School, founded by Queen Elizabeth in 1560; University College School, King's College School, City of London School, Mercers' School, and schools of the several city companies. Besides the above and numberless private schools, there are the City and guilds institutions for technical education, many high schools for girls, many free schools, numerous schools of the National Society, and more than 400 schools of the London School Board. Several polytechnics and centers of technical education have been equipped and supported by the London county council, who have also established a system of county scholarships for students, which promises to be of great value.

Hospitals and Charitable Institutions.— London abounds with hospitals for the cure of disease, as well as other charities. Among these are the three great endowed hospitals: St. Bartholomew's Hospital, in West Smithfield; Guy's Hospital, Southwark; and St. Thomas' Hospital, Lambeth, occupying a large and splendid range of buildings on the Thames Embankment opposite the Houses of Parliament. Others are: The London Hospital, St. George's Hospital, the Middlesex Hospital, Westminster Hospital, Charing Cross Hospital, King's College Hospital, University College Hospital, St. Mary's Hospital, and Royal Free Hospital. There are medical schools attached to all the above institutions. Other general hospitals are: The Great Northern Hospital, the West London Hospital, and the Metropolitan Hospital; besides the German Hospital, Dalston; hospitals for special diseases, as consumption, fever, cancer; hospitals for women, for children, etc. Bethlehem Hospital (Bedlam), in St. George's Fields, S. of the river, is the chief hospital for lunatics; St. Luke's Hospital is also for insane patients. The Foundling Hospital is rather an asylum for illegitimate children generally than a hospital for foundlings. Chelsea Hospital and Greenwich Hospital are institutions by themselves.

Cemeteries.— Extramural interment is of very recent date. Kensal Green Cemetery, in which several royal personages have been buried, was opened in 1832; it occupies about 48 acres of ground, and is tastefully planted and laid out. The cemeteries at Kensal Green, Brompton, the Tower Hamlets, Bethnal Green, Nunhead, and Norwood are the only intramural places in which interments are permitted, excepting in the case of interments in St. Paul's and Westminster Abbey; and some of the cemeteries named would now be closed were they not provided with their special acts. At the Woking Cemetery, which occupies above 2,000 acres, the poor of several of the London parishes are buried, special railway accommodation being provided for cemetery traffic. Some of the parishes, as Marylebone and St. Pancras, and Paddington, have their own cemeteries. The City of London Cemetery is at Ilford, in Essex, and other cemeteries are also situated outside.

Means of Conveyance.— The London population commands two systems of locomotion, namely, internal and external. The former has reference to the purely London requirements, and is by means of omnibuses, cabs, tramways, steamboats, and railways; the latter has reference to the connection of London with the rest of the kingdom and the Continent, and is by canals, railways, and the Thames. The internal traffic of London has now become nearly overwhelming. There are 12,000 cabs, 3,000 omnibuses, 1,200 tramway cars, besides the Metropolitan, the Metropolitan District and the Electric Railway systems, and the local systems on other lines. These are extending in all directions. The number of passengers in one year traveling by omnibus is nearly 200,000,000, and by tramways nearly 300,000,000. But side by side with all this activity along the roadways, the Thames has almost been allowed to drop out of existence as a local travelers' route, for though small steamers ply from wharfs and piers between Kew and Woolwich, the service is at present altogether inadequate. The principal railway stations

London

are: The Great Eastern, Liverpool street, Bishopsgate; the London and Northwestern, Euston Square; North London, Broad street; Great Western, Paddington; the Great Northern, King's Cross; Midland, St. Pancras; Great Central, Marylebone; Southeastern, London Bridge, where there is a congeries of stations, Charing Cross and Cannon street; London, Chatham, and Dover, Ludgate Hill, and Victoria; the London, Brighton, and South Coast railway, Victoria and London Bridge; the Southwestern, Waterloo Bridge. Many of these stations communicate by the Metropolitan and District railways, distinct systems, but both popularly known as the "Underground," affording means of internal communication within the city. Many of the termini are elaborate piles of costly architecture, and have associated with them large and handsome hotels. The Thames affords communication by steam vessels with the most important points on the British and Continental coasts, as well as with all parts of the world.

Markets.— These are numerous, but have generally little to attract either in external beauty or in internal arrangement. The principal ones are: Billingsgate for fish; the Borough Market, Southwark, and the famous Covent Garden for vegetables, fruit, flowers, and plants; Leadenhall for poultry, game, etc.; Deptford for foreign cattle; Smithfield for fresh meat, poultry, and fish; the Islington cattle market, in the Caledonian road. The Spitalfields market and the Woolwich market, for vegetable products, are included in the public markets. But London is very inadequately provided. The city corporation own all the largest markets, and exercise charter rights to prevent others being erected. The result is that all retail markets are in the hands of costermongers, who line many of the most prominent of the public thoroughfares with their barrows and portable stalls, and who are under no public control as to the produce they sell.

Hotels.— The Grand Hotel, Trafalgar Square, occupying part of the site of old Northumberland House; the Victoria Hotel and Hotel Metropole in Northumberland avenue; the Hotel Cecil in the Strand; the Savoy Hotel on the Embankment; the Carlton Hotel at the corner of the Haymarket; and De Keyser's immense hotel at Blackfriars, are the most important and attractive. There are large hotels at Charing Cross and Canon street in connection with the Southeastern railway, at St. Pancras in connection with the Midland railway, and at Marylebone in connection with the Great Central railway, the last named being the largest and one of the handsomest in London. Also associated with railways are the Great Western hotel at Paddington; the Great Northern hotel at King's Cross; the Grosvenor hotel at Pimlico. Other large hotels are the Langham hotel, Portland Place; the Westminister Palace hotel in Victoria street; the Salisbury hotel, in Salisbury Square, Fleet street; the First Avenue, near Gray's Inn; and the famous Ship hotel at Greenwich, where the ministerial whitebait dinner used to be held. But indeed hotels in London are being erected almost everywhere. The greater part of the E. side of Russell Square has been pulled down in order to build the Russell hotel.

Manufactures.— It would be almost endless to specify the different kinds of articles manufactured in London. It contains the largest breweries, distilleries, and sugar refineries in the kingdom; was long the principal seat of silk weaving; has extensive manufactures in metal, including machinery of all kinds, plate, jewelry, watches, and brass work and an enormous production of books and prints. Millinery, the making of clothes and of boots and shoes are also extensive branches of industry. Besides these, there are cabinet making, coopering, coach building, leather working, hat making, shipbuilding, rope making, mast making, etc., all of which are departments of manufacture conducted on a large scale; and there are numerous extensive chemical works, soap manufactories, and dye works.

Commerce, Docks, etc.— The port of London extends from London Bridge to the Nore and is divided into the Pool, Limehouse Reach, Greenwich Reach, Blackwall Reach, etc. It is under the care of the corporation of the city for sanitary purposes, under the Thames Conservancy for navigation and under all sorts of other authorities for various other purposes. It is probably the worst managed port in the world. The docks, some of which are of great extent, are surrounded by wharfs, sheds, storehouses, vaults, and warehouses of the most spacious kind. St. Katherine's docks, London docks, the West India docks, the East India docks, and the Millwall docks (in the Isle of Dogs) extend along the N. side of the river at intervals from the Tower to Blackwall; and on the S. side, between Rotherhithe and Deptford are the Surrey Commercial docks. The tide rises 18 feet at springs and 14 feet at neaps at the London docks; and the depth at low water, spring tides, on the outer sill of St. Katherine's docks is 10 feet. The largest of these older docks is the West India import dock, 2,600 feet long and 500 broad. The dock accommodation of the port was greatly increased by the construction of the Victoria and Albert docks, which follow next in order on the N. side of the river (opposite Woolwich) and have a combined length of 2¾ miles, with a water area of 175 acres. The Victoria dock was opened in 1855, the Albert dock in 1880. The depth

London

over the sill of the E. entrance of the latter at high water is 30 feet. Besides these, there are now the splendid docks at Tilbury, on the Essex shore opposite Gravesend, constructed for the purpose of admitting the largest vessels at any state of the tide. Here there are a tidal harbor, graving dock, 3 miles of quays, sheds covering 20 acres, etc. The vessels belonging to the port in December, 1900, numbered 1,252 sailing and 1,653 steam; aggregate tonnage, 1,716,616 Its exports of British and foreign produce in 1900 amounted to £91,502,-552; the imports to £175,901,307. Out of 11,118 vessels that entered in the foreign and colonial trade in 1900, 5,999 were British, 1,343 Dutch, 1,133 Norwegian, 1,003 German, 444 Swedish, 369 Danish, 353 Belgian, 156 French, 124 Russian, 83 Spanish, 27 Italian, 22 Austro-Hungarian, 62 United States, the total of all foreign vessels being 5,119. For East and West India produce London is the great port; tea, sugar, tobacco, wine, corn, timber, tallow, hides, wool, and drugs form large items.

The amount of customs revenue received in 1900 was £11,388,560. The value of the imports is over one-third, of the customs revenue about one-half of the whole amount for the United Kingdom.

The following table gives particulars for 1900 of the shipping entering and clearing at the port of London from and to foreign countries and British colonies and coastwise:

1900.	Entered.			Cleared.		
	Sailing.	Steam.	Tonnage.	Sailing.	Steam.	Tonnage.
Foreign.....	1,443	7,965	7,153,531	1,113	6,219	5,636,433
Colonial.....	523	1,187	2,427,323	235	536	1,483,240
Coasting.....	4,094	10,602	5,972,147	5,609	12,686	7,827,763
Total	6,060	19,754	15,553,001	6,957	19,441	14,947,436

Support and Growth of the Population.—The vast size of London makes it a question of unusual interest how its enormous population is supported. London enjoys the double advantage of being the capital and a seaport on one of the largest rivers of the greatest trading nation in the world. One of the earliest sources of its prosperity was its commerce, and this alone would probably have made it a great city, though not the city it has become. London is at present, first of all, the monetary capital of the world; the extent of its commerce in other respects may be estimated from the statistics already given. It would be a mistake, however, to suppose that the commerce of London contributes to the actual support of its population in anything like a direct proportion to its apparent magnitude. For a large part of the enormous traffic which passes through it London is a mere entrepôt and its toll upon it must be light or the traffic would be altogether diverted. The docks and shipping trade are sources of revenue immediately connected with commerce and much more exclusively local. The manufactures are also a source of revenue strictly local and of an extent which cannot easily be estimated. There are large districts, such as the greater part of East and South London which from the extent of their manufactures are alone sufficient to support a considerable working class population. But besides this there are special occupations centered in London which support a large number of people. Thus it is the center of all legal work and it is also the center of the medical profession. Finally the growth of very large retail firms, such as Whiteley's, Shoolbred's, the civil service stores, Maple's, and so on, has caused the employment of an enormous number of people in London, as, owing to increased facilities for transmission of goods by post and by carriage, these firms now supply places at considerable distances in the country which were formerly supplied by local industries. Indeed, the concentration of retail trades in London is one of the most remarkable features of the age and has done more to enhance the prosperity of the capital than even the development of its normal commercial enterprise. As in every large town there are numerous occupations which a small town will not support, so in the largest of all there is the largest number of such trades. As the seat of the court and Parliament, London possesses a source of revenue of the highest importance and of extraordinary elasticity. The immediate expenditure of the court and legislators would be nothing; but their presence attracts the wealthier classes from all parts of the country, thus making London the chief center of expenditure in the kingdom. This gives the shopkeepers and warehouse men of London a preëminence which enables them to draw to the metropolis the manufactured products of all parts of the kingdom, to be thence distributed as from a central depot. The number of casual visitors and of foreign residents with means elsewhere who are attracted to London is another great source of revenue to the London shopkeepers. Finally art, literature, and science find their chief center in London and all who are interested in them flock thither; while printing, publishing and all the cognate trades also center here. The counteracting forces by which the prosperity of London is limited are to be found

London

in the very conditions of its growth. It owes its preëminence to being the capital of a commercial country. Commerce lives by competition and London has already numerous competitors among the other large cities of the kingdom. The centrifugal force which in all large cities drives population from the center operates in London with its maximum intensity, but even by yielding to it, the enhanced expense of living in so great an aggregate of population is not evaded. The price of ground, the average of wages and all the elements of expense in commerce and manufactures are high in London which is thus weighted in the race of production and has in many particular industries lost ground already against many more lightly equipped antagonists.

Government of London.— The most ancient civic officer of London is the lord-mayor of the city of London. He is annually elected from among the aldermen who have been sheriffs of the city, on Sept. 29 and installed in office on Nov. 9, when a procession takes place, called the lord-mayor's show. The court of aldermen consists of 26 members, including the lord-mayor. They are chosen for life by the taxpayers of the 26 wards into which the city is divided, each being the representative of a separate ward. They are properly the subordinate governors of their respective wards, under the jurisdiction of the lord-mayor and preside over the business in the courts of Wardmote. The civic sheriffs, two in number, are annually chosen by the livery or general assembly of the freemen of London. The common council is a court consisting of 206 representatives returned by 25 of the wards in proportion to their relative extent; the 26th, or Bridge Ward Without, being represented by an alderman. The general business of this court is to legislate for the internal government of the city, its police, revenue, etc. The recorder is generally a barrister of eminence, appointed for life by the lord-mayor and aldermen as principal assistant and adviser to the civic magistracy and one of the justices of oyer and terminer. The "livery" of London is the aggregate of the members of the several city companies, of which there are 75. Of these, 12 are termed great companies and from one or other of them the lord-mayor was formerly chosen. In order of precedence they are: The Mercers, Grocers, Drapers, Fishmongers, Goldsmiths, Skinners, Merchant Tailors, Haberdashers, Salters, Ironmongers, Vintners, Clothworkers. Many of the companies are very rich and possess large halls. Besides the ancient city of London there are now constituted, under the act of 1899, 28 new boroughs, each of which for local purposes is governed by a mayor, aldermen, and council. These boroughs are Westminster, Kensington, Chelsea, Fulham, Hammersmith, Paddington, Marylebone, Hampstead, St. Pancras, Islington, Holborn, Stoke Newington, Hackney, Shoreditch, Finsbury, Bethnal Green, Stepney, and Poplar, N. of the Thames; Wandsworth, Battersea, Camberwell, Lambeth, Southwark, Bermondsey, Greenwich, Deptford, Lewisham, and Plumstead, S. of the Thames. The governing authority for the entire county of London is the county council which consists of the chairman of the council, 19 aldermen and 118 councillors, the latter being elected by the taxpayers of the several divisions, which are, however, not coincident with the boroughs. There are also two other governing bodies for the county, the School Board and the Metropolitan Asylums Board, the former elected by the taxpayers, the latter by the Boards of Guardians.

The Police.— The city police, confined to the city proper, is administered by the city corporation as a municipal force and numbers about 900 men. The metropolitan police is not municipal. It is administered by a commissioner appointed by the Home Office. It consists of over 15,000 men, whose central offices are New Scotland Yard, a massive building on the Embankment near Westminster bridge. Its area of jurisdiction extends for 15 miles from Charing Cross and therefore considerably beyond London.

History.— Though, by the evidence of its name and by archæological remains, London was occupied by the Celtic Britons before the arrival of the Romans, it was not till the Roman era that it became a place of importance. There were probably two Roman Londons: the first destroyed by Boadicea and probably consisting of the area extending from near the Tower on the E. by the course of the Langbourne (now preserved in Langbourne ward) on the N., by the course of the Walbrook on the W. and the Thames on the S.; the second probably coincident with the mediæval walled city. The Roman walls were destroyed by the Danes and were restored by King Alfred. After the Romans left Britain, London assumed a certain amount of independence and throughout the Anglo-Saxon period it appears to have supported the monarch who was acceptable to the rest of the kingdom. Alfred was the first king of the Anglo-Saxons who thoroughly understood the importance of its military position. It suffered by fire in 764, 798, and 801. It was sacked by the Danes, who obtained a considerable settlement in Southwark and on the W. boundary of the city beyond the Ludgate. At the Conquest, London treated with and finally submitted to William. William's first act was to dominate the city by building his military stronghold, the beginnings of the Tower of London. He then granted the city its ancient rights by a charter, which is still preserved; on

London

the accession of Henry I. a new charter was granted and the charter grants increased considerably under the Plantagenets, while its municipal privileges were made the standard for governing many of the municipal boroughs in the provinces. London sided with Stephen against Matilda, took part in the struggle against John for Magna Charta, was severely oppressed by Henry III., strongly supported by Edward IV. and the Yorkist party in the Wars of the Roses, and was faithful to Richard III.; it equipped and dispatched ships to the navy collected to fight the Spanish Armada, and its citizens, officered by the aldermen of the city, fought for the parliamentarian side against Charles I. Under the later Stuarts and the Georges it become more political than municipal and lost much of its ancient power. In the reign of Henry II. the walls on both sides of the river are described in a contemporary account as supplied with numerous towers. London Bridge, erected instead of a wooden one, was begun in 1176 and finished in 1209. This was to a great extent the same that was taken down in 1832. In 1218 the forest of Middlesex was cleared, and that portion of London N. of the city began to be built. In the year 1328 the village of Southwark was incorporated with the city, as it had previously served as a place of refuge for malefactors. In 1349 and 1361 London was visited by the plague. In 1381 broke out the rebellion of Wat Tyler, who fell by the hands of the lord-mayor, hence the dagger on the city arms. In 1416 street lamps were introduced; in the same century some of the principal streets were paved, and wooden houses began to be replaced by others of brick. In the next century improvements were continued, and Westminster was connected with the city by a row of noblemen's mansions along the river, the last of which, Northumberland House, has made way for the road leading from Trafalgar Square to the Embankment. In the 17th century, Spitalfields was covered with houses, and the space N. of the Strand as far as Holborn, and from Temple Bar to St. Martin's Lane was extensively built on, as well as the neighborhoods of Charing Cross and Pall Mall. The New River was completed and many houses were supplied with water; sewers were dug; smooth pavements were laid down for passengers, and hackney coaches came into general use. But the streets were so narrow and dirty and the houses in so filthy a state that the city was scarcely ever exempt from the plague, which sometimes committed great ravages. In 1666 the great fire broke out and spread over 336 acres, destroying 13,200 houses, 90 churches, and many public buildings. In rebuilding, considerable improvements were introduced, and a fire in Southwark 10 years after gave a similar opportunity of improving that district. Population and trade now rapidly increased, partly from the immigration of French Protestants driven from their country by the revocation of the edict of Nantes. In the 18th century London steadily advanced in extent, prosperity and splendor. In 1780 took place the Gordon riots, when the mob was in possession of London for two days and committed frightful havoc. Since that disgraceful outbreak the peace of London has never been seriously endangered, and the troops stationed in and around the capital, together with the effective police force that now exists seem quite adequate to ensure it against any similar disturbance. The extension and improvements which have taken place in London during the 19th century are still greater than at any former period and further changes of great importance are now in operation. The most remarkable event of the century in the history of London was the carrying into effect in 1851 of the first great truly international industrial exhibition, which has since led to numerous exhibitions of a similar kind both there and abroad. In 1862 took place the second great international exhibition, and since that time various exhibitions of an international character and largely representing the colonies have been held in specially constructed buildings at South Kensington. The history of London contains, indeed, many episodes of vast importance to the nation as well as to London itself. It is now braced together for government as it has never been before and it will have to face problems of vast moment. As the largest, most populous, and richest city that civilization has ever produced, the study of its history and its development must ever be of great importance and interest.

The following shows the population in 1891 and 1901 of the city of London and the metropolitan boroughs within the county of London:

	Population.	
Metropolitan Boroughs.	1891.	1901.
City of London	37,705	26,908
Battersea	150,166	168,896
Bermondsey	136,014	130,486
Bethnal-green	128,929	129,681
Camberwell	233,706	259,258
Chelsea	72,954	73,856
Deptford	101,749	110,513
Finsbury	109,981	101,476
Fulham	91,790	137,289
Greenwich	78,514	95,757
Hackney	199,606	219,288
Hammersmith	97,283	112,245
Hampstead	68,126	81,902
Holborn	66,778	59,390
Islington	319,155	334,928
Kensington	170,071	176,623
Lambeth	278,393	301,873
Lewisham	88,933	127,460
Paddington	135,955	143,954
Poplar	166,880	168,838
St. Marylebone	144,083	133,329
St. Pancreas	234,749	235,284
Shoreditch	124,737	118,705

London

	Population. 1891.	1901.
Southwark	202,479	206,128
Stepney	285,116	298,548
Stoke Newington	47,988	51,247
Wandsworth	155,524	232,039
Westminster, City of	201,969	182,977
Administrative County of London	4,228,317	4,536,063

London, a city of Ontario, Canada, a port of entry, and the county-seat of Middlesex co.; on the N. and S. branches of the Thames river, and on the Grand Trunk, Canadian Pacific, Père Marquette, and Michigan Central railways, 115 miles W. S. W. of Toronto, the capital of the province. The Père Marquette and Michigan Central enter London over the London and Port Stanley railway, which is owned by the city, and this connection makes London practically a lake port. It is situated in one of the finest agricultural districts of the Dominion, and is the distributing and wholesale center of southwest Ontario. Dundas and Richmond are the principal business thoroughfares; Queens avenue, King street, and Grand avenue are three of the twenty or more leading residential streets, which are wide, laid out at right angles to each other, and well supplied with shade trees, which have given to London the name of "Forest City." Many of the streets and bridges have the same names as those of the great English capital; for example, Pall Mall, Regent street, Oxford street, Piccadilly, Blackfriars, Westminster. Victoria park, fourteen acres in extent and handsomely laid out, is almost in the center of the city; Queens park, in the E. end, has an area of about forty acres, and contains the large buildings in which an annual fair is held; Springbank park, of 272 acres, is nearly five miles distant on the Thames river.

Buildings and Institutions.—The principal buildings are the post office, public library, armories, Grand Opera House, Roman Catholic and Anglican cathedrals, and buildings in which the leading banks and educational and charitable institutions are housed. The two latter include the Western University, attended by about 200 students, and having medical, arts, and divinity faculties and departments; a provincial normal school, the Collegiate Institute, Entomological Society, Victoria and St. Joseph hospitals, an orphans' home, an asylum for the insane, the Hygienic Institute, Home for Incurables, Convalescent Home, Women's Shelter, Home for Aged People, etc. There are about 50 churches, many of them of attractive architecture, and Young Men's Christian Association and Young Women's Christian Association buildings. Journalism is represented by the "Free Press" and "Advertiser," both dailies with weekly editions, and four weekly newspapers. A United States consul resides here.

Industry and Commerce.—The principal industrial establishments include engine, stove, soap, and boiler works, breweries, tanneries, packing houses, foundries and machine shops, and manufactories of tobacco and cigars, chemicals, structural iron, wire, confectionery, canned goods, organs, show cases, boots and shoes, carriages and wagons, brass goods, threshing machines, brushes, etc. In 1906 the value of manufactured goods, according to the Dominion census, amounted to $12,626,844, as compared with $8,122,185 for 1901, an increase of 55 per cent. The Grand Trunk railway has shops here employing 400 men. There are fifteen chartered banks. In 1907 steps were taken for the transmission of electricity from Niagara falls for manufacturing and lighting purposes. Pop. (1901) 37,981; local est. (1909) 41,500. The site of London was laid out in 1826.

London, a village of Ohio, the county-seat of Madison co.; on the Pittsburg, Cincinnati, Chicago, and St. Louis, and the Cleveland, Cincinnati, Chicago, and St. Louis railroads, 25 miles southwest of Columbus. It is the trade center of a rich agricultural region, and has large shipments of farm products and live stock. It also has manufactures of lumber, agricultural implements, carriages, tile, galvanized iron, etc. The electric light plant is owned and operated by the municipality. Pop. (1890) 3,313; (1900) 3,511.

London, Conferences of, diplomatic meetings in London, at the first of which (1827) a treaty relating to the affairs of Turkey and Greece, and that led to the establishment of the kingdom of Greece, was signed by England, France, and Russia; the second (1830-31) recognized the independence of Belgium, and provided for the separation of that country from Holland; the third (1840), in which France declined to participate, dealt with Turko-Egyptian troubles, and resulted in confining Mehemet Ali to his viceroyalty in Egypt and compelling him to restore Syria and Crete, which he had previously acquired, to the Sublime Porte. At another conference (Aug. 2, 1850) the powers united in signing a protocol affirming the integrity of the Danish monarchy; at another (May 8, 1852) a protocol was signed in reference to the Danish succession; and at the next conference (May 11, 1867) the neutralization of the duchy of Luxemburg was guaranteed by the five powers represented.

London, Jack, an American author; born in San Francisco, Cal., Jan. 12, 1876. Before finishing his education at the University of California, he left for the Klondike, which stimulated his love of adventure and out-of-door life. He went to sea before the mast in 1892, and subsequently tramped through various parts of America, making a study of conditions and people. He wrote: "The Son of the Wolf" (1900); "The Chil-

dren of the Frost" (1902); "The People of the Abyss" (1903); "The Sea Wolf" (1904); "The War of the Classes" (1905); and "Tales of the Fish Patrol" (1905).

London, University of, an institution of learning in London, England; originally established as a joint-stock undertaking in 1825. In 1836 two charters were granted, one to a university retaining the name of London University, and having power to examine and grant degrees, another to a teaching body occupying the original premises at Gower street, which took the name of University College, and now prepares students for obtaining the degrees conferred by the university. In 1900 the university was reorganized so as to be a teaching as well as an examining body, with twenty-six colleges, or schools giving instruction in eight faculties. New and supplementary charters were granted in 1858, 1863, and 1878, the last admitting women to all degrees and prizes granted by the university. The university corporation, whose seat is in Burlington Gardens, consists of a chancellor, vice-chancellor, fellows, and graduates. The fellows are 36 in number, appointed by the crown or the senate, which consists of the chancellor, vice-chancellor, and fellows. The senate is the governing body and has charge of the property. The university admits as candidates for examination any person who is above 16 years of age, and confers degrees in all departments of knowledge except theology, including the degrees of Bachelor, Master, and Doctor, in Arts (or Literature), and Bachelor and Doctor in Laws, Science, Medicine, and Music. Provincial examinations are carried on simultaneously with the London ones in a number of different towns. The university sends a representative to Parliament.

London Clay, in geology and palæontology, a formation of the Lower Eocene age; so called from its existing at or near London, England. It consists of a tenacious brown and bluish-gray clay, with layers of concretions called septaria.

London Company, one of two branches of a joint-stock company established in London in 1606 with the object of planting two colonies in America, this branch being known as the London or Virginia Company, the other as the Plymouth or North Virginia Company. The territory allotted to the London Company lay between lat. 34° and 38° N. On Dec. 19, 1606, an expedition with a small company under command of Captain Newport sailed from England, and in May, 1607, founded Jamestown.

Londonderry, a city of Ireland, the capital of the county of Londonderry, in the province of Ulster; a seaport, county borough, and assize town; situated on the W. side of the river Foyle, 23 miles from its mouth and 124 miles by rail N. N. W. of Dublin. It contains, within the walls, four main streets, which cross at right angles, and form, with the smaller streets and lanes, a sort of parallelogram; the old walls, flanked with bastions, which were built in the year 1614, still remain in fine repair, and are an ornament to the place. Its principal buildings are the cathedral, a Gothic structure, built in the year 1633, and having a tower and a spire 178 feet high; a bishop's palace, a deanery, various places of worship, schools, a mechanics' institute, jail, an infirmary, a small theater, a linen-hall, town hall, district lunatic asylum, union workhouse, custom house, and barracks; there is also a Doric column, surmounted by a statue, erected in honor of the Rev. G. Walker, who defended the city during its memorable siege. It has an extensive trade with the West Indies and the United States; the harbor is deep, wide, and tolerably secure. This town is of great antiquity, and has often suffered from the effects of war. In 1689 it was besieged by King James II. from April 21 till August 1, when the siege was raised. The defense here made by untrained men against superior numbers is regarded as one of the most heroic and successful military actions of modern times. Pop. (1901) 39,892.

Londonderry, Charles William Stewart, Marquis of, a British military officer and diplomat; born in Dublin, Ireland, in 1778. Served under Sir R. Abercrombie, and under Sir John Moore and Sir A. Wellesley, in the Peninsula; was English ambassador at Vienna, and minister-plenipotentiary at its Congress. By his marriage with Miss Vane he succeeded to immense estates in Durham, and devoted himself to their improvement and to the welfare of his tenantry. He wrote the "Story of the Peninsular War" and some other works. He died in 1854.

Londonderry, Robert Stewart, Marquis of, an Irish statesman; born in Ulster, Ireland, June 18, 1769. He distinguished himself in the Irish Parliament; and, on his father's creation as Earl of Londonderry, became Viscount Castlereagh. As such he took a prominent part in Irish politics, and especially in the matter of the Union, after which he represented his native county, Down, in the Imperial Parliament. Under Pitt he became secretary of war, fought a duel with Canning, and became secretary for foreign affairs. He, as well as his brother Charles, represented England at the Congress of Vienna. He died in Foots Cray, Kent, England, Aug. 12, 1822.

London Pride, *Saxifraga umbrosa*, particularly the sub-species, and a variety of the same specific name. The plant of itself, which is wild in the W. and S. W. of Ire-

land, and naturalized in some other parts of Great Britain, has coriaceous leaves and panicled cymes of small white flowers, speckled with red. The variety has the leaves compactly rosulate, oblong, ovate, crenate. Called also None-so-pretty, Pretty Nancy, and St. Patrick's Cabbage.

Lone Star State, The, Texas; the name being derived from the device on its coat of arms.

Long, Loch, a beautiful Scottish sea-loch, striking off from the Firth of Clyde, 17 miles N. N. E. between the counties of Argyll and Dumbarton, and 3 furlongs to 2 miles broad. It sends off Loch Goil; is flanked by steep and fantastic mountains, 2,000 feet high; and at Arrochar, near its head, approaches to within 1¾ miles of Tarbet on Loch Lomond. A railway from Helensburgh to Fort William, commenced in 1889, skirts its E. shore. Since 1862 the loch has been defiled with the dredgings from the Clyde at the rate of 1,250,000 tons a year.

Long, Chaillé. See CHAILLÉ-LONG.

Long, Crawford W., an American physician; born in Danielsville, Madison co., Ga., Nov. 1, 1815. He was one of the claimants of the discovery of the use of anæsthetics in surgical operations. He died in Athens, Ga., June 16, 1878.

Long, Edwin, an English painter; born in 1839. Among his more important works were: "Babylonian Marriage Market" (1875); "An Egyptian Feast" (1877); "Gods and Their Makers" (1878); "Esther and Vashti" (1879); "Why Tarry the Wheels of His Chariots?" (1882); "Judith, Thisbe, Anno Domini" (1884); "Calista the Image Maker" (1887). He was elected to the Royal Academy in 1882. He died in 1891.

Long, Eli, an American military officer; born in Kentucky, in 1835; entered the cavalry branch of the army prior to the Civil War; led charges at Chickamauga, McMinnville, and Farmingham; was wounded at Stone River and Lovejoy Station; captured Salma, Ala.; brevetted Major-General, U. S. V., and Colonel, U. S. A., in 1865. He died Jan. 5, 1903.

Long, Eli H., an American physician; born in Clarence, N. Y., July 24, 1860; was educated in public schools and in medicine at the University of Buffalo; and became Professor of Therapeutics in the latter institution. His publications include "Tables for Doctor and Druggist" (1891); "Pharmacologic Diagrams" (1901); "Dental Materia Medica, Therapeutics, and Prescription Writing" (1903); etc.

Long, George, an English scholar; born in Poulton, Lancashire, England, Nov. 4, 1800. He was educated at Cambridge University. In 1824 he accepted the chair of Ancient Languages in the University of Virginia, United States; but he returned to England in 1828 to become Professor of Greek in London University. He had a share in founding the Royal Geographical Society (1830), and from 1831 took an active interest in the Society for the Diffusion of Useful Knowledge, writing books for its library and editing its "Journal of Education." The great work of his life was the editing (1833–1846) of the "Penny Cyclopædia," to which he was one of the most valuable contributors. Besides this he edited the "Biographical Dictionary" (1842–1844), Knight's "Political Dictionary" (1845–1846), the excellent "Bibliotheca Classica" (Classical Library) series, and many admirable versions of classic authors. He also translated "Selections from Plutarch's Lives," "Thoughts of M. Aurelius" (1862), and "Discourses of Epictetus" (1877), contributed extensively to Smith's Classical Dictionaries, and wrote "Decline of the Roman Republic" in five volumes. He died Aug. 10, 1879.

Long, John Davis, an American statesman; born in Buckfield, Oxford co., Me., Oct. 27, 1838. He received his preparatory education in the common school of his native town and the Hebron academy, Maine; was graduated from Harvard College in 1857; taught two years in Westford academy, Massachusetts; studied law at Harvard Law School and in private offices; was admitted to the bar and has since practised; was a member of the Massachusetts Legislature in 1875, 1876, 1877, and 1878; was speaker of the house during the last three years; was lieutenant-governor of his State in 1879 and governor in 1880–1881, and 1882; was elected to the 48th and reëlected to the 49th and 50th Congresses, and was for several years on the statehouse construction commission of his State; appointed by President McKinley Secretary of the Navy in 1897 and 1901. On the accession of President Roosevelt Mr. Long retained his office for six months, but on March 10, 1902, tendered his resignation, and was succeeded by W. H. Moody, Congressional Representative from Massachusetts.

Long, Stephen Harriman, an American engineer; born in Hopkinton, N. H., Dec. 30, 1784; was graduated at Dartmouth College in 1809, and after teaching school entered the United States engineer corps in 1814. He was engaged for several years in surveys of the country W. of the Mississippi river, as well as of the Upper Mississippi. One of the peaks of the Rocky Mountains bears his name (see LONG'S PEAK). When the construction of the Baltimore and Ohio railroad was commenced in 1827, Long, who had then attained the brevet of lieu-

tenant-colonel, was made chief engineer of its surveys. He introduced many improvements of wooden bridges, so as to adapt them for railroad purposes. In the construction of railroads he introduced a system of curves in locating roads. He served for some years on the board for the improvement of the Mississippi, and in 1856 was placed in charge of that work. He was made Colonel of Engineers March 3, 1863, was retired in June following, and died in Alton, Ill., Sept. 4, 1864.

Longard de Longgarde, Dorothea. See GERARD, DOROTHEA.

Long Branch, a city in Monmouth co., N. J.; on the Atlantic Ocean and the Shrewsbury river, and on the Pennsylvania and the New Jersey Central railroads; 42 miles S. of New York city. Long Branch is one of the oldest and most noted summer resorts in the United States, and has a long beach, affording excellent bathing facilities. The city was once the resort of fishermen and wreckers, but the advantages of its beach and its proximity to New York and Philadelphia gave it its prominent position among summer resorts. In the early part of the administration of President Grant it became popularly known as the "Summer Capital of the United States." President Garfield died in the Francklyn cottage at what is now Elberon, a short distance below the present city of Long Branch. The city has numerous hotels, pleasure resorts, cottages, parks and driveways, and electric railway communication with other New Jersey coast resorts. It has a National bank, public library, public schools, electric lights, and an assessed property valuation of over $11,000,000. Pop. (1890) 7,231; (1900) 8,872; (1910) 13,298, increased during the summer season to over 25,000.

Long Branch of Boston, a name sometimes given to Swampscott, a seaside resort near Lynn, 13 miles N. E. of Boston; has three good beaches, and no undertow. Nahant, a bold promontory to the S., has a beach as hard as a floor. The Chelsea, or Revere Beach, nearer Boston, is a favorite resort of the working-classes. To the N. are Salem, Marblehead, Beverly, Lowell Island, and the famous Singing Beach of Manchester. Farther N. are Gloucester, Rockport, Pigeon Cove, Cape Ann, Newburyport, and Salisbury Beach.

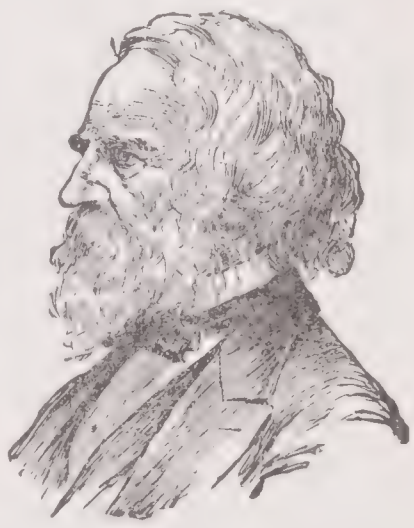
Long Branch of Philadelphia, Cape May, N. J.; it is near the entrance of Delaware Bay, and its fine surf and splendid beach drive are noteworthy.

Longchamps (lôn*g*-sho*ng*'), the racecourse on the S. W. side of the Bois de Boulogne, on the W. of Paris, France, where the race for the Grand Prix ("Grand Prize") is run. It was formerly the custom for the great folk of Paris to drive out in this direction, as far as the old nunnery of Longchamps (founded in 1260), during the week preceding Easter.

Longe. See LUNGE.

Longevity, great age or duration of life. We learn from Scriptures that the lives of the antediluvian patriarchs were greatly extended, Methusaleh having reached the age of 969 years (Gen. v: 27). When Psalm xc. was written, the limits of human life were as they are now. A few instances of abnormal longevity still occur, though a large number of the recorded cases are mythic. During the first few centuries of the Christian era the average duration of life in the most favored classes, was 30 years, while in the present century the average of the same classes is 50 years. Of each 1,000 only 228 medical men live from 63 to 72, and 328 theologians. In the last 50 years the mean term of life seems to have increased from 33 to 41 years. In professions, of those who attain the age of 66, there are found to be 43 theologians, 40 agriculturalists, 35 men in office, 32 military, 32 clerks, 29 advocates, 28 artists, 27 professors, and 24 medical practitioners. The longevity tends to be greater in women than in men.

Longfellow, Henry Wadsworth, an American poet; born in Portland, Me., Feb. 27, 1807; was graduated at Bowdoin College. While at college he distinguished himself in the study of modern languages, and published some short poems, among which was the "Hymn to the Moravian Nuns." In 1826 he accepted the professorship of modern languages at Bowdoin, being allowed three years to prepare himself for the post by study and travel in Europe. In 1833 he published a volume of translations from "Coplas de Manrique," with an essay on the "Moral and Devotional Poetry of Spain"; in 1835 appeared "Outre Mer," a volume of prose sketches, and in the same year he was elected to the chair of modern languages and literature in Harvard University. After spending another year in Europe, studying Scandinavian languages and literature, he entered on his professorship in 1836. In 1839 he published "Hyperion, a Romance," and "Voices of the Night," a series of poems. "Ballads and other Poems," and a small volume of "Poems on



H. W. LONGFELLOW.

Slavery" appeared in 1842; the "Spanish Student," a drama in three acts, in 1843; the "Belfry of Bruges" in 1846; "Evangeline" in 1847. In 1845 he published a volume—"The Poets and Poetry of Europe," containing translations by himself and others from about 360 authors, Danish, Swedish, Dutch, German, French, Italian, Spanish, Portuguese, Anglo-Saxon, and Icelandic, with much valuable information respecting the writers. In 1849 he published "Kavanagh," a tale in idyllic prose; in 1850 the "Seaside and the Fireside"; in 1851 "The Golden Legend"; in 1855 "Hiawatha"; in 1858 the "Courtship of Miles Standish"; in 1863 "Tales of a Wayside Inn"; in 1866 "Flower de Luce"; in 1867–1870 an excellent poetical translation of Dante; in 1869 "New England Tragedies"; in 1871 the "Divine Tragedy"; in 1872 "Three Books of Song" in 1874 "The Hanging of the Crane"; in 1875 "Morituri Salutamus and the Masque of Pandora"; and in 1878 "Keramos." He resigned his chair at Harvard in 1854. In 1868–1869 he again traveled in Europe, and received the degree of LL. D. and D. C. L. from the Universities of Cambridge and Oxford respectively. His poems are equally popular on both sides of the Atlantic. He died in Cambridge, Mass., March 24, 1882.

Longfellow, Samuel, an American clergyman, brother of Henry W. Longfellow; born in Portland, Me., June 18, 1819. He was graduated at Harvard College in 1839. and at the Divinity School in 1846. He held pastorates in Unitarian churches in Fall River, Mass., Brooklyn, N. Y., and Germantown, Pa. Later he settled in Cambridge, Mass. As a hymn-writer he had few equals. Among his works are: "Hymns of the Spirit" (with the Rev. Samuel Johnson), published in 1848; "Life of H. W. Longfellow" (1886); "A Few Verses in Many Years" (1887). He died in Portland, Me., Oct. 3, 1892.

Longicornes (-kor′nēz), or **Longicornia** (-kor′ni-ä), longicorns, a subsection of beetles, section Tetramera. The antennæ are usually longer than the body. They are filiform, tapering, or more rarely hooked or pectinated; the mandibles are large; the thorax and part of the elytra sometimes with spines; the body elongated; the color, as a rule, bright. The longicorns are large beetles, the larvæ of which feed on timber. The perfect insect makes a sound produced by the rubbing of the hind limb of the prothorax over a finely-ribbed prominence on the mesothorax beneath. It is divided into three families: *Prionidæ*, *Cerambycidæ*, and *Lepturidæ*.

Long Island, an island forming part of the State of New York; 115 miles in extent and from 12 to 23 miles broad; area, 1,682 square miles; pop. (1900) over 1,250,000. It is connected with the Borough of Manhattan by four suspension bridges and three tunnels. The island is divided into Kings, Queens, Nassau and Suffolk counties. Kings and Queens counties form part of the city of New York as the Borough of Brooklyn (pop. 1910, 1,634,351) and Borough of Queens (pop. 1910, 284,041), respectively.

Long Island, a name sometimes given to the whole of the Outer Hebrides.

Long Island City, a former municipality and the second city in size on Long Island, N. Y.; since Jan. 1, 1898, a part of the Borough of Queens in the Greater New York. Before the consolidation it comprised Hunter's Point, Ravenswood, and Astoria. It is separated from Brooklyn by Newtown creek, is connected with the Borough of Manhattan by ferries, a bridge, and two tunnels, and contains extensive warehouses, oil refineries, lumber yards, machine shops, and manufactories of carpets, rugs, pianos, jewelry, etc. There are several hospitals, banks, street railroads, waterworks, and newspapers. Pop. (1890) as independent city, 30,396.

Long Island Sound, a large body of water lying between Long Island and New York and Connecticut; length, about 110 miles; width varying from 2 to 20 miles. On the W. it is connected with the Atlantic by a strait called the East River, New York Bay, and the Narrows, and on the E. by a narrow passage called the Race. The principal rivers flowing into the Sound from the mainland are the Housatonic, Connecticut, and Thames. It is in the route of a very large and important trade between the city of New York and the East, and is navigated by numerous regular lines of packets and steamers. There are 15 lighthouses on its coasts.

Longitude, in astronomy, the distance in degrees reckoned along the ecliptic from the spring equinox to a circle at right angles to it passing through the heavenly body whose longitude is required. A star situated directly in the line between the pole of the ecliptic and the vernal equinox has no longitude. In place of celestial longitudes right ascensions are now generally noted. In geography, distance on the surface of the globe. The longitude of a place is the arc of the equator intercepted between the meridian of the place and a meridian passing through some other place from which longitude is reckoned. Longitude, in the United States, is reckoned from the meridians of Washington, Greenwich, and Paris. Longitude is expressed in degrees, minutes, and seconds, or in time, 15° being equivalent to one hour. It is reckoned to 180° E. or W. Heliocentric longitude, in astronomy, the longitude of a heavenly body as reckoned on or re-

ferred to a circle of which the center coincides with that of the sun.

Longius, the Roman soldier who smote Christ with his spear.

Longmynd Group, in geology, the name given by Professor Sedgwick to a series of beds belonging to the Lower Cambrian. They consist of a thick series of olive-green, purple-red, and gray grits and conglomerates. They are divided into the Harlech grits and the Llanberis slates; the former are 6,000 feet thick in the Longmynd Hills, and in parts of Merionethshire yet thicker. They contain a few annelids, trilobites, etc. The latter are found in Carnarvonshire, where they are 3,000 feet thick and contain a zoöphyte, *Oldhamia antiqua.*

Longnon, Auguste Honoré (lông-nyông′), a French historian; born in Paris, France, Oct. 18, 1844. He was a shoemaker, but by diligent cultivation of his rare natural gifts rose to eminence among French scholars. He became Professor of History in the Collège de France, 1892. His principal works are: "Geography of Gaul in the 6th Century" (1878); "Historical Atlas of France" (1884–1889).

Longobardi. See LOMBARDS.

Long Parliament, in English history. a Parliament summoned by Charles I. It met at Westminster, Tuesday, Nov. 3, 1640, and continued its sittings till it was dissolved by Cromwell, April 20, 1653. The journal of this Parliament terminates Tuesday, April 19. It was said of this Parliament that "many thought it would never have a beginning, and afterward that it would never have an end."

Long-range Barometer, a barometer, the upper portion of whose tube is in spiral form, and of diminished diameter. the distance between the coils being usually 12 base to 1 perpendicular, so that each inch rise of mercury in the tube is indicated by an advance of 12 inches in the spiral coil. Another form of long-range barometer is that filled with glycerin instead of mercury, with a tube 27 feet long. This inconvenient length has led to the invention of a combined mercury and glycerin barometer. It consists of two vertical tubes 40 inches in length, and joined at the bottom by a short curve. One, larger in diameter, and closed at the top, is filled with mercury, which extends through the bend and partly into the second tube of less diameter, which is further partly filled with glycerin. The rising and falling of the mercurial column in the large tube, having a lighter fluid to balance, and that dispersed over a larger space by reason of the difference in the diameter of the two tubes, a longer range is obtained, due both to the unequal capacity of the two tubes and the differences in the specific gravity of the two fluids. These barometers admit of minute variations being read without the aid of a vernier. See BAROMETER.

Long's Peak, one of the highest peaks of the Rocky Mountains in Colorado; it is 14,271 feet high.

Longstreet, Augustus Baldwin, an American educator; born in Augusta, Ga., Sept. 22, 1790. He was graduated at Yale College in 1813, studied law at Litchfield, Conn., and was admitted to the bar in Richmond co., Ga., in 1815. In 1822 he removed to Augusta, Ga., and founded the "Sentinel." In 1838 he entered the Methodist Episcopal ministry, and later was president of several Southern universities, chief among them being the University of Mississippi. His works include: "Georgia Scenes" (1840); "Letters From Georgia to Massachusetts." He died in Oxford, Miss., Sept. 9, 1870.

Longstreet, James, an American military officer; born in Edgefield district, S. C., Jan. 8, 1821. He was graduated at the United States Military Academy in 1842. He served with distinction in the Mexican War, participating in the battles of Monterey and Contreras in 1847, and after obtaining his captaincy was brevetted major after the battle of Molino del Rey and the assault on Chapultepec, where he was severely wounded. After serving for some time in Texas, Longstreet was appointed, in July, 1858, paymaster in the regular army, which position he held till the outbreak of the Civil War. Resigning his commission and joining the Confederates, June 1, 1861, Longstreet was appointed to the command of the 4th brigade of General Beauregard's 1st corps, near Centreville, and was present at the defeat of the National army at Bull Run, July 21. During the early part of 1862 he was made Major-General, and earned great celebrity under General Lee, in the campaigns against Generals Pope, McClellan, and Burn-

JAMES LONGSTREET.

side. After the battle of Fredericksburg, Dec. 13, 1862, General Longstreet was given the command of a corps, with the rank of Lieutenant-General. With this force he took an active part in the battles of Chancellorsville (May 2–5, 1863) and Gettysburg (July 1–3); and the gallantry and skillful generalship he displayed on all occasions caused him to be regarded as one of the leading generals in the Confederate army. In the battle of the Wilderness (May 5, 6, 1864), General Longstreet was dangerously wounded, occasioning his retirement for some months from active service. After the fall of Richmond he surrendered, and lived in comparative retirement till 1869, when he was appointed Collector of Customs at New Orleans. Later he was made minister to Turkey, and United States marshal for the District of Georgia. In 1897 he was appointed United States commissioner of Pacific railroads. He died Jan. 2, 1904.

Long Tom, in mining, an apparatus used in California for washing gold from the earth or gravel in which it is found. It consists of a wooden trough, from 12 to 25 feet long and about a foot wide. At its lower end it widens, and its floor there is of sheet-iron pierced with holes half an inch in diameter, under which is placed a flat box a couple of inches deep. The apparatus is set at an inclination over the place which is to be worked, and a stream of water is kept running through it by means of a hose; and, while some of the party shovel in the dirt, one man stands at the lower end stirring the mass as it is washed down, and separating the stones, while the earth and gravel fall through the sieve into another box, where they are again sifted.

Long Tom, the name given a 42-pound gun captured by the British in 1798 from the French battleship "Hoche." It was afterward purchased by the Americans and used in the attack on Haiti by the French in 1804, and remained idle till 1812, when it was placed on the "General Armstrong." This vessel ran the British blockade at New Orleans, Sept. 9, 1814, and was obliged to put into the bay near Horta, Fayal, after being disabled in an encounter with a British squadron. Here the gun was dismantled and remained till, through the efforts of Colonel Reid, son of the commander of the "General Armstrong," it was brought back to New York on the steamer "Vega," April 18, 1893.

Longueville (lôn*g*-vēl′), the name of a noble French family, the principal of whom are Francis d'Orléans, son of the celebrated Dunois, died 1491. His son, of the same name, at whose instance, in 1505, the county of Longueville was erected into a dukedom by Louis XII., died 1512. His brother, Louis, a combatant at the battle of the Spurs and at Marignano, died 1516. Claude, killed at the siege of Pavia, 1525. Leonard, at whose instance the dukes of Longueville were allowed the title of princes of the blood royal by Charles IX., died 1571. Henry, who commanded against the leaguers, and in 1589 won the battle of Senlis, died 1595. His son, of the same name, served under Louis XIII., and was afterward imprisoned with Condé and Conti, as partisans of the Fronde, died 1663. The wife of the latter, Anne Genevieve, sister of the great Condé, distinguished for her part in the wars of the Fronde, died in religious retirement. The last of the family were two sons of Henry and Anne, the eldest of whom died in a convent, 1694; and the second, C. Paris, was killed at the Rhine, 1672.

Longworth, Nicolas, an American horticulturist; born in Newark, N. J., Jan. 16, 1782. In 1803 removed to Cincinnati. He devoted himself to the cultivation of the grape and strawberry. Kindly but eccentric, he gave much money to the "devil's poor." His property was estimated at from $10,000,000 to $15,000,000. He died in Cincinnati, O., Feb. 10, 1863.

Longwy (lôn*g*-wē′), a small town and fortress in the extreme N. of the French department of Meurthe-et-Moselle, 18 miles W. S. W. of Luxemburg. The fortress capitulated to the Prussians in 1792, 1815, and 1871. Pop. (1904) commune, about 7,000.

Lönnrot, Elias (luhn′rot), a great Finnish scholar and folklorist; born in Sammatti, Nyland, Finland, April 9, 1802. He studied medicine, and practised for 20 years in Kajana, but in 1853 on Castrén's death succeeded to the chair of Finnish at Helsingfors, from the duties of which he retired in 1862. He helped to found the Finnish Literary Society at Helsingfors in 1831, and made throughout his life journeys through the whole of Finland, as well as the neighboring parts of Lapland, Russia, and Sweden, in order to collect the remains of poetry and tradition lingering among the people. The first fruit of these inquiries was a collection of more or less ancient Finnish folk-songs, "The Lyre" (1829–1831), after which followed in 1835 the great epic of the "Kalevala." His "Lyric Art" (1840) was a collection of lyrical folk-poetry; "Proverbs of the Finnish People" appeared in 1842; "Riddles of the Finnish People" in 1844 (2d ed., much enlarged, 1861). No less important were the contributions to Finnish philology which his profound knowledge of the popular dialects enabled him to make. His latest work was the great Finnish Dictionary (2 vols. 1866–1880). He died in Sammatti, March 19, 1884.

Lons-le-Saunier (lôn*g*-luh-sō-nyā), (the ancient Ledum Salorium), the capital of the department of Jura, France, 35 miles E. by S. from Châlons-sur-Saône, near the source of the Solman; the brine-springs, discovered in the 4th century, to which the town owes its foundation and name, are still utilized for the extraction of salt. Birthplace of Dumas and of Rouget de l'Isle, author of the "Marseillaise." Pop. (1901) 12,935.

Loo, a game of cards divided into limited and unlimited loo. It is a game the complete knowledge of which can easily be acquired; it is played in two ways, both with 5 and 3 cards, dealt from a whole pack, either first 3 and then 2, or one at a time. It is a good round game at which any number may play, especially at the 3-card game. After 5 cards have been dealt to each player another is turned up for trump; the knave of clubs generally, or sometimes the knave of the trump suit, as agreed on, is the highest card, and is styled "pam"; the ace of trumps is next in value, and the rest in succession, as at whist. Each player has the liberty of changing his cards for others from the pack. He may exchange any of the 5 cards dealt, or throw up the hand, in order to escape being looed. They who play their cards, either with or without changing, and do not gain a trick, are "looed"; as is likewise the case with all who have stood the game, when a flush or flushes occur; and each, excepting any player holding "pam," of any inferior flush, is required to deposit a stake, to be given to the person who sweeps the board, or is divided among the winners at the ensuing deal, according to the number of tricks made by each. For instance, if every one at dealing stakes half a dollar, the tricks are entitled to 10 cents each; every player who is looed paying half a dollar, which, together with the dealer's stake, forms the next pool. But sometimes it is arranged that each person looed shall pay a sum equal to what happens to be on the table at the time. Five cards of a suit, or 4 with "pam," compose a "flush," which sweeps the board, and yields only to a superior flush, or the elder hand. When the ace of trumps is led, it is usual to say, "Pam be civil"; the holder of which last-mentioned card is then expected to let the ace pass.

Loo-Choo Islands. See LIU-KIU ISLANDS.

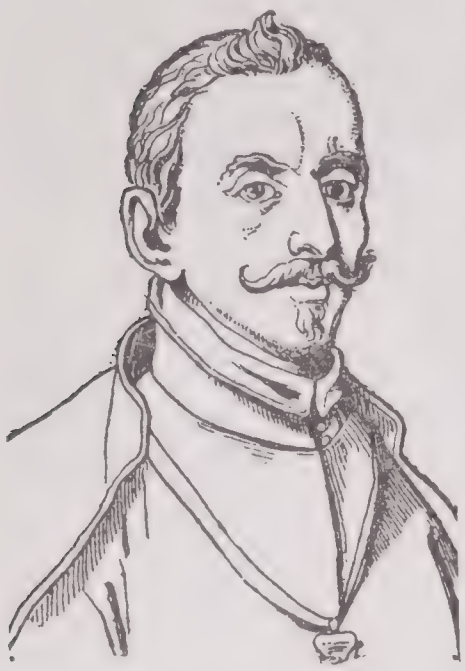
Loofah, Egyptian, the name given to the fibrous portion of the fruit of one or two species of *Luffa* (natural order *Cucurbitaceæ*), sold in England for use as a bath-sponge or flesh-rubber. There are about 10 species of the genus known, but the "towel gourd," as this bath-sponge is sometimes called, appears to be obtained chiefly from *L. ægyptiaca.* In the West Indies the fruit of *L. acutangula* yields a similar network of fibers, and it is there used as a sponge or dishcloth. The fibrous portion of these gourds is also worked up into baskets and small ornamental articles.

Lookout Mountain, a high point in the ridge of mountains running through Northwestern Georgia and adjacent parts of Tennessee and Alabama. It overhangs the Tennessee river near Chattanooga, and from the top, 1,600 feet above the river, seven States can be seen. It was here that during the Civil War, the famous "battle above the clouds" took place between the Confederate force under General Bragg, holding the mountain, and the Union forces under General Hooker. The latter scaled the almost precipitous sides of the mountain, and surprised the enemy, dislodging them and compelling them to retreat after a desperate conflict. This was on Nov. 24, 1863, and the following day the Union flag was hoisted on Pulpit Rock on the summit of the mountain. This victory gave the Union army unimpeded navigation of the river to Chattanooga.

Loomis, Elias, an American physicist; born in Willington, Conn., Aug. 7, 1811. He was graduated at Yale College in 1830, and was tutor there in 1833–1836. After a year's study in Paris he was Professor (1837–1844) of Mathematics in Western Reserve College, Ohio, of Natural Philosophy (1844–1860) in the University of New York, and of Natural Philosophy and Astronomy (from 1860) at Yale. Professor Loomis devoted much of his time to original research, was the author of over 100 scientific treatises, and published a series of textbooks on mathematics, natural philosophy, astronomy, and meteorology, of which more than 500,000 copies were sold. He wrote many articles treating of the exact sciences, which were published in "The American Journal of Science." He died in New Haven, Conn., Aug. 15, 1889.

Loosjes, Adriaan (lōs'yes), a Dutch novelist; born on the island of Texel in 1761. He was intended for the Church, but abandoned theology for the trade of bookseller, devoting his leisure to the composition of poems and especially historical romances which made him a favorite in Holland. Among the most popular were: "Charlotte of Bourbon" (1792); "Louise de Coligny" (1803); "Johann de Witt" (1805); "Maurice Lynslager" (1808). "Love Songs" (1783); "De Ruyter" (1784), an epic; and several dramas, constitute his other important works. He died in Haarlem in 1818.

Lope de Vega (lō′pā dā vā′gä), **(Lope Felix de Vega Carpio),** a Spanish dramatist and poet; born in Madrid, Spain, Nov. 25, 1562. Lope, a man of adventurous disposition, led a very active life till he had attained middle age. After having been secretary to the Duke of Alva, he was obliged to conceal himself for a time in consequence of a duel; he next served as a soldier, and narrowly escaped shipwreck in the Armada. On the death of his second wife he took holy orders; but this step, though it removed him from business, did not slacken his literary activity. He was the most prolific of all authors, composing with a rapidity which, while it implied extraordinary talents, made it impossible that his works should possess high merit either in design or in execution. Besides writing epics and many other kinds of poems, he produced a number of dramas so great as to be almost incredible. He himself states it at upward of 1,500; and more than 500 plays attributed to him are actually in print. They embrace all the varieties of kind which are to be found among the works of his successor Calderon; and they abound both in snatches of wit and poetical fancy, and in ingenuity of dramatic invention. Though Lope was not the founder of the Spanish drama, he was the first who made its romantic irregularities attractive through force and originality of genius. While Cervantes, who was 15 years his senior, was neglected and starving, the writings of Lope procured for him overflowing wealth, and a popularity such as hardly ever was gained by any other living poet. He died in Madrid, Aug. 27, 1635.



LOPE DE VEGA.

Lopes, or **Lopez, Fernao** (lō′pāth), the oldest of the Portuguese chroniclers; born about 1380. Appointed chief archivist of the kingdom by Dom Joao I. in 1434, he devoted his life to historical research and to the composition of chronicles, which for literary and critical value were unsurpassed in his century. His "Chronicle of Señor Don John I.," describing the great struggle between Portugal and Castile, has invited comparison with Froissart's writings on account of its picturesqueness and dramatic reality. Equally vigorous are his chronicles of Dom Pedro I. and Don Fernando. He died after 1459.

Lopes, Caetano, a Brazilian historian; born in Bahia in October, 1780. He was a mulatto, educated in Bahia and Paris, France; he settled in the latter place in 1822 and became corresponding member of the Academy of Inscriptions and Belles-lettres. The Emperor Pedro held him in high esteem. The Historical Institute of Rio Janeiro bestowed a gold medal on him. He was noted for brightness of style and purity of language. His works were numerous, treating of history, biography, and surgery. He died in Paris, Dec. 22, 1860.

Lopez (lō′pāth), **Cape,** a low promontory on the W. coast of Africa, in the delta of the Ogoway river, territory of the French colony of Gabun; in 1883 M. de Brazza made it a station and entrepôt.

Lopez, Carlos Antonio, President of Paraguay; born near Asuncion about 1795. He was made president of Paraguay in 1844; served 10 years and was reëlected for three years in 1851; and again in 1857 for seven years. He was the cause of many quarrels with foreign nations, and in 1859 the United States sent a naval force to the Plata to enforce demands against him. He offered to submit the question of damages to arbitration, but afterward evaded the claim. He died near Asuncion, Sept. 10, 1862.

Lopez, Francisco Solano, President of Paraguay; born in Asuncion in 1827; son of Don Carlos Antonio Lopez, then president. His early education was neglected during the dictatorship of Francia. In his 18th year his father made him a Brigadier-General in the war against Rosas, the dictator of Buenos Ayres, but he took no actual part in the struggle. He afterward filled some of the principal offices of state, and was sent to Europe in 1853, accredited to the chief courts there. In 1855 he returned to Paraguay, became minister of war, and on the death of his father, in 1862, president for 10 years. He had long been aiming at the foundation of a great inland empire, and as his military preparations were now complete, and his army superior to that of any of the South American States, he took opportunity in 1864 to commence hostilities against Brazil. The Argentine Republic and Uruguay allied themselves with Brazil, and after five years' conflict Lopez was reduced to extremities, and was finally surprised on the banks of the Aquidaban by a troop of Brazilian cavalry and slain, March 1, 1870. The latter part of his career had been stained by many cruelties and wanton murders.

Lopez, José Hilario, President of New Granada; born in Popayan, Feb. 18, 1798. He was president of New Granada, Colombia, from March 7, 1849, to March 7, 1852.

In the latter year of his administration slavery was abolished and changes were made in the direction of a federal government. During the revolutions of 1854 and 1859–1862, he fought with the Federalists and was part of the time commander-in-chief. He was a member of the provisional government 1862–1863, and later President of Tolima. In 1867 he was named commander-in-chief of the army, but soon afterward retired. He died in Neiva, Nov.. 27, 1869.

Lopez, Narciso, a Spanish-American filibuster; born in Venezuela in 1798 or 1799. He fought against the patriots in Venezuela and against the Carlists in Spain; was governor of Valencia in 1839; and was made a general in 1840. In 1841 he went to Cuba, but on account of his revolutionary opinions was obliged to fly to the United States. He was at the head of three filibustering expeditions, the first, in 1849, was suppressed by the United States authorities; the others, sent out in May, 1850, and August, 1851, reached Cuba but resulted in disaster; and Lopez with a number of his followers was captured and publicly executed in Havana, Cuba, Sept. 1, 1851.

Lopez y Planes, Vicente (ē plä'nes), an Argentine poet; born in Buenos Ayres in 1784. He was lawyer, soldier, politician, and author; founded the classic and topographical departments when the university was established. He was Member of Congress, 1819–1825; provisional president of the republic, July 5 to Aug. 13, 1827; president of the supreme court of justice; and governor of the province of Buenos Ayres. He wrote the "Argentine National Hymn" and other poetical works. He died in Buenos Ayres in 1856.

Lophiidæ (-fī'i-dē), or **Lophiadæ** (-fī'-a-dē), in ichthyology, a family of *Acanthopteri.* The carpal bones are prolonged, so as to form a sort of arm for the support of the pectoral fins, which sometimes have a faint resemblance to legs; this gives these fishes a frog-like appearance. Called also *Pediculati.*

Lophopsittacus (lof-ō-sit'-), a name proposed by Professor Newton for an extinct group of parrots of which *Psittacus mauritianus* is the type. It was distinguished by a frontal crest, of a shape quite unlike that found in any other form of parrot, rising from the base of the bill and terminating before reaching the occiput, which was apparently flat and smooth.

Loquat (*Eriobotrya Japonica*), an esteemed Chinese and Japanese fruit, of the natural order *Rosaceæ*, sub-order *Roseæ*, and of a genus closely allied to *Mespilus.* It has been introduced into Australia and is now abundant there. The tree or shrub which produces it attains a height of 20 or 30 feet, but in cultivation is seldom allowed to exceed 12 feet. It is a beautiful evergreen, with large oblong wrinkled leaves, and white flowers in terminal woolly panicles, having a fragrance like that of hawthorn-blossom; the fruit is downy, oval, or pear-shaped, yellow, and about the size of a large gooseberry. The seeds have an agreeable flavor which they impart to tarts. The loquat lives in the open air in the S. of England and produces fruit; but a warmer climate is required for fruit of fine quality. It is hardy about London and S. in England. It may be grafted on any species of *Mespilus.*

Lorcha, a light Chinese coaster having a hull of European model and Chinese masting and rigging. The name became familiar to the public in 1856, a dispute about a "lorcha" having in that year brought on war between Great Britain and China.

Lord, in feudal times, the lord (*seigneur*) was the grantor or proprietor of the land, who retained the dominion or ultimate property of the feud or fee; and the grantee, who had only the use or possession of the land, was styled the feudatory or vassal. A person who has the fee of a manor, and consequently the homage of his tenants, is called the "lord of the manor." The superior lord is styled "lord paramount"; and his tenants, if they grant a portion of the land to other tenants, while they remain tenants in reference to the lord paramount, are lords in reference to their own tenants, and are hence styled mesne or middle lords. "Lord in gross" is one who is lord, not by reason of any manor, as the king in respect to his crown. "Very lord" is he who is immediate lord to his tenant; and very tenant he who holds immediately of his lord. Thus, where there is a lord mesne, he is very lord to his tenant, and not the lord paramount. Lord is also a mere title of dignity attached to certain official stations, which are sometimes hereditary, but sometimes only official or personal. All who are noble by birth or creation, otherwise called "lords of parliament" and "peers of the realm," are styled lords. The five orders of English nobility constitute the lords temporal, distinguished from the prelates of the Church, who constitute the lords spiritual in the House of Lords (see PARLIAMENT). Lord is also applied to persons holding certain offices; as, the Lord Chief-Justice, the Lord-Mayor, etc. It is likewise given by courtesy to the younger sons of dukes and marquises, and to the eldest sons of earls.

In the translation of the Scriptures, Lord is used, without much discrimination, for all the names applied to God; but when it represents the great name of Jehovah, it is printed in small capitals. In the New Testament it is applied to Jesus Christ, the

term in the original Greek being *kurios* (owner or master).

Lord, John, an American historian; born in Portsmouth, N. H., Sept. 10, 1812. He spent most of his life in historical study and lecturing; three years (1843–1846) were passed in England, where he spoke on "The Middle Ages." His lectures were delivered in the principal towns and cities of the United States. The degree of LL. D. was given him by the University of New York in 1864. He published "Modern History for Schools" (1850); "The Old Roman World" (1867); "Ancient States and Empires" (1869); and "Beacon Lights" (1883). He died in Stamford, Conn., in 1894.

Lord, William Wilberforce, an American clergyman; born in Madison co., N. Y., Oct. 28, 1819. He was tutor at Amherst College in 1847; clergyman in the Protestant Episcopal Church; chaplain in the Confederate army in the Civil War; and published "Poems" (1845), that was praised by Wordsworth; "Christ in Hades" (1851); and "André, a Tragedy" (1856). He died April 22, 1907.

Lord Chamberlain, an officer in England who has control of the establishment attached to the chapels royal; of officers and servants attached to the royal chambers, except of those of the bedchamber; and over the medical men of the household. The royal tradesmen are appointed by him. He directs all great royal ceremonies, receives all applications to attend levées and drawing-rooms, superintends the royal wardrobe and the jewel house at the Tower, and licenses theaters and plays, his power extending to the cities of London and Westminster, and certain other parts of the metropolis, as well as to those places within which the sovereign may reside occasionally. The power of licensing theaters elsewhere belongs to the justices.

Lord Great Chamberlain, a State office of great antiquity entirely distinct from that of Lord Chamberlain of the Household. The Lord Great Chamberlain assists, with the Earl Marshal, at the ceremony of the introduction of new peers; he issues tickets for the opening and prorogation of Parliament, and orders of admission for viewing the House of Lords when Parliament is not sitting. He arranges the preparation of Westminster Hall for a coronation, the trial of a peer, or for any other ceremony taking place therein. He walks on the right of His Majesty when he opens Parliament in person. The office is hereditary, and at present is held by the Earl of Ancaster.

Lord Howe Islands, a main island (area 5 square miles), with some small islets, in the Pacific, 300 miles E. of Port Macquarie in New South Wales; lat. 31° 30′ S., lon. 159° E.; pop. (1900) 55. It was discovered by Lieutenant Ball in 1788, colonized in 1840, and is attached administratively to New South Wales. The flora is very rich, banyan trees being particularly conspicuous. The surrounding waters are full of fish. The island consists of three volcanic ridges, rising to 2,840 feet, and is crescentic in shape. A group of the Solomon Islands bears the same name; and a Lord Howe's Island is one of the Society Isles.

Lord Lieutenant, a British official of high rank, representing the sovereign, as: (1) The Viceroy, or Lord-lieutenant of Ireland, who is a member of the ministry, retiring from office with them. He has the control of the government of the country, subject to the approval of the ministry in office, and nearly all the patronage is also vested in him. He can confer knighthood. In his government he is assisted by a privy council nominated by the sovereign. (2) The lord-lieutenant of a county, the principal official of a county, at whose nomination all deputy-lieutenants and justices of the peace are appointed, and first commissions in the yeomanry, militia, and volunteers are given.

Lord Mayor, the title given to the chief magistrates of London, England, and of Dublin, Ireland, and York, during the year for which they hold office.

Lord-Mayor's Day, the 9th of November, on which a great procession accompanying the newly-elected Lord Mayor of London from Westminster to Guildhall takes place. The procession, formerly famous for its historical and allegorical devices, has now much dwindled

Lord of the Isles, a title borne by a race of chiefs who ruled the Western Islands of Scotland with almost regal authority. They were descended from Somerled, the Lord of Argyll, on whom David I., having in 1135 expelled the Norwegians from Arran and Bute, conferred these islands. The first to take the title was John, son and heir of Angus of Isla, who fought at Bannockburn. John, 4th and last Lord of the Isles, was deprived of his title and estates by the Parliament of May, 1493. He retired to the monastery of Paisley, and dying about 1498 was buried beside his ancestor Robert II. In 1540 the Lordship of the Isles was annexed to the Scottish crown, and from it the Prince of Wales derives one of his titles.

Lord's Day, a day first named in Rev. i: 10, where the sacred writer says, I was in the spirit on the Lord's day (*en tē Kuriakē hēmera*). "The Lord" in the New Testament generally referring to the Lord Jesus, the Lord's day was probably that celebrating His resurrection, viz., the first day of the week. (John xx:1–19, 26; Acts xx: 7; I Cor. xvi: 1, 2.) Regarding the

proper method of its celebration, two schools of thought exist. The first considers that the Lord's day is simply the Christian Sabbath, and that the Old Testament directions for the keeping of the Sabbath are also those divinely given for the observance of the Lord's day. The second view is that the Sabbath was designed to be simply a Jewish institution, and that the Lord's day is a joyous Christian festival, in some respects essentially differing from the Old Testament Sabbath. See SABBATH.

Lord's Prayer, the prayer which Jesus taught His disciples (Matt. vi: 9–13), and which is used in public worship, whether liturgical or not.

Lord's Supper, a term first used by St. Paul in 1 Cor. xi: 20, of a ceremonial ordinance observed in the Corinthian and doubtless in other churches. The night on which Jesus was betrayed, He took bread, blessed it, brake it, and gave it to His disciples to eat, with wine similarly blessed for them to drink, the former in the Protestant view symbolizing His broken Body, the latter His shed Blood. (Matt. xxvi: 26–29; Mark xiv: 22–25; Luke xxii: 14–20.) St. Luke records that Jesus said, "Do this in remembrance of me" (xxii: 19). St. Paul evidently considered that these words, addressed originally to the apostles, were designed for the Church of all ages. The term Lord's supper is used chiefly by those who hold the ordinance to be a commemorative one. See COMMUNION: EUCHARIST: MASS.

Lorelei (lō're-lī), or **Lurlei** (lör'), a rock which rises perpendicularly from the Rhine to the height of 427 feet, near St. Goar. It used to be dangerous to boatmen, and has a celebrated echo. But the name is best known from Heine's song of the siren who sits on the rock combing her long tresses, and singing so ravishingly that the boatmen, enchanted by the music of her voice, forget their duty, and are drawn on the rock and perish.

Lorente, Sebastian (lō-ren'tā), a Peruvian historian; born about 1820. A Professor of History at the University of San Marcos, he made valuable contributions to the historical literature of his country in his "History of Peru" (5 vols. 1860); "History of the Conquest of Peru" (1861); and articles in the "Peruvian Review." He died in Lima in November, 1884.

Lorenz, Ottokar (lō'rentz), a German historian; born in Iglau, Sept. 17, 1832. His first work was "The Consular Tribunal" (1855). He was appointed Professor of History in the University of Vienna, 1862; in 1885 accepted a call to the University of Jena. Among his writings are: "German History in the 13th and 14th Centuries" (2 vols. 1863); "Sources of Mediæval German History" (1870); "History of Alsace" (1871); "History and Politics" (1876); "Genealogical Manual of the History of European States" (1895).

Lorenzo Marques (lō-rān'sō mär'kes), a Portuguese station on Delagoa Bay, E. coast of Africa; is the terminus of the railway to Pretoria in the Transvaal; completed in 1895; imports (1898) $3,759,655, exports (1898) $84,000; pop. (1905) 9,849, of whom 4,691 were Europeans. See DELAGOA BAY.

Loreto (lō-rā'tō), an interior department of Peru, watered for miles by the Marañon and its tributaries; area 288,456 square miles; pop. est. 100,600. The quickest route from the coast to this province, about 700 miles distant in a direct line, is round the N. coast of South America and up the Amazon, a journey of 6,500 miles. Capital, Moyobamba.

Loretto (lō-ret'tō), or **Loreto,** a city of Italy, in the province of Ancona, about 3 miles from the sea. It is a famous resort of pilgrims, who come to visit the Casa Santa or Holy House of Loretto, which is said to have been the house of the Holy Family at Nazareth, and to have been miraculously conveyed by the angels first to Fiume in Dalmatia, and afterward to Loretto. This Holy House, which is in the center of a church built by Majano and Bramante (1464–1587), is covered externally with white marble, is 30 feet long, 15 wide, and 18 feet high, and richly ornamented. The number of pilgrims amounts to 50,000 yearly. Pop. (1900) 5,000.

Lorica (-rī'kä), a cuirass or crest of mail, made of leather and set with plates of metal in various forms, chiefly in rings like a chain, used by the Roman and Greek soldiers.

L'Orient (lō-ryo*ng*'), a seaport in the French department of Morbihan; on a good bay; 116 miles N. W. of Nantes; is a well-built town, with a deep and spacious harbor; founded in 1664 by the French East India Company; but, after the ruin of their trade by the English toward the close of the next century, their plant was acquired by the government, who since 1815 have made L'Orient the principal naval shipbuilding yard in France; the dockyard and arsenal are consequently among the best and largest in the country, and the place ranks as a fortress of the second class; has schools of navigation and marine artillery, and an observatory; inhabitants engaged chiefly in shipbuilding and its cognate trades, and in fishing (especially sardines); the trade does not exceed a total of 100,000 tons annually. Off this port the British fleet under Lord Bridport defeated the French under Villaret-Joyeuse, June 23, 1795. Pop. (1906) 46,403.

Lorikeet, a general name of certain small Australian birds belonging to the parrot tribe and forming the genus *Tricho-*

glossus, remarkable for their extensible tongue, furnished with a pencil at its extremity, by which they are enabled to suck up the nectar of flowers.

Lorimer, a maker of bits, spurs, stirrup-irons, metal mountings for saddles and bridles, and generally of all articles of horse-furniture. In London the lorimers, who had previously formed part of another guild, were incorporated by letters-patent in 1721; in Scottish burghs they have been comprehended as a branch of the corporation of Hammermen.

Lorimer, George Claud, an American clergyman; born in Edinburgh, Scotland, in 1837; came to the United States in 1856; was educated at Georgetown College, Ky.; ordained to the Baptist ministry in 1859; pastor at Harrodsburg, Paducah, and Louisville, Ky., Chicago and Boston. In October, 1901, he accepted a call from the Madison Avenue Baptist Church of New York city. Editor of the "Watchman" in 1876. He wrote: "Under the Evergreens" (1872); "The Great Conflict" (1876); "Isms" (1882); "Studies in Social Life" (1886); "Christianity and the Social State"; "Messages of Today to the Men of Tomorrow"; etc. He died Sept. 8, 1904.

Lorimer, James, a Scotch jurist; born in Aberdalgie, Perthshire, Scotland, Nov. 4, 1818. He studied at Edinburgh, Geneva, Bonn, and Berlin, was called to the Scotch bar in 1845, and in 1862 appointed Professor of Public and International Law in the University of Edinburgh. In 1873 he took a principal share in founding the Institute of International Law. Besides contributing to the "Edinburgh" and "North British" reviews, he wrote, from the standpoint of the historico-political school: "Handbook of the Law of Scotland" (1862; 5th ed. 1885); "Constitutionalism of the Future" (1865; 2d ed. 1867); "Reasons for the Study of Jurisprudence as a Science" (1868); "Institutes of Law" (1872; 2d ed. 1880); and "Institutes of the Law of Nations" (1883–1884), besides "The Universities of Scotland" (1854); "Political Progress not Necessarily Democratic" (1857); and "Studies, National and International" (1891). He died Feb. 13, 1890.

Loring, Edward Greeley, an American jurist; born in Massachusetts in 1802; was a graduate of Harvard; for many years probate judge and United States Commissioner in Boston. It was while holding this position that he remanded to slavery the negro Anthony Burns, for which Loring was removed from the bench. Later he was appointed by President Lincoln judge of the Court of Claims, which post he resigned in 1877. He died in 1890.

Loring, George Bailey, an American agriculturalist; born in North Andover, Mass., Nov. 8, 1817. He wrote many essays and papers on farming, was a noted orator, and served several terms in the Massachusetts Legislature. He died in Salem, Mass., Sept. 14, 1891.

Loring, William Wing, an American military officer; born in Wilmington, N. C., Dec. 4. 1818; joined the United States army as a private in a troop of volunteer cavalry; participated in the Florida War in 1835–1842, becoming 2d lieutenant in 1837. During the war with Mexico he was conspicuous for gallantry in the actions at Contreras, Churubusco, and Chapultepec; lost an arm at the siege of the City of Mexico; and was brevetted lieutenant-colonel and colonel. In May, 1861, he resigned his commission; became a Brigadier-General in the Confederate army and later Major-General. He went to Egypt in 1869 and was made a pasha and chief of staff in the army of the Khedive. In 1879 he returned to the United States and published "A Confederate Soldier in Egypt." He died Dec. 30, 1886.

Loris, a genus of *Lemuridæ,* with rounded heads and pointed snouts, slender bodies, very large eyes, and rudimentary tail or

LORIS.

none at all. The genus has two other names, *Stenops* and *Nycticebus.* The two species known are both natives of the East Indies. The largest species, *L. tardigradus,* is not so large as a cat; the other, *L. gracilis,* is much smaller. They are nocturnal animals, spending the day asleep on a branch, the body rolled up, and the head hidden between the legs. Their fur is rich and soft. Their motions are slow, and they advance stealthily and noiselessly on the insects and birds on which they prey.

Loris=Melikoff, Michael Tarielovitch Tainoff, Count, a Russian military officer; born in Tiflis, Russia, Jan. 1, 1826. He entered the army in 1843; distinguished himself in the Caucasus in 1847, and at the siege of Kars in 1854; was made Lieutenant-General in 1863; commander of the army in Armenia in 1876, and took Kars. In 1878 he was made a count; in 1879 governor-

general of Charkow, in which post he suppressed the Nihilistic conspiracies with much vigor. In 1880 he was appointed minister of the interior, in which post he showed a tendency toward measures of a wide remedial kind, and had persuaded the czar, Alexander II., to call a kind of national representative assembly, when the assassination of the latter occurred in March, 1881. On the accession of Alexander III. Loris-Melikoff's position became untenable, and he resigned in 1881. He died in Nice, Dec. 22, 1888.

Lorm, Hieronymus, pseudonym of HEINRICH LANDESMANN, a German poet and prose-writer; born in Nikolsburg, Moravia, Aug. 9, 1821. Though blind and deaf, he performed much literary work. His works include "Poems"; and "A Child of the Sea." He died Dec. 3, 1902.

Lorne, Marquis of (John George Douglas Sutherland Campbell), a British statesman; born in London, England, Aug. 6, 1845. He was educated at Eton, St. Andrews University, and Cambridge; represented Argyllshire in the Liberal interest (1868-1878), married the Princess Louise in 1871, was Governor-General of Canada 1878-1883, and succeeded his father as 9th Duke of Argyll in 1900. He wrote several books, tales, etc., among which were: "The Book of Psalms," literally rendered in verse; "A Trip to the Tropics"; "Guido and Lita, a Tale of the Riviera" (in verse); "Memoirs of Canada and Scotland"; "Life of Palmerston"; libretto for an opera. "Diarmed" (1897); etc.

Lorraine. See ALSACE-LORRAINE.

Lorraine, Claude. See CLAUDE LORRAINE.

Lory. a tribe of birds composed of several genera, closely allied to the parrots.

Los Angeles, California, county-seat of the county of the same name; on the Los Angeles river, 20 miles N. of its mouth, and 15 miles E. of the Pacific Ocean shore. The "river" is not navigable, its water appearing only briefly and occasionally in the rainy season. Both the county and the city are widely known, by reason of the extraordinary fertility of the country between the mountains and the sea, and the delightful climate, which have been chief factors in attracting and maintaining the access of new comers from all parts of the United States, stimulating the local pride and inciting enterprise.

Los Angeles, although really dating its active life only from about 1885, had a century of existence before that, having been founded in 1781 by a few Spanish soldiers from the Mission of San Gabriel. With the Spanish sense of dignity and piety they named the little village (which 10 years later had but 141 inhabitants) Nuestra Señora La Reina de Los Angeles—The City of Our Lady the Queen of the Angels—but The Angels was enough for the busy Americans who came later, and with the mingling of good taste and practicality that has retained most of the old Spanish names in California, they called the town Los Angeles. Until 1847 it alternated with Monterey as the capital of the Mexican portion of California. In 1850 it had 1,610 inhabitants and began to be known as the center of a fine grape-growing country and as a resort for invalids. By 1880 it had grown to 11,311 inhabitants, but when in 1885 the Atlantic and Pacific railway was completed at Cajon Pass, giving a new overland route, the 13,000 population began to mount, the industry and enterprise to grow—the speculators to get busy. For about three years there was a most insane "boom" in real estate, fortunes being made and lost in a day. In the single year 1886-7 the transfers of real estate recorded were $100,000,000. Naturally this was succeeded by a fall in values and a stagnation for several years; but there was no business panic and the basis for hopefulness in the town's prosperity was found to be substantial. Between 1890 and 1900 the property valuation grew from something over 20 millions to a hundred million dollars.

At present, the city presents a unique and beautiful aspect; for while its public and business buildings are notably fine, the peculiarity of the place is its lovely homes and delightfully picturesque, shaded streets. The houses are of a great variety of architecture but of modern and interesting effect, mostly built without of pine and finished inside with redwood; while the mild climate, which allows the most delicate flowers and shrubbery to flourish all the year round, gives scope for good taste in shade-trees and offers to view even in December, hedges of calla lilies, great 10-foot geranium bushes, heliotrope covering the side of a house, roses in vines and ample tree-shrubs, and a fragrant abundance of jasmine, tuberose, orange and other odorous blooms. About a third of the city is hilly, the average height above sea level being 300 feet and from many points can be found noble views of the country round about. The private ownership of the majority of the residences assures excellent care.

The chief industry of Los Angeles county is horticulture, especially fruit (oranges, lemons, prunes, olives and apricots) and winter vegetables, which are largely exported to the North and East. Of oranges alone over 20,000 carloads are sent off annually, bringing about $500 for each car. The beet sugar industry handles the product of several thousand acres, and the output is about three-fourths of the whole manufacture in the United States. The expensive conditions of fuel, labor and transportation were for years a handicap on the

vicinity, but the railroads opened up both labor and transportation, and the discovery of oil solved the fuel question. A dozen lines of railroad now center in the city, including the three transcontinental lines, and the fourth one by way of Salt Lake which will shorten the distance to Chicago more than 200 miles; and many coast-steamships call at the neighboring ports. As to the petroleum, the vicinity not only has enough for its own consumption but ships thousands of barrels daily for fuel use in factories and on railroads. Enterprise and science also have utilized the abundant water-courses in the mountains nearly 100 miles away for operating electric plants and conveying the power to the city, which, in advance of most of our cities, was entirely lighted by electricity in 1879. During the 25 years of the city's modern growth it has been supplied with 200 miles of graded and graveled streets, 14 miles paved, and 300 miles of sidewalk, finished in cement and gravel. The 146 miles of sewer give a fine drainage. There are about 200 miles of single track electric street railway, besides a number of surburban lines already connecting it with neighboring towns and with the several attractive sea-side resorts within an hour's ride. The 15 to 20 miles of territory between the city and the sea are sure to be built up and populated for residence and the accompanying trade. The chief seaport of Los Angeles is San Pedro, where there is excellent harborage which has been deepened and protected by the United States government and is to be yet further improved. There is a large trans-Pacific trade in prospect for Los Angeles, not only for its own neighboring produce but for much that will come from the East by way of New Orleans, the Mississippi, and the Southern Pacific railroad routes. This city is also the distributing center for the mining interests of Southern California and Arizona. Its mining affairs yield about one third of its business, manufacturing about one fifth, agriculture about one half. The valuation of manufactures in 1900 was given in the United States census at $21,297,727, but five years immensely enlarged that sum. The banks are prosperous, their clearings for 1904 having been $345,343,956.00.

The government of the city is of the usual municipal order with some local variations, civil service reform principles being incorporated; the public library of 65,000 volumes is one of the most advanced in modern methods; the educational facilities are admirable, in public, private and parish schools, with a State Normal College, the University of Southern California, and several religious colleges; the hospitals, homes and orphan asylums are abundant. The Blanchard Art Gallery, the botanical gardens, the 600 acres of parks within the city and the 3,000 acres of Griffith park just north of it, the many churches, the several theaters, the private clubs—all help to make Los Angeles with its charming climate one of the most attractive spots in the land. Pop. (1890), 50,395; (1900), 102,479 (20,000 being of foreign birth); (1910) 319,198.

Loss. See Loess.

Lossing, Benson John, an American historian; born in Beekman, Dutchess co., N. Y., Feb. 12, 1813. He was a voluminous writer, and equally at home in historical, biographical, and critical composition; but his most useful and enduring works were his great "Pictorial Field-Books" of the Revolution, the War of 1812, and the Civil War, the first published in illustrated numbers 1850-1852 (2 vols.), the second in 1868, the third 1866-1869 (3 vols.). He was a wood engraver, and himself made the engravings for the works, the scenic ones largely from sketches on the spots. He wrote also "Outline History of the Fine Arts" (1841); "Lives of the Presidents of the United States" (1847); "Biographies of Eminent Americans" (1855); "A History of England" for schools (1871); "Cyclopædia of United States History," 2 vols., revised and enlarged to 10 vols., by George J. Hagar (1901); etc. He died near Dover Plains, N. Y., June 3, 1891.

Lot (lō) (ancient Oltis), one of the largest tributaries of the Garonne in France, rising in Mont Lozère, a section of the Cévennes, flowing in a generally W. direction, being known at first as the Olt, through the departments of Lozère, Aveyron, Lot, and Lot-et-Garonne, and joining the Garonne from the right at Aiguillon, after a course of nearly 300 miles, nearly two-thirds being navigable.

Lot, a department in the S. of France, formed out of the old province of Guienne, and comprising the arrondissements of Cahors, Gourdon, and Figeac, watered by the Dordogne and the Lot; area, 2,012 square miles; pop. (1906) 216,611. The E. districts are invaded by the Causses plateaus of the Cévennes; the valleys fertile; wheat, maize, tobacco, fruits, chestnuts, and wine are the more important products. Sheep-breeding is largely carried on. Milling, tanning, and the manufacture of woolens are the industries. Capital, Cahors.

Lot, the son of Haran, and nephew of Abraham, by whom he was brought up. He afterward settled at Sodom, where he was taken prisoner by the King of Edom, but rescued by Abraham. When Sodom was about to be destroyed, two angels came to Lot and obliged him to quit the place with his wife and daughters, when the former, for looking back, was turned into a pillar of salt. By his daughters he became the father of two sons, named Moab and Ammon, from whom sprung the Moabites and Ammonites.

Lot-et-Garonne (lō-tā-gä-ron′), a department in the S. W. of France, formed out of the old provinces of Guienne and Gascony, and comprising the arrondissements of Agen, Villeneuve, Marmande, and Nérac, watered by the Garonne and its tributaries, the Gers and Lot; area, 2,067 square miles; pop. (1906) 274,610. The department is a rolling plain and extremely fertile, except in the S. W., where it is invaded by the landes; principal products wheat, maize, wine (20,000,000 gallons annually), hemp, fruits (the plums of Agen are particularly celebrated), tobacco, potatoes, flax, and oil-plants; pine, cork, and chestnut woods are numerous; poultry are reared in great numbers for exportation; manufacturing is confined chiefly to metal-works, paper-mills, woolen and cork factories, distilleries, and tanneries.

Lothaire I., Emperor of Germany, eldest son of Louis-le-Débonnaire; born about 795. In 817 he was associated with his father in the empire, and named King of the Lombards in 820. He afterward dethroned his father and imprisoned him in a monastery, on which Louis and Charles, his brothers, joined their forces and defeated Lothaire at Fontenay in 841. Two years afterward, the three brothers entered into a treaty by which Lothaire retained the title of emperor, with Italy, and some French provinces beyond the Rhine and the Rhone. Charles became King of France, and Louis had a tract of country bordering on the Rhine. Lothaire died in 855.

Lothaire II., Emperor of Germany and Duke of Saxony between 1125 and 1137. He died in Italy, on his return from an expedition against Roger, King of Sicily.

Lotheissen, Ferdinand (lōt′hī-sen), a German historian; born in Darmstadt, May 20, 1833. His studies were mainly in the field of French literature; he wrote: "Literature and Society in France, 1789–1794" (1872); "History of French Literature in the Seventeenth Century" (4 vols. 1878–1884); "Molière, His Life and Works" (1880); "Margaret, Queen of Navarre" (1885). Among his literary remains was a contribution to the "History of French Civilization in the Seventeenth and Eighteenth Centuries" (1889). He died in Vienna, Dec. 19, 1887.

Lothrop, Amy. See WARNER, ANNA BARTLETT.

Lothrop, Harriet Malford, pseudonym MARGARET SIDNEY, an American novelist, wife of the publisher, D. Lothrop; born in New Haven, Conn., in 1844. She was founder and president of the National Society of the Children of the American Revolution, and wrote: "So As by Fire" (1881); "The Pettibone Name" (1883); "The Golden West" (1885); "The Minute-Man" (1886); "Dilly and the Captain" (1887); "Little Maid of Concord Town" (1898); "Adventures of Joel Pepper" (1900); etc.

Loti, Pierre (lō-tē′), a French poet and novelist; real name LOUIS MARIE JULIEN VIAUD; born in Rochefort, Jan. 15, 1850. He was a French naval officer. In 1892 he was elected a member of the French Academy. His works include: "Aziyadé" (1876); "Rarahu" (1880), afterward called "The Marriage of Loti," a romance of Tahiti; "An Iceland Fisherman" (1886); "Madame Chrysanthème" (1887); "In Morocco" (1890); "The Romance of a Child" (1890); "A Phantom From the East" (1893); "Sailor" (1893); and "Jean Berny, Sailor" (1893).

PIERRE LOTI.

Lotion, a liquid remedy consisting principally of water, as a menstruum, and applied to circumscribed portions of the skin, or of the mucous surfaces. Lotions are either cooling, stimulating, astringent, soothing, or sedative. Water combined with spirit of vinegar is an example of the first. The spirit is added to the water in the proportion of half an ounce and upward to the half pint. The lead lotion is at once cooling and astringent. A good stimulating lotion is procured from a mixture of water with a third or a half of its bulk of spirit of wine, which is applied to the skin by means of lint, and covered to prevent evaporation. Astringent lotions are formed by adding from ½ to 10 grains of sulphate of zinc or of white vitriol to an ounce of very cold water, having other astringents in solution. Soothing lotions consist of the various preparations of opium, of the decoction of poppies, hemlock, etc., and prussic acid is employed in the preparation of sedative lotions. Stimulating lotions are applied to indolent ulcers and tumors, and sedative and narcotic mixtures are employed to alleviate pain.

Lotophagi (-tof′ā-jī), in Greek mythology, the name given to a people who ate of the fruit of the lotus tree, the effect of which was to make them forget their friends and homes, and to lose all desire of returning to their native land, their only

wish being to live in Lotus Land. This was in Syrtica W. of Egypt. Ulysses' wanderings brought him to this coast. See LOTUS.

Lotta. See CRABTREE, CHARLOTTE.

Lottery, a scheme for the distribution of prizes by chance. Lotteries like every other species of gambling have a pernicious influence on the character of those concerned in them. As this kind of gambling can be carried on secretly and the temptations are thrown in the way of both sexes, all ages and all descriptions of persons, it spreads widely in a community, and thus silently infects the sober, economical, and industrious habits of a people.

Lotteries are of two different kinds: (1) Numerical lottery or lotto, invented by the Genoese. In this lottery the numbers from 1 to 90 are usually put into a wheel of fortune, five of the numbers being drawn at one time. Those taking part in the game put stakes on any numbers they choose and if they hit upon the right ones receive from the lottery bankers sums of money according to arrangements. Benedetto Gentile, a counsellor of Genoa, first introduced this lotto in 1620 and it roused an extraordinary spirit for gambling. Wise governments soon put an end to it or prohibited adventuring in it under a severe penalty. (2) The proper lottery, in which each person takes part by means of tickets costing each a fixed sum of money. Its origin is more ancient than that of the lotto and it probably originated from the transfer of merchandise by lot, of which method the Italian merchants made use even in the Middle Ages. So also in France, under Francis I., similar lotteries for merchandise were permitted to the merchants, under the inspection of government, in consideration of certain duties. A money lottery was established at Florence in 1530. In 1571 there appears to have been a public officer in Venice for the inspection of the lottery. From Italy lotteries passed into France under the name of *blanque* (from the Italian *bianca*, because most of the tickets were blanks, mere white paper, *carta bianca*). In 1582 and 1588 Louis de Gonzaga established such a *blanque* in Paris, for providing poor girls of his estates with dowries; and in 1656 Lawrence Tonti (from whom the tontines derive their name) sought to establish a large *blanque royale*, which was first accomplished in 1660. Since this time there have been in France only *loteries royales*, but these were finally abolished in 1836. In England the first lottery occurred in 1569, a printed plan of which, as distributed, belongs to the Antiquarian Society in London. In 1612 a lottery was granted in behalf of the Virginia Company. In 1709 the rage for private and in many instances most fraudulent lotteries was at its height in England, and toward the close of the year an existing act of Parliament was put in force for their suppression as public nuisances, and another to the same purpose was passed in the ninth of Queen Anne. The first Parliamentary lottery was instituted in 1709, and from that time till 1824 no session passed without a lottery bill. Lotteries are now abolished in Great Britain, but in the case of art unions, from their supposed good effects in encouraging art, the legislature has legalized the distribution by lottery of works of art. Latterly, lotteries for merchandise of all kinds, under the inspection of government, have been frequent in Germany. The managers of the principal lotteries sell only whole tickets. Brokers, however, divide them into halves, quarters, eighths, and even sixteenths, in order to facilitate their sale. In recent times in the Austrian monarchy, in Germany, and in various other States of the continent of Europe estate lotteries have been instituted, and manufactories, the estates of noblemen, and even whole lordships have been disposed of by lottery, under public sanction, and ordinarily under the security of important mercantile houses, which undertook the disposal of the property in order to settle the debts of the owners.

Sometimes lotteries have been combined with State loans. When the credit of the State is low, or when the rate of interest is high, efforts have been made to induce capitalists to put their money into the hands of the State by means of a lottery, which gives them the expectation of a premium above the customary interest of the country. For example: If a government is uncertain of obtaining, or cannot obtain, money at 7 per cent., it may perhaps effect its object by offering 4 per cent. for a loan, and dividing the remaining 3 per cent. among the lenders by means of a lottery. In this way loans have been raised in Austria, Denmark, Baden, and other States, including Prussia. Public lotteries carried on mainly for the purpose of putting money in the public treasury, still exist in Prussia, Holland, Austria, and other countries.

In the United States lotteries at one time prevailed extensively, but latterly those not specially authorized were prohibited and the persons concerned in establishing them were subjected to a heavy penalty. The object for which they were granted might be such as the assistance of literary or benevolent institutions or of public works — as roads, bridges, etc. Their pernicious effects have latterly induced the legislatures of all the States to decline granting them.

Lotus, a name given by the Greeks to a number of different plants whose fruit was used for food. One of the most notable of these is the *Zizyphus lotus* of the N. of

Africa and the S. of Europe, a shrub belonging to the natural order *Rhamneæ*. The fruit of the *Diospyrus Lotus*, or date plum, is the European lote. The name lotus was also given to several beautiful species of waterlily, especially to the blue water lily (*Nymphæa cærula*) and the Egyptian water lily (*N. lotus*), which grow in stagnant and slowly running water in the S. of Asia and N. of Africa. The *Nymphæa lotus* grows in the Nile and adjacent rivulets and has a large white flower. The root is eaten by the people who live near the lake Manzaleh. The rivulets near Damietta abound with this flower, which rises two feet above the water. It was the rose of ancient Egypt, the favorite flower of the

NYMPHÆA LOTUS, OR EGYPTIAN WATER LILY.

country, and was often made into wreaths or garlands, placed on the foreheads of women, or held in their hands and smelt for its fragrance. It frequently appears in the hieroglyphs, where it represents the Upper Country or Southern Egypt, and entered largely into works of art — the capitals of columns, prows of boats, heads of staves, and other objects being fashioned in its shape. In the mythology it was the special emblem of Nefer-Tum, the son of Ptah and Bast; the god Harpocrates is seated on it; and there was a mystical lotus of the sun. In the mythology of the Hindus and Chinese, the lotus which plays a distinguished part is the Nelumbo. American writers have given the name lotus to a closely similar species, *Nelumbium luteum*, the water chinquapin.

Lotze, Rudolf Hermann (lōt'suh), a German philosopher; born in Bautzen, Saxony, May 21, 1817. Having graduated in medical science and philosophy at Leipsic, he was appointed Professor of Mental Philosophy there (1843), and in 1844 accepted a call to Göttingen. He ranks among the first of metaphysicians, and has given impulse to the recent development of physiological psychology. Among his numerous works the most important are: "Metaphysics" (1841); "Logic" (1843); "Microcosmos" (3 vols. 1856–1864); "History of Æsthetics in Germany" (1868), several of which have been translated into English. He died in Berlin, July 1, 1881.

Loubet, Emile (lö-bā'), President of the French Republic; born in Marsanne, Drôme, France, Dec. 31, 1838. His father, a simple peasant, provided him with the best education within his means. Émile studied law and began practice in Montelimar. The first office he held was that of mayor of the city; in 1876 he was elected to a seat in the Chamber of Deputies; was reëlected in 1877, and again in 1881, but in 1885 moved up to the Senate; was Minister of Public Works in the shortlived Tirard Cabinet, Dec. 12, 1887, to April 3, 1888; on the refusal of M. de Freycinet to reassume the presidency of the cabinet was intrusted by President Sadi-Carnot with the task of organizing the ministry with the larger part of its former constituents, himself assuming the portfolio of the Interior and the presidency of the Cabinet; in this position his policy of compromise toward the extreme left, without satisfying that party, excited the uneasiness of the majority of the moderate republicans. His enemies were glad to avail themselves of the excitement caused by the Panama scandals to bring about his downfall. His honor remained unsmirched, but he fell for what was adjudged to be a certain lukewarmness in prosecuting the attendant investigations. M. Loubet was elected president of the senate in 1896, to which position he was reelected in January, 1898. He succeeded Félix Faure as president, 1899-1906.

Loudon, Fort, an ancient fortification in Tennessee, on the Tennessee river, near the borders of Georgia.

Loudon, or **Laudon** (lou'-), **Gideon Ernst, Freiherr von,** an Austrian military officer; born in Tootzen, Livonia, Russia, Feb. 2, 1716. His ancestor had migrated to Russia from Ayrshire, Scotland, in the 14th century. In 1732 he entered the Russian service, but 10 years later exchanged into that of Austria, soon afterward marrying and turning Catholic. In the Seven Years' War he won the title of Freiherr (Baron) at Hochkirch (1758); at Kunersdorf (1759) he turned defeat into victory; and his loss of the battle of Liegnitz (1760) was due mainly to Lacy and Daun. As field-marshal he commanded in the war of the Bavarian succession (1778), and against the Turks (1788–1789), capturing Belgrade and Semendria. He died in Neutitschein, July 14, 1790.

Loudon, John Claudius, a Scottish horticulturist; born in Cambuslang, Lanark-

shire, Scotland, April 8, 1783. Between 1820–1843 he produced a number of works of the highest importance to the scientific farmer, the gardener, and the botanist. The "Encyclopædias of Gardening, Agriculture, Plants, Cottage, Farm, and Villa Architecture," may be quoted as examples of his great industry and usefulness. He died in London, England, Dec. 14, 1843. His wife, JANE LOUDON, wrote several valuable works, chiefly connected with botany, such as "The Ladies' Flower-garden"; "Botany for Ladies"; "The Ladies' Country Companion"; etc. Died in 1848.

Lough Neagh. See NEAGH, LOUGH.

Louis, the name of various European rulers, as follows:

GERMANY.

LOUIS (lö-ē') I., surnamed le Débonnaire, Emperor of Germany and King of France; born in 778. He succeeded his father, Charlemagne, in 814. In 817 he associated his eldest son, Lothaire, with himself in the empire, and gave to his other two sons, Pepin and Louis, the kingdoms of Aquitaine and Bavaria. This division gave such offense to Bernard, King of Italy, the illegitimate son of Pepin, eldest son of Charlemagne, that he raised an army against the emperor, who put himself at the head of his troops and marched into Italy. On his approach the soldiers of Bernard fled, and the king was taken prisoner by his uncle, who deprived him of his eyes, Bernard dying during the operation. In 829 Louis created his younger son, Charles, whom he had by Judith of Bavaria, King of Germany; on which his other sons arose against him, deprived him of his crown, and shut him up in a monastery, where he died June 20, 840.

LOUIS II., surnamed the Young, Emperor of Germany; born about 822. He was the only son of Lothaire I., and was created King of Italy in 844, ascending the imperial throne in 855. He died in 875.

LOUIS III., called the Blind, Emperor of Germany. He was the son of Boson, King of Provence, and Ermengarde, daughter of the emperor Louis the Young. He succeeded his father at the age of 10, and in 900 contested the imperial throne with Berengar, who, having surprised him at Verona, deprived him of his eyes. He died about 923.

LOUIS IV., Emperor of Germany; born in 893. He was the son of the Emperor Arnulphus, whom he succeeded in 899. The empire was a scene of desolation during his reign, being constantly ravaged by the Hungarians. He was the last prince in Germany of the Carlovingian race. Died in 911.

LOUIS V., commonly called Louis of Bavaria, Emperor of Germany; born in 1286. He was the son of Louis the Severe, Duke of Bavaria. He was elected emperor in 1314, and at the same time Frederick le Bel was chosen at Cologne by another party of electors, which occasioned a war between them. Frederick was taken prisoner, but gained his liberty by renouncing his claim in favor of his rival. Pope John XXII. being opposed to that arrangement, in 1322 issued his bull of deposition against Louis, who, in return, appealed to a general council and marched into Italy, where he procured the election of Peter de Corbiere (Nicholas V.), and by whom he was crowned at Rome. Five electors, on the other hand, chose Charles of Luxemburg to be emperor; on which the civil war was about to be renewed, when Louis was killed by a fall from his horse, in 1347.

FRANCE.

LOUIS I., King of France. See LOUIS I., EMPEROR OF GERMANY.

LOUIS II., called the Stammerer, King of France; born in 846. He was the son of Charles the Bald, was crowned King of Aquitaine in 867, and succeeded his father as King of France in 877. He was obliged to deliver up Provence to Boson, by whom it was erected into a kingdom. His children were Louis and Carloman, who divided the kingdom between them and a posthumous son, who was afterward known as Charles the Simple. Died in Compiègne, in 879.

LOUIS III., King of France; born about 863. He was the son of the preceding and brother of Carloman, with whom he enjoyed the kingdom. He defeated Hugh the Bastard, son of Lothaire, marched against Boson, King of Provence, and opposed the progress of the Normans. Died without issue in 882.

LOUIS IV., surnamed d'Outremer, King of France; born in 921. He was the son of Charles the Simple and ascended the throne in 936. He invaded Normandy, but was defeated and taken prisoner in 944. He regained his liberty the following year, after being obliged to concede Normandy to Richard, son of Duke William, and Laon to Hugh, father of Hugh Capet. He afterward recovered the latter territory, and died of a fall from his horse in 954.

LOUIS V., surnamed the Fainéant (do-nothing), King of France; born in 966. He succeeded his father Lothaire in 986, and soon after took the city of Rheims. He was preparing to march to the assistance of the Count of Barcelona, who was pressed by the Saracens, when he is said to have been poisoned by his queen. After his death the crown devolved by right to his uncle Charles, Duke of Lower Lorraine; but that prince being disliked by the French,

it was conferred on Hugh Capet. Died in 987.

Louis VI., called the Big, King of France; born about 1078. He was the son of Philip I., and succeeded to the throne in 1108. His reign was disturbed by wars with the Normans, and also by feuds among his vassals. He also quarreled with Henry I. of England, and thus was commenced the wars between the English and French, which lasted during three centuries. He was a good and wise monarch, and was ably supported by his minister, Abbé Suger. He died in 1137.

Louis VII., King of France; born about 1120. He was the son and successor of the preceding. He had a dispute with Pope Innocent II., on the right of presenting to benefices, and was excommunicated by that pontiff, who also laid his kingdom under interdict. Thibault, Count of Champagne, being devoted to the Pope, Louis declared war against him and ravaged his country. A reconciliation afterward took place between them, and Louis, by the persuasions of St. Bernard, engaged in a crusade, but was defeated by Saladin, and, on his return to Europe, was taken at sea by the Greeks and delivered by the general of Roger, King of Sicily. Having divorced his queen, Eleanor, she married Henry of Normandy, afterward Henry II. of England, to whom she brought, as her dower, the provinces of Poitou and Guienne. This produced a new war between England and France, which lasted, with little intermission, for 21 years. He died in 1180.

Louis VIII., named the Lion, King of France; born in 1187. He was the son of Philip Augustus and his queen Isabella of Hainault. In 1216 he accepted the call of the barons of England, provoked to revolt by the tyranny and treachery of King John, and, though prohibited by the papal legate, sent them aid, and soon after landed in England himself. He took Rochester and Winchester, besieged Dover unsuccessfully and received the homage of the barons at London; but, after the death of John, was abandoned by most of his adherents, and was excommunicated by the legate; his troops were defeated by the Earl of Pembroke, at The Fair of Lincoln; and Louis besieged in London made terms with Pembroke and withdrew to France in September, 1217. He succeeded his father in 1223, and in the following year recovered most of the English possessions in France, in spite of papal excommunications. In 1226 he undertook a crusade against Raymond, Count of Toulouse, and the Albigenses; took Avignon after a three months' siege; overran Languedoc; and died in Auvergne in November of the same year. He had married in 1200, Blanche of Castile, by whom he had seven sons and one daughter.

Louis IX., or Saint Louis, King of France; born in Poissy, France, April 25, 1214. He succeeded his father, Louis VIII., in 1226. Being then only in his 12th year, he was placed under the guardianship of his mother, Blanche of Castile, who was made regent of the kingdom. He was declared of age in 1236. A severe struggle was going on between the crown and some of the great feudal nobles, in which the latter were assisted by Henry III. of England. In 1243 Louis defeated the English in several engagements, and a truce for five years was concluded. Having made a vow, in the event of recovering from a dangerous disease, to march against the infidels in the Holy Land, he made preparations for doing so, and in 1248 embarked at Aigues-Mortes with an army of 50,000 men, accompanied by his queen, his brothers, and almost all the chivalry of France. The particulars of his disastrous campaign, which led to his surrender and that of the remains of his army, cannot be recorded here; but we may remark that a greater union of fortitude, punctilious honor, humanity, and personal bravery has seldom been witnessed in the conduct of a prince than was displayed by Louis throughout this expedition. The town of Damietta, which had been taken by the French, was demanded as the price of the monarch's freedom, and a vast ransom was also claimed for his followers. These terms being fulfilled Louis embarked with about 6,000 men, the remains of his fine army, for Acre and spent four years in Palestine. In 1254 he returned home and in the interval Queen Blanche, who had ruled the kingdom in an exemplary manner, had died. Louis again turned his attention to the administration of the laws, which until this time had been left entirely to the caprice of the barons. The subjects could now appeal from the decision of their lords to four royal tribunals, and men of learning were introduced into the parliaments, whose members had till now been composed of illiterate barons. Louis likewise diminished the taxes, which had exhausted the wealth of the subjects. In March, 1268, he published his pragmatic sanction, which secured their rights to the cathedral churches, though, when occasion required, he repressed the arrogant pretensions of the clergy. About 1270 he drew up a code of laws, known as the Établissements de St. Louis. Notwithstanding the disasters of his crusade, he undertook a new one, the object of which was the conquest both of Egypt and Palestine. Tunis, however, was the first point of attack; but while engaged at the siege of that place, a pestilence broke out among the French troops; and, after seeing one of his sons and a great part of his army perish, he was himself one of its vic-

Louis

tims, Aug. 24, 1270. Louis was canonized by Boniface VIII. in 1297, and his life was written by his friend, the Sire de Joinville.

Louis X., surnamed Hutin (an old French term for quarrelsome), King of France; born in Paris in 1289. He succeeded Philip the Fair, his father, in 1314, being King of Navarre before, in right of his mother. He recalled the Jews to his kingdom and made successful war against the Count of Flanders. Died in Vincennes, in 1316.

Louis XI., King of France; born in Bourges, France, July 3, 1425. He was the son of Charles VII. Active, bold, and cunning,

LOUIS XI.

he was in all respects unlike his father, of whose ministers and mistress, Agnes Sorel, he soon showed himself a decided enemy. In 1440 he left the court and put himself at the head of an insurrection. Charles defeated the rebels and executed some, but pardoned his son, whom he even trusted with a command against the English and Swiss. Louis conducted himself with valor and prudence, and his father became entirely reconciled to him; but having soon entered into new conspiracies he was obliged to take refuge first in Dauphiné and afterward in Burgundy, and lived there five years in a dependent condition. On the death of his father, in 1461, he dismissed the former ministers and filled their places with obscure men, without character or talents to recommend them. Insurrections broke out in various parts of his dominions; but they were soon quelled, and followed by many executions. In everything he did, his crooked policy and sinister views were evident. While he pretended to reconcile contending parties, he secretly instigated them against each other; and when he had a negotiation with a foreign government he corrupted its courtiers by bribes, and established secret correspondences with them. He became involved in a war with Charles the Bold, Duke of Burgundy, which lasted 1465–1472. In the course of the war Louis having requested a passport from the duke, went to visit him at Peronne, though he had just before secretly instigated the people of Liege to rise, and promised them aid. Charles, having discovered this act of treachery, was furious with rage, and hesitated three days (during which he kept the king in prison) as to what course he should adopt. Nothing but the aversion of Charles to take the life of a king, and the greatest persistency in falsehood on the part of the latter, who asserted his innocence under the most solemn oaths, saved him. He was obliged to accompany Charles to Liege, and to witness the pillage and slaughter of which he had been the cause. A peace was concluded on favorable terms for Charles and his allies; but when Louis returned to Paris he used every artifice to evade its fulfillment. The great object of Louis was the establishment of the royal power, and the overthrow of the feudal aristocracy; but it is almost impossible to convey a just idea of his character, so contradictory were its qualities. He was at once confiding and suspicious, avaricious and lavish, audacious and timid, mild and cruel. He died in Plessis-les-Tours, near Tours, France, Aug. 30, 1483.

Louis XII., surnamed the Father of his People, King of France; born in Blois, France, June 27, 1462. He was the son of Charles, Duke of Orleans. On ascending the throne in 1498 he pardoned the wrongs he had suffered before his accession. "The King of France," said he, "must not revenge the injuries done to the Duke of Orleans." His reign was a continued course of warfare. He conquered the Milanese, Genoa, and Naples; but after ravaging Italy for 15 years the French were expelled in 1513. The Emperor Maximilian, Henry VIII. of England, and the Swiss, attacking Louis in his own dominions, he was obliged to sue for peace. About three months before his death he had married the young Princess Mary, sister of Henry VIII. She was his third wife, and after his death was married to her first lover, Charles Brandon, Duke of Suffolk. Louis XII. possessed many of the qualities of a good ruler; he was honest, kind-hearted, and magnanimous; he was also a friend to science, and France enjoyed under him a high

degree of prosperity and security. He died Jan. 1, 1515.

Louis XIII., King of France; born in Fontainebleau, France, Sept. 27, 1601. He was the son of Henry IV. Being only nine years old at the death of his father, the care of him and the kingdom were intrusted to his mother, Mary de Medicis. During the early part of his reign France became the prey of civil dissensions, which Marshal d'Ancre, prime minister at that time, was utterly unable to suppress; and when the king, in 1615, married a Spanish princess, the disturbances grew still more alarming. At length the Huguenots rose in arms, with Rohan and Soubise at their head; and a great part of the kingdom rebelled against the king, who now delivered himself up to the guidance of Cardinal Richelieu. After victory had inclined, sometimes to one side and sometimes to the other, and both parties felt deeply the necessity of repose, peace was concluded in 1623. But it was of no long duration. La Rochelle, the headquarters of the Huguenots, revolted, and was supported by England. The king drove the English to the sea, conquered the island of Rhé, and at last took La Rochelle, which had sustained all the horrors of a siege for 12 months. After this event, fatal to the Protestant interest in France, Louis assisted the Duke of Mantua against the emperor, and entered on the campaign in person, in which he showed skill and bravery. In 1631 a treaty was concluded by which the duke was confirmed in his estates. The year following Gaston of Orleans, only brother of the king, revolted, out of dislike to Richelieu, and was assisted by the Duke of Montmorency, who being wounded and taken prisoner at the battle of Castelnaudary in 1632 was beheaded at Toulouse. Louis and the cardinal were attacked by a mortal disease nearly at the same time; the latter died in December, 1642, and the king in May following.

Louis XIV., called the Grand Monarque, King of France; born in St. Germain-en-Laye, France, Sept. 5, 1638. He was the son of the preceding and only five years old on the death of his father, the regency being in the hands of the queen-mother, Anne of Austria, under whom Mazarin acted as prime minister. The nation was then involved in a war with Spain and the emperor, which was maintained with glory to the French arms by the Prince of Condé and the famous Turenne; but though Louis was successful abroad, his kingdom was distracted by internal divisions; the Parisians, irritated against Mazarin and the queen, took up arms; and the king, his mother, and the cardinal were obliged to fly. The Spaniards, profiting by these troubles, made several conquests in Champagne, Lorraine, and Italy. In 1651 the king assumed the government, but Mazarin returning to power the year following, the civil war was renewed. On the war breaking out between England and Holland, Louis joined with the latter; after a few naval actions the peace of Breda was concluded in 1667. In 1672 the French king made an attack on Holland and reduced some of its provinces in a few weeks. This invasion produced a new confederacy against Louis, between the emperor, Spain, and the Elector of Brandenburg, in which the allies were unsuccessful, and which was terminated in 1678 by the treaty of Nimeguen. Amidst all his glory Louis committed an act of impolitic cruelty, by the revocation, in 1685, of the Edict of Nantes, granted by Henry IV. in favor of the Protestants — a measure which drove from France a vast number of ingenious mechanics and others, who settled in England and Holland. About this time another league was formed against France by the Prince of Orange, the Duke of Savoy, and the Electors of Bavaria and Brandenburg. To this league were afterward added the German emperor and the King of Spain. The dauphin had the command of the French army, and he opened the campaign by taking Philipsburg in October, 1688, but he was soon forced to retreat before a superior force. In 1690 Luxembourg gained the battle of Fleurus, and Catinat took Nice and gained a victory over the troops of the Duke of Savoy; this was followed by the taking of Mons in Flanders, Valencia in Spain, and Carmagnola and Montmelian in Savoy. These successes were counterbalanced by the defeat of Tourville's squadron off La Hogue, by Admiral Russell, June 2, 1692. Louis in person took Namur, and Luxembourg gained the battles of Steenkirk and Neerwinden. In 1696 Savoy made a separate peace with France, which was followed by a general one at Ryswick, in 1697.

The tranquillity of Europe, however, was again broken by the death of Charles II., King of Spain, in 1700. He left his crown to Philip of France, Duke of Anjou, who assumed the title of Philip V. In opposition to him the Archduke Charles laid claim to the throne; and he was supported by the emperor, Holland, and England. Prince Eugene had the command of the imperial forces, with which he took Cremona. In 1704 Eugene and Marlborough gained the great battle of Hochstet, or Blenheim; the year following Nice and Villa-Franca were taken by the French, who also gained a dear victory at Cassano over Eugene; on the other hand, Barcelona surrendered to the archduke, and Gironne declared in his favor; the battle of Ramilies was gained by the Duke of Marlborough, and Prince Eugene saved Turin by defeating the Duke of Orleans. In 1708 Lille was retaken by

Louis

the allies, who also gained the battle of Oudenarde, and the imperialists made themselves masters of Naples. The year following the French lost Tournay and suffered a great defeat at Malplaquet. In 1713 a treaty of peace was signed at Utrecht by France, Spain, England, Savoy, Portugal, Prussia, and Holland; and the next year peace was concluded with the emperor at Rastadt. Louis, though aged and reduced to stand at bay, still retained vigor enough to save France from the dismemberment threatened by the allies, and to leave his successor his most valuable conquests. The internal administration of his government during this long period had been marked by the highest magnificence, and conduced to the most splendid results. The favorite motto of Louis, *L'état c'est moi* ("I am the State") was quite as much the expression of a principle as of personal

LOUIS XIV.

pride, and it meant the extension and consolidation of the state from its own center, in place of the distraction of government occasioned by the feudal system. He carried this principle into effect immediately after the death of Mazarin, by dispensing with any future prime minister; and the issue of it (besides its results in his political wars) was to humble the noblesse, and raise the talent of the middle classes to places of trust — as in the person of Colbert.

The domestic history of Louis, for the greater part of his life, is far more open to censure than any part of his public conduct. His succession of mistresses, La Vallière, Montespan, Fontange, and others, exhibits him in the character of a sensualist, and we can only say that he was not an unrepentant one for at least the last 20 years of his life. To Madame de Maintenon, aided by the eloquence of Bossuet, belongs the credit of reforming him in this particular, and the most skeptical of historians have not been able to show that Madame owed her influence to any sacrifice of honor, or that she was not really married to him in 1684, about a year after the death of his queen, Maria Theresa. Apart from all this, Louis XIV. was distinguished by high qualities of heart and mind, and his self-command and moderation in all that pertains to the sovereign character cannot be doubted. He most completely realized the idea of a monarchy at a period when the habits of thought and the manners of a people naturally fickle and tired of his long reign, were taking a new direction; and if he loved warlike enterprise too much, as indeed he deplored on his death-bed, he also loved France, and did all in his power to develop the resources of commerce, industry, literature and art, and to discover the efficient instruments of a wise administration. He died in Versailles, France, Sept. 1, 1715.

Louis XV., King of France; born in Versailles, France, Feb. 15, 1710. He was great-grandson and successor of the preceding; and Louis XIV. dying when he was only five years of age, the kingdom was placed under the regency of Philip, Duke of Orleans. Louis was crowned in 1722, and declared of age the following year. The beginning of his reign was rendered disastrous by the Mississippi scheme (see Law, John) which ruined thousands of people. On the death of the Duke of Orleans in 1723, he was succeeded as prime minister by the Duke of Bourbon, who was displaced in 1725 and was succeeded by Cardinal Fleury. The same year the king married the daughter of the King of Poland. On the death of the last-mentioned monarch, in 1733, Louis supported the election of his father-in-law, Stanislaus, against the Elector of Saxony, which occasioned a war between France and the emperor; Stanislaus, however, was forced to abandon the throne; but the French were successful in Italy, and a peace was concluded in 1738. The death of the Emperor Charles opened a new scene. The succession of the house of Austria was disputed by four persons, and Louis declared himself against Maria Theresa, daughter of the late emperor, contrary to his own engagements. He supported the pretensions of the Elector of Bavaria, who called himself Charles VII. That prince took Prague, where he was crowned King of Bohemia; but in 1742 that city was retaken, and the allies, under the King of England, gained the battle of Dettingen. In 1744 Louis took the field in person, and captured Courtray, Menin, and Ypres; he was also present at the battles of Fontenoy and Lawfeld. These advantages were ac-

companied by the taking of Ghent, Ostend, Brussels, Bergen-op-Zoom, and other places. On the other hand, the troops of the Duke of Saxony and of the Queen of Hungary, ravaged Provence, and the English completely ruined the French commerce at sea, and negotiations were opened which ended in the peace of Aix-la-Chapelle in 1748. In 1755 a new war broke out between France and England, in which the latter power had Prussia for an ally, while Austria leagued with France. At first the French were successful, taking Port Mahon, defeating the Duke of Cumberland at Hastinbeck, and forcing the English general and his army to capitulate at Closter-Seven. The electorate of Hanover was conquered; but in 1757 the French and Austrians were defeated by Frederick the Great at Rossbach; this was followed by other losses, both by land and sea, particularly by the conquest of Canada by the English, and Louis, humiliated, despised by his subjects, and given up to the grossest immoralities with his mistresses, died in Versailles, France, May 10, 1774.

Louis XVI., King of France; born in Versailles, France, Aug. 23, 1754. He was son of Louis the dauphin and Maria Josephine, daughter of Frederic Augustus, King of Poland, and immediately created Duke of Berri. On the death of his father, in 1765, he became the heir to the throne; and in 1770 he married Marie Antoinette, an Austrian princess of great beauty and accomplishments. In 1774 he succeeded to the crown. France was in a deplorable state; her finances were nearly exhausted, her trade diminished, her navy destroyed, and the nation groaned under a weight of debt. In this state of things the people looked to their young king to recover their lost greatness, and he seconded their hopes by calling around him those persons whom he thought most likely to redeem the errors of the late administration. He chose Turgot and Malesherbes for his first ministers. His first act was very popular; he dispensed with the customary tax paid by the people at the beginning of every new reign. In 1774 the Parliament was recalled, and affairs began to assume a favorable aspect, when the war of the American Revolution broke out, and the agents of the United States, Franklin and Deane, arrived in Paris to solicit aid for the struggling colonies. Louis, though sympathizing with the Americans, was averse to embarking in a war on their account; but his pacific inclination was at length overcome by the urgency of his ministers and of the queen, and on Feb. 6, 1778, he concluded the treaty of alliance with the United States which in a few months resulted in the declaration of hostilities between France and Great Britain. The war cost France 1,400,000,000 livres; and besides the irreparable deficit it produced in the already disordered finances, it tended greatly to weaken the monarchy by diffusing republican and revolutionary ideas. Necker became, by his attempts at reform, so obnoxious to the court and the aristocracy that he was obliged to resign in 1781. The sanguine Calonne took the post, and strove as vainly against the overwhelming embarrassment of the government; and the Cardinal de Brienne, who succeeded Calonne, laid such intolerable burdens on the people that their Parliament refused to register them. For this the members were exiled to Troyes, but were

LOUIS XVI.

afterward recalled by Louis, who, at the suggestion of Necker, again in office, convened the states-general. This assembly met in May, 1789. The public mind was agitated. Mirabeau was the leader of the popular party. At his voice the people of Paris arose, and on July 14 of that year stormed the Bastille. Revolution had begun; and in October the armed mob, with a prodigious number of women, marched to Versailles, forced the palace, murdered the guards, and searched in vain for the queen, who would have shared the same fate had she not escaped from her bed, which the miscreants pierced with their sabers. The result of this insurrection was the leading of the king and his family in triumph to Paris, amid the insults of a lawless rabble. In February, 1790, Louis was forced to accept the new constitution; but notwithstanding all his concessions, finding himself a mere prisoner at Paris, and exposed daily to new injuries, he resolved to escape. Accordingly, on the night of June 21, 1791, he and his family quitted the Tuileries; but at Varennes he was recognized and con-

Louis

ducted back to Paris, where he became a prisoner in his own palace. War was declared against France by the emperor and the King of Prussia; and the Duke of Brunswick marched into the country, but was forced to retreat. In the meantime, the people were wrought up to a pitch of savage ferocity, and assaulted the Tuileries, in storming which they murdered the brave and loyal Swiss guards. The king and royal family sought refuge in the National Assembly, which ordered them to be sent to the Temple. The Legislative Assembly gave way to the National Convention, which brought Louis to trial. His defense was conducted by Malesherbes, Tronchet, and Deseze; and his own deportment was, as it had uniformly been during his confinement, firm and modest, dignified and resigned. On Jan. 17, 1793, he was adjudged to death for conspiring against the public good. His separation from his family was uncommonly affecting; yet in every scene he manifested the spirit of a Christian, and employed the short interval allowed him in preparation for death. On Jan. 21 he was led to the scaffold, where he showed the calm fortitude which had distinguished him through all the scenes of suffering and indignity to which he had been exposed. He declared his innocence to the surrounding crowd, but was interrupted while addressing the people by the noise of drums and the interference of his executioners. He was accompanied by his confessor, the Abbé Edgeworth, who, as the monarch laid his head on the fatal block, exclaimed, "Ascend, O son of St. Louis, ascend to heaven." His body was thrown into a pit filled with lime, and no vestige left of the place of his interment.

Louis XVII., titular King of France; born in Versailles, France, March 27, 1785. He was second son of the preceding, was at first styled Duc de Normandie, and after the death of his elder brother, Louis-Joseph, in 1789, became dauphin of France. Imprisoned in the Temple with his relatives, he was, after his father's death, styled monarch by the Royalists and foreign powers. A cobbler, named Simon, was appointed his jailer, with the derisive title of tutor. He died June 8, 1795, it is suspected of poison; but it is more probable that his life was brought to a premature close by the harsh treatment to which he had been subjected in prison.

Louis XVIII. (Stanislas Xavier), surnamed Le Desiré, King of France; born in Versailles, France, Nov. 17, 1755. He was the second son of the dauphin (the son of Louis XV.), and was originally known as the Count de Provence. At the accession of his brother, Louis XVI., in 1774, he received the title of Monsieur; and after the death of his nephew, in 1795, from which time he reckoned his reign, he took the name and title of Louis XVIII., King of France and Navarre. When Louis XVI., attempting to escape to the frontiers of the kingdom, took the road to Montmedy, and was arrested at Varenness Monsieur took that of Mons and reached Brussels in safety; and in 1792 he and the Count d'Artois joined the Prussian army, at the head of 6,000 cavalry. The progress of the republican arms, however, compelled them to make a retreat, first to Turin, and afterward to Verona, where he assumed the name of Count de Lille, a title which he retained till his accession to the French throne. He now led a wandering life, supported by foreign courts, especially the British, and by some friends of the house of Bourbon. In 1796 he joined the army of the Prince de Condé, on the Rhine. After this he went to Blankenburg, where he lived under the protection of the Duke of Brunswick and carried on a correspondence with his friends in France, especially with Pichegru. Being invited to Russia by the Emperor Paul, he took up his residence for a while in the ducal castle of Mittau, in Courland. The versatility of his new ally, however, soon put an end to his continuance there, and he received peremptory orders to quit Russia in a week. The Russian government then allowed him to reside at Warsaw; and while there, in 1803, Bonaparte, at that time first consul, attempted to induce him to renounce his claims to the throne. In 1805, Louis, with the consent of the emperor Alexander, returned to Mittau; but the peace of Tilsit obliged him to leave the Continent, and, as a last resource, he took refuge in England, where he was hospitably received, and where he remained till the fall of Napoleon, in 1814, drew him from his retreat to reascend the throne of his ancestors.

On May 3 he made his entry into Paris; on May 30 he caused a constitution to be drawn up; on June 4 it was formally accepted; and the Chamber of Deputies, which was established by this instrument, requested the king to take the surname of "The Desired," *Louis le Desiré*. But the disgrace which the French arms had received was too deeply felt by the soldiers who had fought under Napoleon to make them satisfied with the Bourbons, and the prevalence of ultra-liberal opinions rendered a great portion of the people disaffected to the monarchy; and when Napoleon made his reappearance in France, March 1, 1815, his presence roused every latent feeling, and inspired his former followers with tenfold courage and enthusiasm. Louis was compelled to flee from Paris on the 20th, and seek refuge in Belgium. The Duke and Duchess d'Orleans, the old Prince de Condé, the Count d'Artois, and the Duke de Berri, also hastily left Paris; and proceeding to

La Vendée and the S. of France they endeavored to awaken popular sympathy in favor of the royal cause. The ministers, together with several officers of distinction, followed the king; and Talleyrand, in particular, was actively engaged in his cause at Vienna. Great events now followed in rapid succession. The battle of Waterloo, fought June 18, broke the power of Napoleon; Wellington and Blücher marched to Paris; and Fouché, who had already induced the emperor to leave France, put a stop to the shedding of blood by the capitulation of Paris, July 3. Thus was Louis once more restored to the throne of France. On July 7 the British and Prussians occupied Paris; on the 9th the king entered the capital under the protection of the Duke of Wellington; and he immediately appointed his new ministry, at the head of which was Talleyrand, and in which Fouché was minister of police. Among the most decided measures by which the king sought to support his throne was the ordinance of July 16 disbanding the army, according to the wishes of the Allies; and another, dated July 24, excluding from the general amnesty those who were there denominated "rebels," and whose punishment, for the most part, consisted in exile, or degradation from the peerage. All the relations of Napoleon were, under pain of death, banished from France; as were also those who had voted for the death of Louis XVI., and those who had, in 1815, received offices or honors from the "usurper." During the last few years of his reign Louis was much enfeebled by disease; and a paralysis of the lower limbs taking place, he died, Sept. 16, 1824, having survived his second restoration nine years.

Louisa, Queen of Prussia; born in Hanover, March 10, 1776. Her father, Duke Karl of Mecklenburg-Strelitz, was then commandant. She was married to the Crown-prince of Prussia, afterward Frederick-William III., Dec. 24, 1793, and was the mother of Frederick-William IV. and William III., afterward emperor. After her husband's accession to the throne she became exceedingly popular, her great beauty being united with dignity and grace of manners, and with much gentleness of character and active benevolence. This popularity was increased by her conduct during the period of national calamity that followed the battle of Jena, when she displayed not only a patriotic spirit, but no little energy and resolution. She especially endeared herself to her people by her bearing when compelled to endure insult at the hands of Napoleon. She died in Strelitz, July 19, 1810. The Prussian Order of Louisa, the Louisa School for Girls, and the Lóuisa Governesses' Seminary were instituted in her honor.

Louisburg (lö′ē-burg), a port on the S. E. coast of Cape Breton Island, Nova Scotia, 27 miles S. E. of Sydney. It is inhabited only by a few fishermen; but there are the ruins of the old town, which under the French had a large export trade in cod, and was the strongest fortress in North America till taken by the English in 1758. It had already been captured by the New England colonists and an English squadron in 1745, and restored in 1748; now its fortifications, which had been 30 years in building, and cost over $5,000,000, were demolished, and it gradually sank into ruin.

Louis-d'or (lö-ē-dor′), a gold coin introduced into France in 1641, and continued to be coined till 1795. The louis-d'or ranged in value from about $4.14 to $4.69. In some parts of Germany, in the old coinage, were gold pieces of five thalers, often popularly called louis-d'or, and the name has been occasionally applied to the French napoleon or 20-franc piece.

Louisiade (lö-ē-zē-äd′) **Archipelago,** a group of islands belonging to British New Guinea, and forming an E. extension of that island; it embraces Sudest (45 miles long by 4 to 10 miles wide), Rossel, St. Aignan's (28 miles long by 8 to 9 miles wide), and a vast number of smaller islands. All are mountainous, rising to 3,500 in St. Aignan's and covered with vegetation. The inhabitants are numerous, but wild, and head-hunters; they seem to partake of both Malayan and Papuan characteristics.

Louisiana, a State in the South Central Division of the North American Union; bounded by Arkansas, Mississippi, the Gulf of Mexico, and Texas; admitted to the Union, April 30, 1812; number of parishes (counties), 59; capital, Baton Rouge; total area, 48,720 square miles; pop. (1900) 1,386,625; (1910) 1,658,388.

Topography.— The surface of the State may properly be divided into two parts, the up-lands, and the alluvial and coast and swamp regions. The alluvial regions, including the low swamps and coast lands, cover an area of about 20,000 square miles; they lie principally along the Mississippi, which traverses the State from North to South for a distance of about 600 miles, the Red river, the Ouachita and its branches, and other minor streams. The breadth of the alluvial region along the Mississippi is from 10 to 60 miles, and along the other streams it averages about 10 miles. The Mississippi flows upon a ridge formed by its own deposits, from which the lands incline toward the low swamps beyond at an average fall of six feet per mile. The lands along other streams present very similar features. These alluvial lands are never inundated save when breaks occur in the levees by which

Louisiana

they are protected against the floods of the Mississippi and its tributaries. These floods, however, do not occur annually, and they may be said to be exceptional. With the maintenance of strong levees these alluvial lands would enjoy perpetual immunity from inundation. The uplands and contiguous hill lands have an area of more than 25,000 square miles, and they consist of prairie and woodlands. The elevations above sea-level range from 10 feet at the coast and swamp lands to 50 and 60 feet at the prairie and alluvial lands. In the uplands and hills the elevations rise from 60 feet to something under 500 feet in North Louisiana, where the greatest altitudes are to be found. Besides the navigable rivers already named (some of which are called bayous), there are the Sabine, forming the W. boundary, and the Pearl, the E. boundary, the Calcasieu, the Mermentau, the Vermilion, the Teche, the Atchafalaya, the Boeuf, the Lafourche, the Courtableau, the D'Arbonne, the Macon, the Tensas, the Amite, the Tchefuncta, the Tickfaw, the Matalbany, and a number of other streams of lesser note, constituting a natural system of navigable waterways, aggregating over 4,000 miles in length, which is unequalled in the United States and probably in the world. The State also has 1,060 square miles of land locked bays, 1,700 square miles of inland lakes, and a river surface of over 500 square miles.

Soil.— The soil of Louisiana, generally, is exceedingly fertile and it varies from 10 to 40 feet in depth. The alluvial lands are world-renowned for their productiveness, and the larger part of the uplands surpass in fertility the same character of lands in most of the States. The pine flats, which elsewhere are considered sterile, are rendered productive when fertilized, and they would be more so with irrigation. The only non-productive portions of Louisiana are the salt seacoast marshes. The principal forest trees include long and short leaf pine, oak, honey locust, ash, elm, sweet gum, magnolia, cypress, willow, cottonwood, palmetto, osage, poplar, orange maple, walnut, wild cherry, persimmon, linden, tulip, holly, lime and hackberry.

Agriculture.— The State possesses exceptionally great agricultural advantages, embracing varieties of products appertaining to the temperature and to the semi-tropical zones. Cotton is grown throughout the State, and gives the largest general average yield per acre in the South. S. of the Red River, because they are usually more remunerative than cotton, sugar cane and rice are by preference cultivated in a great portion of the alluvial lands, and in recent years the prairie region of S. W. Louisiana has been converted into the most extensive region of rice culture in the United States. In 1899–1900 the valuation of the productions of the State was as follows:

Cotton and by-products, $36,000,000; sugar and molasses, $35,000,000; rice and by-products, $7,000,000; corn, oats and hay, $10,000,000; and fruits, vegetables, live stock, etc., $4,000,000 — total $92,000,000.

The animals on farms and ranches in 1899 were: Horses, 145,029, valued at $5,228,953; mules, 92,722, valued at $5,827,072; sheep, 113,205, valued at $179,203; milch cows, 123,232, valued at $2,704,942; and other cattle, 171,729, valued at $2,299,702.

Manufactures.— There were reported by the United States census in 1900, 4,350 manufacturing establishments employing $113,084,294 in capital, 46,154 persons, paying $15,385,715 in wages, and $82,299,893 for materials; and having finished products valued at $121,181,683. The principal manufactures were sugar and molasses, lumber and timber products, cottonseed oil and cake, foundry and machine shop products, and clothing.

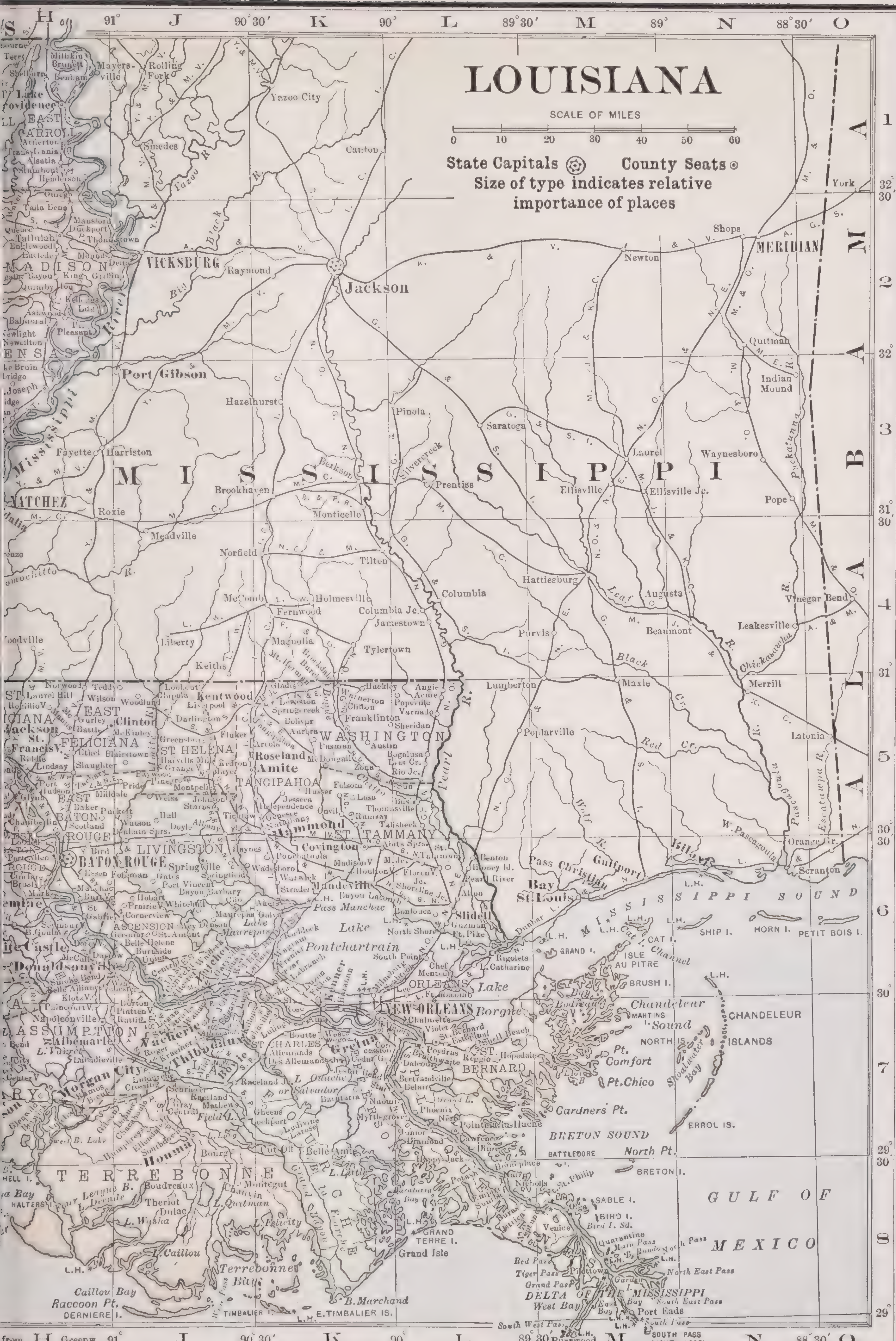
Geology.—The underlying strata of the State are of Cretaceous formation, and are covered by alluvial deposits of Tertiary and post-Tertiary origin. A large part of Louisiana is the creation and product of the Mississippi river. It was originally covered by an arm of the sea, and has been built up by the silt carried down the valley by the great river.

Mineralogy.— The mineral resources of the State are imperfectly known and only partially developed. Brown coal is found in the Northwest, iron in North Louisiana, and sulphur in South Louisiana. Salt is found on five islands of the Gulf coast, and is of the purest quality. Other discoveries of salt have recently been made on the mainland. Salt is extensively mined on Avery's Island and at Belle Isle, and its output is extensive. Petroleum is found in large quantities on the Gulf coast, and recent discoveries promise developments equal to those in the neighboring oil fields of Texas. Limestone, gypsum, and marble occur in several localities.

Banking.— In 1901 there were 27 National banks in operation, with $4,192,580 in capital, $2,667,364 in outstanding circulation, and $2,372,750 in United States bonds. There were also 66 State banks, with $4,255,287 capital, and $631,295 surplus. In the year ending Sept. 30, 1901, the exchanges at the United States clearing house at New Orleans aggregated $607,418,307; an increase over the previous year of $107,047,236.

Commerce.—New Orleans is the second largest exporting city in the Union. The imports of merchandise at this port amounted to $21,093,005 in 1900–1901, and the exports $152,911,748. The imports of gold

A 94°30′ B 94° C 93°30′ D 93° E 92°30′ F 92° G Long. West
1 2 3 4 5 6 7 8 32° 31° 30° 29°
CADDO
BOSSIER
WEBSTER
CLAIBORNE
UNION
MOREHOUSE
OUACHITA
CLAIBORNE
LINCOLN
Caddo Lake
Lodwick
Jeffersen
Terrans
Karnack
Harleton
Pine Ridge
Marshall
Leigh
Kildare
Lodi
Shreveport
Minden
Homer
Farmer
Monroe
Bastrop
Longview
Jonesville
Waskom
Greenwood
Bethany
Haughton
Dubberly
Mt. Lebanon
Ruston
Grambling
Vernon
Okalousa
Jackson
Bienville
Libertyhill
Quitman
Dalley
Chatham
Henderson
Carthage
Boren
Gary
(Zodar Sta.)
Ragley
Springridge
Keithville
Stonewall
Frierson
Crosskeys
Gloster
Keatchie
Whatley
Longstreet
Grand Cane
Mansfield
DE SOTO
Natchitoches
Mt. Enterprise
Timpson
Joaquin
Tenaha
Logansport
Mansfield Jc.
Haker
Cook
Spider
Oxford
Rambin
Lake End
Ajax
Lenoir
Benson
Pelican
Butler
Tullos
Harrisonburg
Caro
Center
Hatcher
Converse
Pleasant Hill
Mitchell
Sardis
Boleyn
Marthaville
Thaxton
Shamrock
Robeline
Natchez
Sabine
Watterman
Nacogdoches
San Patricio
Noble
Bayou Scie
Victoria
Provencal
Vowells Mill
Clyde
Zwolle
Ft. Jesup
Loring
Blue Lake
San Augustine
SABINE
Many
Type
Montrose
Cypress
Bellwood
Derry
Marco
Colfax
LA SALLE
GRANT
Wooden
E. Pendleton
Negreet
Fisher
Coburn
Florien
Mill Creek
Kisatchie
Lotus
Chopin
Gorum
Lena Sta.
Zimmerman
Mink
Flatwoods
Mora
Edwards Jc.
Boyce
Rapides
Lamothe
Wilda
Alexandria
Manton
Diboll Jc.
Prestridge
Broadus
Hemphill
Christie
Columbus
Hornbeck
Barham
Jerguson
Toro
Orange
(Orangeville Sta.)
Simpson
Stille
Hoyt
Anandale
Auburn
Schley
Bolton
Walnut Hill
Mayo
Hicks
Leander
Woodworth
Hawthorn
Front
Diboll
Lufkin
Manning
Leesville
RAPIDES
Eddy
Caney
Burr Ferry
Elmwood
Stables
Cooper
Whiskachitto
Fullerton
Sycamore
Wye
Bruce
Forest Hill
Longleaf
Pickering
Nelume
Almadans
Rosepine
Ludington
Nitram Jc.
Ashmore
Osborn
Pitkin
Elizabeth
Glenmora
Camden
Jasper
Colmesneil
Newton
Neches
DeRidder
April
Shear
Merry V.
Peterton
Pawnee
Turkey Cr.
Bayou Chicot
Bigcane
Bayou Current
Campwood
Bon Weir
Kirbyville
Call Jc.
Adsul
Call
Hall City
Carson Mill
Carson
Boswell
Bundick
Sugartown
Oakdale
Gract
Tennille
Ward
Canton
Simmons
Singer
Newlin
Walla
Dry Creek
Ennes
Jumata
Bancroft
Blewett
Smyth Jc.
Woodring
Longville
Le Blanc
Reeves
Bear
Mystic
Scale
Wasey
Exart
Fulton
Le Blanc
Kinder
Wilburton
Oberlin
Builder
Fords
Burrisa
(Houston Sta.)
Colcasieu R.
Beaver
Pine Prairie
Ville Platte
Mamou
Lecia
Eggard
Chatagnier
Andrepont
Opelousas
Pt. Barre
Washington
ST. LANDRY
EVANGELINE
Durald
Tyrone
Flynn
Savoy
Armide
Cortableau
Atwood
Leonville
Grand Coteau
Arnaudville
Sunset
Lawtell
Church Pt.
Coe
Rhineland
Gassler
Iota
Maxie
Branch
De Clouet
Warren
Buna
Kountze
Bragg
Baylor
Fields
Pendleton
De Quincy
Pearl
Topsy
Phillips
Bluff
Gulary
Elton
S. Basile
Lawtell
Redfish
Silsbee
Lillard
Starks
Fields
(Lucas Sta.)
Turner
Gillis
Hecker
Fenton
Nezpique
CALCASIEU
Lake Charles
ACADIA
Ariola
S. L. Jc.
Ruliff
Mauriceville
Lockport Jc.
Nibletts Bluff
Edgerley
Sulphur
Vinton
Westlake
Lucasine Crossing
Bellevue
Bell City
Holmwood
Iowa
Jennings
Mermentau
Lake Arthur
Crowley
Rayne
Lafayette
Evangeline
Egan
Ellis
Scott
Vatican
Breaux Bridge
Ruth
Estherwood
Morse
Midland
LAFAYETTE
ST. MARTIN
Hardin
Terry
Orange
Jacksonville
(Toomey Sta.)
Vincent
Calcasieu
S. R. Hayes
Thornwell
Lowry
Rice
Andrew
Maurice
Cossinade
Kaplan
Lakeside
Parc Perdue
Derouen
Delacroix
Loreauville
BEAUMONT
Pt. Neches
Nome
Black L.
Grandlake
Sweetlake
Lake Miserie
Gulley
Shellbank
Hackberry
Projected Calcasieu Inter-coastal
Abbeville
Erath
Perry
Bancker
Esther
Delcambre
Henry
Avery I.
Salt Mine
Patout
Murphy
Ashton
Gray
Grand Lake
Sabine
Port Arthur
W. Port Arthur
Lake
CAMERON
Lake
Mud L.
Cameron
Creole
Mud L.
L.H.
Berry
Winnie
Sabine Pass
Sabine
Johnsons Bayou
Louisiana Pt.
Sabine Pass
Calcasieu Pass
Grand Chenier
White Lake
Canal
VERMILION
Pecan Island
Vermilion Bay
Shell Pt.
West Cote Blanche Bay
MARSH I.
Frank
East Br.
High Island
Pt. Bolivar
Galveston Entrance
GALVESTON
Southwest Pass
South Pt.
RABBIT I.
Pt. Chevreuil
GULF OF MEXICO
Hammond's New 8 x 11 Map of Louisiana
Copyright, 1909, by C.S. Hammond & Co., N.Y.



LOUISIANA
SCALE OF MILES
0 10 20 30 40 50 60
State Capitals
County Seats
Size of type indicates relative importance of places
H J K L M N O
91° 90° 30′ 90° 89° 30′ 89° 88° 30′
from Greenw.
1 2 3 4 5 6 7 8
32° 30′ 32° 31° 30′ 31° 30° 30′ 30° 29° 30′ 29°
MISSISSIPPI
ALABAMA
Yazoo City
Rolling Fork
Mayersville
Smedes
Canton
VICKSBURG
Raymond
Jackson
Port Gibson
Hazelhurst
Pinola
Fayette
Harriston
NATCHEZ
Roxie
Meadville
Brookhaven
Monticello
Norfield
Tilton
McComb
Holmesville
Fernwood
Liberty
Magnolia
Keiths
Tylertown
Columbia
Columbia Jc.
Jamestown
Prentiss
Silvercreek
Berkson
Saratoga
Laurel
Ellisville
Ellisville Jc.
Waynesboro
Pope
Newton
Shops
MERIDIAN
York
Quitman
Indian Mound
Hattiesburg
Augusta
Beaumont
Purvis
Lumberton
Maxie
Merrill
Leakesville
Vinegar Bend
Latonia
Poplarville
Orange Gr.
Scranton
Biloxi
Gulfport
Pass Christian
Bay St. Louis
Woodville
Kentwood
Clinton
EAST FELICIANA
ST HELENA
WASHINGTON
TANGIPAHOA
Roseland
Amite
Franklinton
Bogalusa
Hammond
ST TAMMANY
Covington
Mandeville
Slidell
EAST BATON ROUGE
BATON ROUGE
LIVINGSTON
Springville
ASCENSION
Donaldsonville
Lake Maurepas
Lake Pontchartrain
Pass Manchac
ORLEANS
NEW ORLEANS
Lake Borgne
Kenner
Gretna
ST CHARLES
ST. BERNARD
ASSUMPTION
Napoleonville
Thibodaux
Vacherie
Morgan City
Houma
TERREBONNE
Terrebonne Bay
Caillou Bay
Raccoon Pt.
DERNIERE I.
TIMBALIER I.
E. TIMBALIER IS.
B. Marchand
Grand Isle
GRAND TERRE I.
Barataria Bay
MISSISSIPPI SOUND
SHIP I.
HORN I.
PETIT BOIS I.
CAT I.
Cat I. Channel
ISLE AU PITRE
BRUSH I.
GRAND I.
Chandeleur Sound
CHANDELEUR ISLANDS
NORTH IS.
Pt. Comfort
Pt. Chico
Shoalwater Bay
Gardners Pt.
BRETON SOUND
North Pt.
BATTLEDORE
BRETON I.
ERROL IS.
SABLE I.
BIRD I.
GULF OF MEXICO
Venice
Pilottown
Port Eads
Burrwood
DELTA OF THE MISSISSIPPI
South West Pass
South Pass
North East Pass
South East Pass
SOUTH PASS LIGHT VESSEL
Pearl R.
Mississippi River
Pascagoula R.
Chickasawha R.
Leaf R.
Black Cr.
Red Cr.
Wolf R.
Escatawpa R.
Puckatunna

and silver were $298,510 in gold and $199,527 in silver; exports, gold, $27,809; silver, $55,217. The receipts of internal revenue amounted to $2,443,558.

Education.— In 1900 the school population was 483,600; the enrollment in public schools, 196,169; and the average daily attendance, 146,323. There were 3,302 public school buildings; 4,157 teachers; public school property valued at $1,125,000; receipts for the year $1,126,112; and expenditures, $1,126,112. For higher education there were 22 public high schools, 30 private secondary schools, the Louisiana State Normal School at Natchitoches, the New Orleans Normal School at New Orleans, the Louisiana State University and Agricultural and Mechanical College at Baton Rouge, the Tulane University at New Orleans, the Industrial College at Ruston in North Louisiana, the Industrial College at Lafayette in Southwestern Louisiana, the Institution for Deaf Mutes and the Institution for the Blind at Baton Rouge, Jefferson College, Centenary College, Keachie College, Mansfield College, Silliman Collegiate Institute, College of the Immaculate Conception, St. Joseph's Convent, and other institutions of lesser note. The Southern University, Leland University, New Orleans University, and the Straight University are for the benefit of the colored race.

Churches.— The strongest denominations in the State are the Roman Catholic; Regular Baptist, colored; Regular Baptist, South; Methodist Episcopal, South; African Methodist; Protestant Episcopal; and Presbyterian, South. In 1900 there were 820 Evangelical Sunday-schools, with 6,151 officers and teachers and 48,559 scholars.

Railroads.— The total length of railroads in the State on Jan. 1, 1901, was 2,058.72 miles, with 896.80 miles of sidings, double tracks, etc.

Postoffices and Periodicals.— In 1901 there were 1,191 postoffices of all grades, and 193 periodicals, of which 24 were daily, 3 semi-weekly, 146 weekly, 6 semi-monthly, and 14 monthly.

Finance.— The assessed valuation of all taxable property in 1900 amounted to $276,568,507. For 1901 the assessments show the remarkable increase of values in one year of $24,555,815, making a total of $301,215,222. The total bonded debt on April 1, 1901, was $10,877,801, and the floating debt was $913,597.

State Government.— The governor is elected for a term of four years and receives a salary of $5,000 per annum. Legislative sessions are held biennially and are limited in length to 60 days each. The Legislature has 39 members in the Senate, and 114 in the House, each of whom receives $5 per day and traveling expenses. There are 7 representatives in Congress under the new apportionment. The State government in 1904 was Democratic.

History.—Louisiana was colonized by the French in 1699, and was ceded in 1717 to a chartered company (one of the schemes of the notorious Law). In 1732 it was resumed by the crown; in 1763 ceded by France to Spain; in 1800 re-ceded to France; and in 1803 purchased from France by the United States for $15,000,000. The territory comprehended in this purchase included the present State and all the country now occupied by Arkansas, Missouri, Iowa, Kansas, Nebraska, Indian Territory, North and South Dakota, and the greater part of Minnesota. By the act of Congress of March 26, 1804, the territory was divided into two governments, that of Orleans including the present State of Louisiana, and that of Louisiana, including all the country N. and W. of it. On Feb. 11, 1811, an Act of Congress enabled the inhabitants to form a constitution and State government; and by a subsequent act the territory of Orleans was admitted to the Union, under the title of the State of Louisiana, on April 30, 1812. The State seceded from the Union Jan. 25, 1861, and became the theater of important military operations during the ensuing Civil War. On July 13, 1868, Louisiana was readmitted to representation in the Federal Congress, and in 1877 the governments growing out of reconstruction ceased and stable government was resumed. With this resumption has come the era of progress which is shown in the foregoing. W. W. HEARD.

Louisiana Purchase, the territory purchased from France in 1803. See ANNEXATION.

Louisiana Purchase Exposition, an international exposition in St. Louis, Mo., to commemorate the centennial of the purchase of the Louisiana Territory by the United States from France in 1803; held, under Acts of Congress, from April 30 to Dec. 1, 1904. The National Commission comprised: Thomas H. Carter, Montana, president; Martin H. Glynn, New York, vice-president; John M. Thurston, Nebraska; William Lindsay, Kentucky; George W. McBride, Oregon; Frederick A. Betts, Connecticut; John M. Allen, Mississippi; John F. Miller, Indiana; Philip D. Scott, Arkansas; and Joseph Flory, secretary. The Louisiana Purchase Exposition Company, incorporated with an authorized capital of $6,000,000, elected the following officers: David R. Francis, president; Corwin H. Spencer, first vice-president; Samuel M. Kennard, second vice-president; Daniel M. Houser, third vice-president; Cyrus P. Walbridge, fourth vice-president; Seth W. Cobb, fifth vice-president; Charles H. Huttig, sixth vice-president; August Gehner, seventh vice-president; Pierre Chouteau, eighth vice-president; William H. Thomp-

Louisiana Purchase Exposition

son, treasurer; Walter B. Stevens, secretary; James L. Blair, general counsel. The following officers were chosen as a Commission of Architects and Committee on Grounds: Isaac S. Taylor, chairman and director of works; Widman, Walsh, and Boisselier, St. Louis; Barnett, Haynes, and Barnett, St. Louis; Eames and Young, St. Louis; Van Brunt and Howe, Kansas City; Carrere and Hastings, New York; Cass, Gilbert, New York; Walker and Kimball, Omaha and Boston; Theodore C. Link, St. Louis. A Division of Exploitation was organized with the following: Thomas W. Cridler, Europe; John Barrett, Oriental countries; Vittorio Zeggio, Italy; José de Olivares, Argentina, Bolivia, Chile, Paraguay, Uruguay; John Taylor Lewis, Brazil; Ernest H. Wands, Colombia, Ecuador, Peru, and Venezuela; Charles M. Pepper, Cuba; John Rice Chandler, Costa Rica, Guatemala, Honduras, Nicaragua, and Salvador; F. H. Wennerstrum, Denmark, Norway, and Sweden; resident representatives: Joseph H. Brucker, Berlin; Palmer L. Bowen, Paris; and George F. Parker, London. The following were selected as a Board of Lady Managers: Miss Helen M. Gould, New York city, president; Mrs. James L. Blair, St. Louis, Mo., vice-president; Mrs. Louise E. Frost, Winona, Minn.; Mrs. John A. McCall, New York city; Mrs. John M. Holcombe, Hartford, Conn.; Miss Anna L. Dawes, Pittsfield, Mass.; Mrs. Fannie L. Porter, Atlanta, Ga.; Mrs. Frederick Hanger, Little Rock, Ark.; Mrs. W. E. Andrews, Hastings, Neb.; Mrs. Helen Boice Hunsicker, Philadelphia, Pa.; Mrs. Emily W. Roebling, Trenton, N. J.; Mrs. Jennie Gilmore Knott, Louisville, Ky.; Mrs. Belle Everest, Atchison, Kan.; Mrs. William H. Coleman, Indianapolis, Ind.; Mrs. M. H. DeYoung, San Francisco, Cal.; Mrs. Margaret P. Daly, Anaconda, Mont.; Mrs. Finis P. Ernest, Denver, Col.; Mrs. Edward L. Buchwater, Springfield, Ohio; Mrs. Mary Phelps Montgomery, Portland, Ore.

The site chosen for the exposition was the western half of Forest Park with adjacent lands, having a combined area of 1,240 acres. The clearing of the site was begun in August, 1901; the first stake was driven Sept. 3 following; and the grounds were dedicated April 30, 1903.

The exposition was planned to cover every important activity of the human hand and mind, and the Division of Exhibits was subdivided into the following departments: Education, Art, Liberal Arts, Manufactures, Machinery, Electricity, Transportation Exhibits, Agriculture, Horticulture, Forestry, Mines and Metallurgy, Fish and Game, Anthropology, Social Economy, Physical Culture, and Live Stock. In addition to these there were under the direction of the Division three bureaus, Music, Aeronautics, and Refrigeration, and a Committee on International Congresses. These departments were subdivided into an extensive series of special groups and classes to cover the principal features of the earth's resources and man's activity.

In laying out the grounds provision was made for what was called the "Main Picture," a composition of avenues and buildings in the general form of a fan, the avenues, each from 300 to 600 feet wide and enriched with flowers and shrubbery, representing the ribs. At the converging point of the avenues an architectural composition was planned to occupy the slope of a natural hill, down which pour three great cascades. At the source of each of these cascades the plan showed an ornamental circular building, the central one being designed for a Festival Hall and the side ones for restaurant pavilions. Connecting these buildings is a semi-circular colonnade, and between the columns are 14 large statues symbolical of the States that have been created out of the original Louisiana Territory. The cascades pour into an immense basin, from which branches a lagoon system which touches each of the eight exhibit buildings in the "Main Picture," and completely surrounds two of them. In the central avenue the lagoon is 300 feet wide. This avenue is further enriched by the Louisiana Purchase Monument, a towering, sculpture-decked shaft, and a number of fine equestrian and portrait statues by famous American sculptors. All the buildings in the "Main Picture" are ivory white, with mural paintings on screen walls and in shaded places, and each of the palaces on the main avenue has a colonnade façade, three of them showing inner courts of great beauty.

The chief of the buildings designed to display exhibits are: The United States Government Building, having a gilded dome supporting a large quadriga, and containing all the exhibits of the departments and bureaus of the Federal Government; 800 feet long by 250 feet wide; cost $450,000. Palace of Education, devoted to education and social economy, 750 feet long by 525 feet wide; cost $367,363. Art Palace, comprising three fire-proof pavilions, the central one being an international court of sculpture; also having separate divisions for works produced between 1803 and 1893 and between 1893 and 1903, and for loans from public and private collections; 836 feet long by 450 feet wide; cost $1,000,000. Palace of Liberal Arts, for exhibits in science, art, and industry, 750 feet long by 525 feet wide; cost $47,917. Palace of Manufactures and Palace of Varied Industries, two buildings, each 1,200 feet long by 525 feet wide; cost together $1,432,080. Palace of Transportation, the exterior combining the architectural features of an exposition building and of a railroad station; contain-

ing over 5 miles of track, and having sections for exhibits of marine transportation, automobiles, and road and farm vehicles; 1,300 feet long by 525 feet wide; cost $692,000. PALACE OF AGRICULTURE, the largest building on the exposition grounds, showing collections of all kinds of implements used in tillage and of machinery used in cultivation and harvesting; 1,600 feet long by 500 feet wide; cost $800,000. PALACE OF ELECTRICITY, containing exhibits illustrating the development and applications of electricity and also the largest wireless-telegraph station in the world; 750 feet long by 525 feet wide; cost $415,352. PALACE OF MINES AND METALLURGY, showing the methods of working mines and quarries and of prospecting for mineral deposits, collections of minerals and stones, models, maps and photographs illustrating the nature and extent of mineral deposits, and the literature of mining and metallurgy; 750 feet long by 525 feet wide; cost $498,000. FISH PAVILION, containing the indoor exhibits of the Departments of Fish and Game and of Forestry, having a central nave, 85 feet wide, an aquarium, 185 feet long by 35 feet wide in the east end of the building, two lines of tanks separated by an aisle 15 feet wide, a series of pools for large fish and another for aquatic animals, the central one being 40 feet in diameter and 5 feet deep; 600 feet long by 300 feet wide; cost $171,000. PALACE OF HORTICULTURE, with a conservatory 230 feet long, 230 feet wide, and 40 feet high; 800 feet long by 400 feet wide; cost $228,872; and MACHINERY HALL, 1,000 feet long by 526 feet wide; cost $510,090. Among other notable buildings are the HALL OF INTERNATIONAL CONGRESSES, 257 feet long by 46 feet wide; the new building of WASHINGTON UNIVERSITY, which was leased to the exposition officers, in consideration of which they erected buildings for the university's use after the close of the exposition; and the TEMPLE OF FRATERNITY for the use of members of fraternal and beneficiary organizations throughout the world.

The following shows the appropriations for State and Territorial buildings: Alaska, $50,000; Arizona, $60,000; Arkansas, $100,000; California, $300,000; Colorado, $250,000; Connecticut, $100,000; Florida, $25,000; Georgia, $50,000; Hawaii, $30,000; Idaho, $40,000; Illinois, $262,000; Indiana, $150,000; Indian Territory, $50,000; Iowa, $200,000; Kansas, $275,000; Kentucky, $100,000; Louisiana, $145,000; Maine, $50,000; Maryland, $50,000; Massachusetts, $100,000; Michigan, $125,000; Minnesota, $100,000; Mississippi, $75,000; Missouri, $1,000,000; Montana, $125,000; Nebraska, $120,000; New Jersey, $100,000; New Mexico, $30,000; New York, $350,000; Nevada, $112,000; North Carolina, $75,000; North Dakota, $51,086; Ohio, $100,000; Oklahoma, $61,000; Oregon, $100,000; Pennsylvania, $350,000; Philippine Islands, $300,000; Porto Rico, $20,000; Rhode Island, $60,000; South Carolina, $63,900; South Dakota, $35,000; Tennessee, $140,000; Texas, $100,000; Utah, $60,000; Virginia, $100,000; Washington, $105,000; West Virginia, $95,000; Wisconsin, $175,000; Wyoming, $25,000. The following shows the appropriations for foreign buildings: Argentina, $80,000; Austria, $100,000; Belgium, $1,000,000; Bolivia, $50,000; Brazil, $600,000; British Honduras, $25,000; Canada, $100,000; Cape Colony, $50,000; Ceylon, $17,000; Chile, $50,000; China, $350,000; Colombia, $50,000; Costa Rica, $50,000; Cuba, $80,000; Denmark, $50,000; Ecuador, $12,250; France, $1,000,000; Germany, $1,000,000; Great Britain, $500,000; Greece, $50,000; Guatemala, $25,000; Haiti, $50,000; Italy, $100,000; Japan, $400,000; Mexico, $500,000; Morocco, $10,000; Netherlands, $50,000; Nicaragua, $50,000; Norway, $50,000; Paraguay, $25,000; Peru, $25,000; Russia, $100,000; Salvador, $25,000; San Domingo, $25,000; Siam, $100,000; Spain, $50,000; Sweden, $32,400; Uruguay, $10,000; Venezuela, $25,000.

In December, 1903, while searching the archives of the French Foreign Office for original documents relating to the sale of the Louisiana Territory to the United States, E. Spencer Pratt, formerly United States Minister to Persia, brought to light an autograph letter of Louis XV. giving the territory to his cousin, then King of Spain, as a present, and stating that he had previously offered it to the English in place of Florida, but that they had refused it.

Louisiana State University, an educational non-sectarian institution, in Baton Rouge, La.; opened in 1860; has grounds and buildings valued at over $700,000; endowment exceeding $320,000; volumes in the library, about 28,000; scientific apparatus, etc., over $80,000; ordinary income, about $160,000; average number of faculty, 56; students, 650; graduates, 600.

Louis Philippe (lō′-ē fi-lēp′), King of the French; born in Paris, France, Oct. 6, 1773. He was the eldest son of Duke Louis Philippe Joseph of Orleans, surnamed Égalité, and during his father's lifetime he was known as Duke of Chartres. He entered the army in 1791, and favoring the popular cause in the Revolution he took part in the battles of Valmy and Jemappes; was present at the bombardment of Venloo and Maestricht, and distinguished himself at Neerwinden. Dumouriez had formed a scheme for placing him on the throne as a constitutional monarch, and being included in the order of arrest directed against Dumouriez, in 1793, he took refuge within the Austrian territory. For 21 years he re-

mained exiled from France, living in various European countries and in America. He had become Duke of Orleans on the death of his father in 1793, and in 1809 he married the daughter of Ferdinand IV. of Naples. After the fall of Napoleon I. he returned to France and was reinstated in his rank and property. At the revolution of July, 1830, he was made "Lieutenant-General of the Kingdom," and in August became king of the French. He reigned for 18 years, when the revolution of 1848 drove him from the throne to England, where he remained till his death in Claremont, Aug. 26, 1850.

Louis Quatorze (kä-tōrz′), the name given to a meretricious style of architecture and internal decoration which prevailed in France in the reign of Louis XIV. It was marked by a deterioration of taste, the natural laws of architecture being more and more neglected, and replaced by certain conventional rules for the application of the Roman columnar orders. The principal architect of this style was Jules Hardouin Mansard, by whom were built the palaces of Versailles (1647–1708), Marly, the Grande Maison, and also the Invalides at Paris. The windows are larger, the rooms more lofty, than in the preceding period, and in everything there was a striving after pomp and sumptuousness. In internal decorations mirrors were freely introduced, and may be said to have become a distinctive feature of interiors. Gilt stucco work was largely used, the scroll and shell patterns being the characteristic features of ornamental decoration, the panels being formed by chains of scrolls, concave and convex alternately, but symmetry of arrangement was largely neglected.

Louis Quinze (ka*ngz*), the name sometimes given to the style of architecture and internal ornamentation prevailing in France during the reign of Louis XV. It is often known under the designation Rococo (*q. v.*). Internal arrangement and decoration are the main characteristics of the style of this period, and in this direction the best results were doubtless obtained. Large and lofty rooms, as well as scope of display, were indispensable; consequently this style of embellishment was most happily carried out in state apartments, especially in princely castles and palaces and the mansions of the aristocracy. There was the greatest freedom in the treatment of architectural forms, to the disregard of all laws, and free scope was given to the most fantastic combinations. Curved lines superseded all straight lines both in ground plans and in designs, while the most ordinary and characteristic embellishments were volutes, shell-fish and scrolls, groups of fruit, garlands of flowers, hangings, etc.

Louisville, a city and county-seat of Jefferson co., Ky.; on the Ohio river, and on the Louisville and Nashville; the Louisville, Paducah, and Southwestern; the Louisville, Cincinnati and Lexington; the Jefferson and Indianapolis, and the Louisville, New Albany, and Chicago railroads. The city is built at the falls of the Ohio, 400 miles from its mouth, and is also known as Falls City, a name derived from these rapids which are 27 feet high. Area, 20 square miles; pop. (1890) 161,129; (1900) 204,731; (1910) 223,928.

Municipal Improvements.—The city owns an extensive waterworks system costing $5,500,000. The reservoirs have a storage capacity of 32,000,000 gallons, and the water is distributed through 225 miles of mains. The consumption averages 16,000,000 gallons per day. There are in all 286 miles of streets, of which 170 miles are paved. The sewer system covers about 100 miles. The city is lighted by electricity at an annual cost of about $135,000. The average cost of the police department is about $275,000 a year, and that of the fire department about $237,000. The annual death rate averages 16.02 per 1,000.

Notable Buildings.—The public buildings of Louisville are of a solid and substantial character. They include the Court House, which is a limestone structure costing $1,000,000; the City Hall, built in the composite style, cost, $500,000; the United States Government Building; Masonic Temple; Commerce Building; Masonic Widows' and Orphans' Home; the Church Home for Females; John N. Norton Memorial Infirmary; St. Vincent's Orphan Asylum; United States Marine Hospital; the Building of the Polytechnic Society of Kentucky; State Blind School; House of Refuge for Girls, etc.

Manufactures.—Louisville has upward of 2,000 manufacturing establishments. It is the center of the tobacco trade of the United States, and has very large interests in the manufacture of iron piping, pig-iron, woolen jeans, leather, and furniture. It is the great distributing market for all the fine whiskies manufactured in Kentucky and also has a number of large breweries. An important industry is the manufacture of cement from the limestone, dug from flats under the river below the dam, which are exposed when the water is low.

Banks.—On Dec. 3, 1900, there were 8 National banks in operation, having a combined capital of $4,645,000; and a surplus of $1,652,500. The exchanges at the United States clearing house in the year ending Sept. 30, 1900, aggregated $414,413,359, an increase over the preceding year of $23,298,062.

Education.—At the close of the school year 1898–1899 the children of school age aggregated 56,236; the enrollment of pub-

lic day schools was 27,408, and in private and parochial schools (estimated) 7,000; and the average daily attendance in public day schools was 20,686. There were 553 teachers; 63 buildings used for school purposes; and public school property valued at $1,130,085. The institutions of higher education include the Kentucky School of Medicine, a normal school, Southwestern Homeopathic Medical College, colleges of pharmacy and dentistry, National Medical College for the Colored Race, etc., and the Southern Baptist and Presbyterian Theological Seminaries.

Finances.—On Jan. 1, 1901, the total bonded debt of the city was $8,206,000; the sinking funds, $1,461,604; net debt, $6,744,396. The assessed valuations in 1901 were: Real estate, $90,200,000; personal property, $33,900,000; total, $124,100,000; tax rate, $21.25 per $1,000.

History.—The first settlement was made here in 1778 by 13 families under Col. George Roger Clarke. Two years later the place was incorporated by an act of the Virginia Legislature, and called Louisville in honor of Louis XVI. of France, whose soldiers were then aiding the Americans in the Revolutionary War. During its early history it suffered greatly from Indian attacks. It was chartered as a city Feb. 13, 1828. In 1890 it was visited by a cyclone which destroyed $3,000,000 worth of property and killed 100 persons.

Lounsbury, Thomas Raynesford, an American scholar; born in Ovid, N. Y., Jan. 1, 1838. He was graduated at Yale in 1859, and led the life of a student in Anglo-Saxon and early English, and a writer in critical and biographical works, till 1862, when he enlisted as a volunteer in the Union army, served as 1st lieutenant of the 126th New York Volunteers, and was mustered out at the close of the war; after 1871 occupied the chair of Professor of English in the Sheffield Scientific School of Yale University. Among his published works are Chaucer's "House of Fame" and "Parlement of Foules"; "History of the English Language" (1879); biography of James Fenimore Cooper in "American Men of Letters" series (1883); and his crowning work, which brought him great celebrity, "Studies in Chaucer, his Life and Writings" (3 vols. 1892).

Lourdes (lörd), a town of France, in the department of Hautes-Pyrénées, arrondissement of and 6 miles N. N. E. of Argeles, on the Gave-de-Pau, 10 miles W. by N. from Bagnères-de-Bigorre, on the Toulouse and Bayonne railroad; situated at the foot of an almost inaccessible rock, and commanded by a strong castle, now used as a prison; in the neighborhood are marble and slate quarries. In modern times a famous place of pilgrimage, a fact due to the belief that in 1858 the Virgin Mary appeared in a grotto in the neighborhood, above which a magnificent basilica has since been erected. Pop. (1901) commune, 8,708.

Loure (lör), or **Louvre** (lövr), a dance adapted to an air called "L'aimable vainqueur" ("The Amiable Conqueror") said to have been a favorite of Louis XIV. Some authors, however, consider it to have been a kind of jig or a waltz. The name is derived from the word *lourer*, to slide.

Louse, the genus *Pediculus.* The sexes of lice are distinct. The female is oviparous, producing eggs, popularly called nits. The young are hatched in five or six days, and in 18 these are capable of reproduction. Three species are parasitic in certain circumstances on man. The body or clothes louse, *Pediculus corporis* or *vestimentorum;* the head or common louse, *P. capitis;* and the pubic or crab louse, *P. pubis.* The first species lives in the folds of the clothing in some elderly and uncleanly people. It has the abdomen three times as broad as the thorax. It is the insect which produces the disease called phthiriasis, unless the agent in this case be of fourth species *P. tabescentium.* The third plague of Egypt was an immense multiplication of Heb. *kinnim, kinnom, kinnam,* in the Bible rendered "lice." (Exod. viii. 16–18; Ps. cv. 31). What insect is intended has been much debated, some pronouncing for the louse, others for the gnat. Bird lice constitute the order *Mallophaga.* Plant lice is the ordinary English name for Aphides.

Louvain (lö-va*ng'*) (German Löwen, Flemish Leuven), a city in the Belgian province of Brabant, 19 miles by rail E. of Brussels; chief industries, bell-founding, brewing, and the manufacture of leather, paper, lace, starch, and chemicals; has a town-house, a richly-decorated Gothic building (1448–1469); the Church of St. Peter, with a beautiful flamboyant rood-loft, a wrought-iron chandelier by Quentin Matsys, and some good pictures; St. Gertrude's Church possessing the finest carved oak stalls in Belgium; and the Weavers' Hall (1317), appropriated by the university in 1679. In 891 King Arnulf gained here a great victory over the Northmen, and built a castle against them; it used to be known as Cæsar's Castle; a few fragments of it still remain. In the 14th century the town was rich, prosperous, and large (200,000 inhabitants), due to its cloth manufactures and its position as the capital of Brabant (from 994). In 1382 the townsmen revolted against their rulers, and the harsh punishment meted out to them drove large numbers away to England. The old walls, forming a circuit of 5 miles, have been demolished. A severe blow was struck at the prosperity of Louvain by a terrible visita-

tion of the plague in the 16th century. Pop. (1906) 42,107.

L'Ouverture, Toussaint. See TOUSSAINT, L'OUVERTURE.

Louvois (lö-vwä′), **François Michel le Tellier, Marquis de,** the war-minister of Louis XIV.; born in Paris, France, Jan. 18, 1641. His father was Chancellor and Secretary of State in the war department; the son joined him as assistant-secretary in 1662, and became war-minister in 1668. He created a standing army, gave it a corps of officers, recruited by compulsion from among the nobility, established commissariat and hospital services, and founded the Hôtel des Invalides and various orders or merit. In the drilling of the armies he had a ready agent in Martinet, whose name is not yet forgotten in military life. His labors bore their fruit in the great war that ended with the peace of Nimeguen (1678). During the following years Louvois took a leading part in the capture of Strasburg, in 1681, in time of profound peace, and in the persecution of the Protestants through the dragonnades after the Revocation of the Edict of Nantes. He died suddenly July 16, 1691.

Louvre, the name of a celebrated public building of Paris, situated in the N. part of the city, near the right bank of the Seine. In the time of Dagobert, a hunting-seat existed here, the woods extending over all the space which is now occupied by the N. part of the city down to the banks of the Seine. It was converted into a stronghold by Philip Augustus in 1214, and used as a state prison. Charles V. (1364–1380) added some embellishments to it, and brought thither his library and his treasury; and Philip I., in 1528, erected that part of the palace which is now known as the gallery of Apollo. Henry IV. laid the foundation of the gallery which connects the Louvre on the S. side with the Tuileries. Louis XIII. erected the center; and Louis XIV., according to the plan of the physician Perrault, the elegant façade toward the E., together with the colonnade of the Louvre. That monarch afterward chose the palace at Versailles, and from that time to the middle of the 18th century the works were interrupted. They were again commenced, under the direction of M. de Marigny, but were again interrupted by the Revolution, when the Louvre was declared to be national property, and its contents roughly handled by the populace. When the great number of works of art seized in Italy by the armies of Napoleon made it necessary to assign a proper place for their reception, the architect Raimond was selected to conduct the work; and Percier and Fontaine, who, in 1803, were charged by Napoleon with its resumption, built the great staircase of the museum proper, the museums of ancient art, the Egyptian museum, etc. After the Restoration the work was again brought to a stand-still; and nothing was done till after the revolution of 1848. Two million francs were devoted by the provisional government to the repairs of the old Louvre, under the direction of M. Duban, who restored the Apollo gallery. A resolution having been passed by the provisional government in favor of the completion of the whole building, the foundation-stone of the new Louvre was laid July 25, 1852, and the work completed in 1857, at a cost of nearly 6,000,000 francs.

The Louvre now consists of two parts — the old and new Louvre. The former is nearly a square, 576 feet long and 538 wide, and inclosing a quadrangle of about 400 feet square; its E. façade, looking toward the church of St. Germain l'Auxerrois, is a colonnade of 28 Corinthian columns, and one of the finest works of architecture of any age or country. The new Louvre consists of two vast lateral piles of buildings, projecting at right angles from the two parallel galleries, which formerly joined the old Louvre with the Tuileries, and formed the E. boundary of the Place du Carrousel. Turning into the Place Napoléon III., they presented on each side a frontage of 590 feet, intersected by three sumptuous pavilions intended to accommodate the minister of state, the minister of the interior, and the library of the Louvre. Some of the galleries on the upper stories are set apart for permanent and annual exhibitions of works of art. In the central part of the building is the council-chamber, to be used as an assembly-room for the public bodies of the empire on the opening of the legislature and on other solemn occasions. The Tuileries, before its burning by the communists and subsequent demolition, and the Louvre formed together a single palace of a magnitude and splendor which can be paralleled nowhere else. The total space covered or inclosed by the Louvre is nearly 60 acres.

Lovage, a genus of plants of the natural order *Umbelliferæ,* allied to *Angelica;* the fruit is elliptical; each carpel has five sharp somewhat winged ribs; and there are many vittæ in the interstices. Common lovage is a native of the S. of Europe, with ternate decompound leaves, and obovate, wedge-shaped leaflets. It is sometimes cultivated in gardens, and, notwithstanding its strong and peculiar odor, is used as a salad plant. Its roots and seeds are aromatic, acrid, and stimulant, and are used to cure flatulency and to excite perspiration. A liquor called "lovage" is made from them. Very similar in appearance and qualities is the only British species, Scottish lovage, a native of the sea-coasts. It is

eaten, both raw and boiled, by the Shetlanders. The flavor is aromatic, but acrid and very nauseous to those unaccustomed to it.

Lovat, Simon Frazer, Lord, a Scotch nobleman; second son of Thomas Frazer of Beaufort; born in 1667. In 1699, on the death of his father, he assumed the title of Lord Lovat, to which on the death of the 11th Lord Lovat his father had acquired a disputed claim. To secure the estates he effected a forced marriage with the Dow-

LOUVRE: WEST PAVILION.

ager Lady Lovat, for which he was outlawed and forced to take refuge in France. After a varied life of intriguing, first on the Hanoverian side and next on the Stuart, and a long imprisonment, his title, which had been objected to in various elections, was decided in his favor by the Court of Session in 1730. On the outbreak of the rebellion of 1745, Lovat acted with his usual duplicity, sending his son to fight for the Pretender while he himself remained at home, protesting his loyalty to the Hanoverian house. This conduct brought him to trial for treason, and resulted in his execution at Tower Hill, London, April 9, 1747.

Love, Alfred Henry, an American philanthropist; born in Philadelphia, Pa., Sept. 7, 1830. After 1867 he was editor of the "Voice of Peace and the Peacemaker" and "Court of Arbitration." In 1866 he aided in organizing the Universal Peace Union. He contributed to periodicals many articles on reformatory subjects and made many addresses.

Love, Court of, in mediæval France, a tribunal composed of ladies illustrious for their birth and talents, whose jurisdiction, recognized only by courtesy and opinion, extended over all questions of gallantry. Such courts existed from the 12th to the 14th century, while the romantic notions of love which characterized the age of chivalry were predominant. Some of the troubadours were often present to celebrate the proceedings in verse, and the songs of these minstrels were not infrequently reviewed and judged by the tribunal.

Love, an affection of the mind excited by beauty or worth of any kind, or by the qualities of an object which communicate pleasure, sensual or intellectual; ardent or passionate affection. It has been defined to be the internal feeling of good-will and kindness which one intelligent being bears to another, and the expression of that benevolence in words and acts which gratify and benefit another. In its full and proper sense the inward emotion and the outward act are united; for neither the doing good nor wishing good to another can of itself, in strict propriety, be termed love. Reciprocity is almost an essential element of love; all durable love is mutual. This passion forms one of the most prominent features of the Christian religion; and hence the incomparable superiority of Christianity to any other system of religion or morals. The sum of the Christian religion is love to God and love to our fellow-man. "If a man say that he love God and hate his brother, the truth is not in him." On what is commonly termed Platonic love very mistaken ideas prevail. It is generally regarded as a pure spiritual affection, abstracted from all carnal desires, and terminating in itself. The dialogue in which Plato treats of love is indeed very mystical and allegorical; but the thing principally intended to be brought out by him, and consequently that which ought to be understood by Platonic love, evidently is the ascent of the soul unto God by the steps of inferior and subordinate beauties — from the many beauties to the chief beauty, that is, to God. The steps thereof are, according to his idea, as follows: from the beauty of the soul to the beauty that is in the offices of life and laws; and from thence to the beauty that is in the sciences; and lastly, from the beauty of the sciences to the immense ocean of beauty, that is, God, of whom he gives a noble and magnificent description, and details the happiness of him that shall enjoy Him.

Love, God of, Camdeo, in Hindu mythology; Camadeva, in Persian mythology; Cupid, in Roman mythology; Eros, in Greek mythology; Freya, in Celtic mythology; Kama or Cama, in Indian mythology.

Love Birds, the genus *Agopornis* (separated from *Psittacula* by Jardine and Sel-

by), family *Psittacidæ*, sub-family *Androglossinæ;* habitat, the Melanesian and Australian provinces. Their popular name has reference to the affection the male displays toward the female, whether caged or wild. The furcula is wanting, and its place supplied by a ligament.

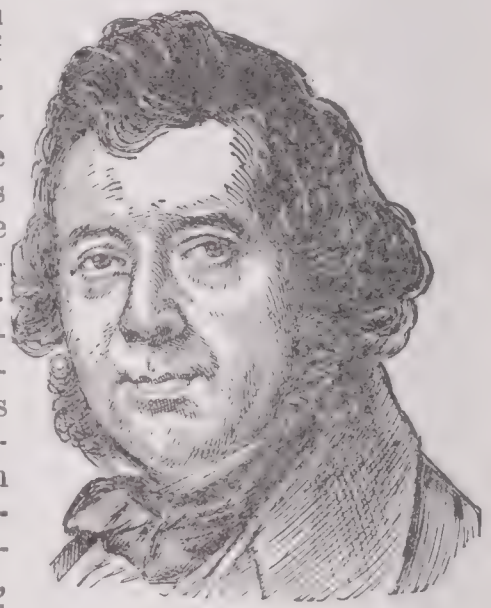
Lovedale, an important educational and mission station in South Africa, 650 miles N. E. of Cape Town, and about 40 miles W. of King Williamstown; founded in 1841, and generously supported by the Free Church of Scotland; besides giving a general education, it aims specially at training teachers for native schools, and teaching such arts of civilized life as printing, bookbinding, telegraphy, smith and carpenter work, etc. There was printed at Lovedale in 1887 a brief individual record of over 2,000 natives, as well as a few hundred Europeans, who had been educated here, and the result was creditable in a surprising degree to the institution.

Love Feasts, religious meetings held quarterly by the Wesleyan and other sects, owing their origin directly or indirectly to the labors of Wesley. None but members of the Church are admitted, except by the permission of the minister. Love feasts are retained in avowed imitation of the ancient Agapæ. See AGAPE.

Lovejoy, Elijah Parish, an American abolitionist; born in Albion, Me., Nov. 9, 1802. Soon after his graduation at Waterville, in 1826, he went West, where, after teaching for some time, he became editor of a political journal. Subsequently he joined the Presbyterian Church and was licensed to preach in 1833. He then took editorial charge of the "Observer," a religious weekly published at St. Louis, Mo., and, first a believer in colonization, he gradually became strongly anti-slavery, though always opposing immediate and unconditional abolition. His articles created great excitement, and when his office was finally wrecked by a mob in 1836 he decided to remove his paper to Alton, Ill. Here three presses were destroyed by mobs. The fourth press was placed in a stone warehouse which Lovejoy and some of his friends defended. The house was surrounded by a mob and the roof set on fire. In attempting a sally Lovejoy was shot and killed, Nov. 7, 1837. A monument was erected to his memory at Alton in 1897.

Lovelace, Richard, an English Cavalier poet; born in Woolwich, England, in 1618. He was the eldest son of a Kentish knight of old family, and was educated at the Charterhouse and at Oxford. He found his way to court, and went on the Scotch expedition in 1639, after which he retired awhile to his estate. In April, 1642, he was committed to the Gatehouse at Westminster for presenting to the House of Commons a petition from the royalists of Kent "for the restoring the king to his rights, and for settling the government," and was only released on bail of $200,000. In 1646 he took part in the siege of Dunkirk, and was flung into prison on returning to England in 1648. In 1649 he published "Lucasta," (from *Lux casta,* his epithet for his love, Lucy Sacheverell). In 1659 his brother collected his poems as "Lucasta : Posthume Poems." His name survives from two of the most faultless lyrics in the English language — "To Althea from Prison" and "To Lucasta on going to the Wars." He died in London, England, in 1658.

Lover, Samuel, an Irish novelist; born in Dublin, Ireland, Feb. 24, 1797. Starting in life as a painter, his early success secured his election, in 1828, as an academician of the Royal Hibernian Society of Arts. While still engaged as painter he turned his attention to literature and produced his celebrated "Legends and Tales Illustrative of Irish Character." Removing to London in 1827, he published his popular novels, "Rory O'More," "Handy Andy" (his best work), and "Treasure Trove." In addition to these labors he devoted himself to music, composed the comic operas of "Rory O'More," the "Happy Man," and the "White Horse of the Peppers," and a collection of songs and ballads, some of which, as "Molly Carew," "Rory O'More," "The Angel's Whisper," "Molly Bawn," "The Four-leaved Shamrock," etc., have achieved a world-wide popularity. In 1847 he visited the United States, returning to England in the following year. In 1858 appeared his "Lyrics of Ireland." He died in St. Heliers, July 6, 1868.



SAMUEL LOVER.

Low, Seth, an American educator; born in Brooklyn, N. Y., Jan. 18, 1850; was graduated at Columbia University in 1870; made a member of his father's mercantile firm in 1875; mayor of Brooklyn in 1881–1885; and was elected president of Columbia University in 1890. In 1895 he erected for that institution a grand university library at a cost of $1,175,000. In honor of President Low's generosity and in accord with his desire, the trustees of Columbia founded 12 scholarships in the univer-

sity for Brooklyn boys and the same number in Barnard College for Brooklyn girls, and also agreed to found eight annual scholarships. In 1899 he was appointed by President McKinley a member of the delegation to represent the United States at the International Peace Conference at The Hague. Mr. Low was an unsuccessful candidate for mayor of Greater New York in 1897; and was again nominated for the office on a fusion ticket in 1901. After accepting the nomination he resigned the presidency of Columbia University in order to begin a vigorous campaign, which resulted in his election to the mayoralty.

Low Church, a term commonly applied in the Church of England to those who form the more moderate party in the Church, having less ambitious notions of its authority and power, and being more tolerant in their conduct toward dissenters — opposed to HIGH CHURCH (*q. v.*).

Lowe, John, an American naval officer; born in Liverpool, England, Dec. 11, 1838; entered the navy in 1861, served through the Civil War, being wounded in the first battle of Bull Run; and was a member of the Greely Relief Expedition in 1884. He was the first naval officer of any nation to serve in a submarine torpedo boat, which he did in 1898, and made the first report to the Secretary of the Navy on submarine service. He was promoted rear-admiral Dec. 11, 1900, and retired the same day.

Lowe, Sir Hudson, a British military officer; the custodian of Napoleon in St. Helena; born in Galway, Ireland, July 28, 1769. Entering the army in 1787, he served in various parts of the Mediterranean, and in 1808 capitulated at Capri to the French. But in the following year he helped to conquer Zante and Cephalonia, and then for nearly two years acted as governor of Santa Maura, Ithaca, and Cephalonia. He was afterward for some time attached to the Prussian army commanded by Blücher. On Aug. 23, 1815, he was appointed governor of St. Helena. Napoleon had landed there on Oct. 17 of the previous year. The strictness of Lowe's watch on the disturber of the peace of Europe brought down on him much obloquy, and exposed him to bitter and rancorous attacks from Napoleon's friends and admirers, especially from O'Meara. He was even assaulted in London in 1822. In 1825 he was appointed commander of the forces in Ceylon. He died in London, England, July 10, 1844.

Lowe, Thaddeus S. C., an American scientist; born in Jefferson, N. H., Aug. 20, 1832. During the Civil War he was chief of the aeronautic corps. He invented a system of signaling, and valuable instruments for atmospheric investigation, etc.; constructed and operated the largest aerostat ever built; made the first artificial ice in the United States (1865); and established the Lowe Observatory in the Sierra Madre Mountains, Cal.

Lowe, Martha Ann, an American verse-writer; born in Keene, N. H., Nov. 21, 1829. She published "The Olive and the Pine" (1859); "Love in Spain, and Other Poems" (1867); "The Story of Chief Joseph" (1881); "Memoir of Charles Lowe" (1883); etc. She died May 6, 1902.

Lowell, a city and one of the county-seats of Middlesex co., Mass., on the Merrimac river and the Boston and Maine and the New York, New Haven and Hartford railroads, 22½ miles N. W. of Boston, and contains the villages of Ayers City, Belvidere, Bleachery, Centralville, Highlands, Middlesex Village, and Pawtucketville. The city derives immense waterpower from the falls of the river, and is one of the largest cotton-manufacturing cities in the world. It also has large woolen, carpet, patent-medicine, furniture, tools, hydraulic-press, ammunition and hosiery manufactories and iron and machine works. Among the charitable and educational institutions are St. John's Hospital, Lowell Hospital, Old Ladies' Home, St. Peter's Orphanage, Theodore Edson Orphanage, State Normal School, Lowell Textile School, and Rogers Hall School. The principal public buildings are the court house, the city hall, and several fine churches and school houses. There are many public squares; waterworks supplied from the river, thorough sewerage, daily, weekly and monthly periodicals and electric light and street railroad plants. In 1901 there were 8 National and 7 savings banks; and an assessed property valuation of $56,000,000. Pop. (1890) 77,696; (1900) 94,969; (1910) 106,294.

Lowell, Abbott Lawrence, an American educator; born in Boston, Mass., Dec. 13, 1856; practiced law in Boston in 1880-1897; was a lecturer at Harvard University in 1897-1899, Professor of the Science of Government in 1900-1903, and Eaton professor in 1903-1909; succeeded Charles W. Eliot as president in 1909; wrote much on governments, corporations, and politics.

Lowell, Edward Jackson, an American historian; born in Boston, Mass., Oct. 18, 1845. He was educated as a lawyer, but afterward gave himself entirely to literary pursuits. He was the author of "The Hessians and Other German Auxiliaries of Great Britain in the Revolutionary War" (1884): this work is deemed exhaustive in its scope. He was a frequent contributor to the magazines. He died in 1894.

Lowell, Francis Cabot, an American merchant, son of John Lowell (1743–1802); born in Newburyport, Mass., April 7, 1775. He acquired celebrity as being the first to establish the cotton manufacture in the

United States, and also as the founder of the town which bears his name, and which has since become the chief seat of textile manufactures in this country. He died in Boston, Mass., Sept. 2, 1817.

Lowell, James Russell, an American author; born in Cambridge, Mass., Feb. 22, 1819; was graduated at Harvard College in 1838; became an abolitionist and in his famous "Biglow Papers" and other writings did much to make the movement popular. In 1855 he was appointed successor to Longfellow as Professor of Belles-Lettres in Harvard University, and after two years' study abroad he entered upon the duties of his professorate. At this time the "Atlantic Monthly" was founded, and Lowell was a constant contributor until in 1863 he became one of the editors of the "North American Review," a position which he maintained till 1872. At the outbreak of the Civil War the poet again attacked the slavery party in a second series of "Biglow Papers," which appeared from time to time in the "Atlantic Monthly," and were published in a volume in 1867. In 1869 he published "The Cathedral," a poem of some length. This was followed by two volumes of essays, "Among My Books" (1870) and "My Study Windows" (1871). In 1872 he visited Europe, and on his return he wrote the "Centennial Ode." He was United States minister to Spain in 1877–1880 and to Great Britain in 1880–1885. In Madrid he was the recipient of the same attention and honor that had formerly been bestowed on Washington Irving, and in England his graceful oratory was in constant demand on public occasions. During his residence in London he was elected Lord Rector of St. Andrew's University in Edinburgh. His works include: "Conversations on Some of the Old Poets" (1845); "Poems" (1848); "The Biglow Papers" (1848); "Life of Keats" (1854); "Poetical Works" (2 vols. 1858); "The President's Policy" (1864); "Ode recited at the Commemoration of the Living and Dead Soldiers of Harvard University" (1865); "Democracy and other Addresses" (1887); etc. He died in Cambridge, Mass., Aug. 12, 1891.

Lowell, John, an American statesman; born in Newburyport, Mass., June 17, 1743. He was graduated at Harvard College in 1760, and after being admitted to the practice of law settled in Boston in 1777 and became a member of the convention which framed the constitution of Massachusetts, in 1780. He was one of the earliest advocates of the abolition of slavery, and aided its extinction in his State in 1783. In 1781 he entered Congress, and in 1801, was appointed Chief Justice of Massachusetts. He died in Roxbury, Mass., May 6, 1802.

Lowell, John, an American merchant; son of F. C. Lowell; born in Boston, Mass., May 11, 1799. He founded the Lowell Institute in that city, bequeathing $250,000 for its maintenance. He died in Bombay, India, March 4, 1836.

Lowell, Josephine Shaw, an American philanthropist; born in West Roxbury, Mass., Dec. 16, 1843. In 1863 she married Charles Russell Lowell. She was a commissioner of New York State Board of Charities, 1877-1889; author of "Public Relief and Private Charity," "Industrial Arbitration and Conciliation," and other economic works. She died Oct. 12, 1905.

Lowell, Maria (White), an American writer; wife of James Russell Lowell; born in Watertown, Mass., July 8, 1821. The best-known of her poems are: "The Alpine Shepherd" and "The Morning Glory." The death of Mrs. Lowell, occurring the same night that a child was born to Mr. Longfellow, called forth his poem beginning:

> "Two angels, one of life and one of death,
> Passed o'er our village as the morning broke."

She died in Cambridge, Mass., Oct. 27, 1853.

Lowell, Percival, an American author; born in Boston, Mass., March 13, 1855. He was graduated from Harvard in 1876, and spent some time in Japan and Korea. He established the Lowell Observatory at Flagstaff, Ariz., in 1894. Among his works are: "Chosön, a Sketch of Corea" (1886); "The Soul of the Far East" (1888); "Noto, an Unexplored Corner of Japan"; "Occult Japan"; "Mars" (1895); "Annals of the Lowell Observatory" (1898–1900).

Lowell, Robert Traill Spence, an American educator; brother of James Russell Lowell; born in Boston, Mass., Oct. 8, 1816. He was graduated at Harvard in 1833; was ordained a Protestant Episcopal minister in Bermuda in 1842; and held pastorates in Newfoundland, New Jersey, and New York. He became principal of St. Mark's School, Southborough, Mass., in 1869; and in 1873 Professor of Latin in Union College, Schenectady, N. Y. His best-known work is the novel "The New Priest in Concepcion Bay" (1864). He also wrote: "Fresh Hearts, and Other Poems" (1860); "Anthony Brade" (1874), a story of school life; "A Story or Two from an Old Dutch Town" (1878). He died in Schenectady, N. Y., Sept. 18, 1891.

Löwenburg. See LEMBERG.

Lower California, a peninsula on the Pacific coast of North America, extending about 750 miles S. of California; area 58,328 square miles; pop. (1900) 47,624. It belongs to Mexico and, with the exception of a few spots, is a sterile and unproductive region. Chief towns are La Paz, the capital, Loretto, and Rosario.

Lower Empire, the Roman Empire, according to some, from the time that the seat of it was removed to Constantinople in 330 (or, according to others, from the time that the Eastern and Western Empires were separated in 395) to 1453, when that city was captured by the Turks.

Lowestoft, a municipal borough and seaport on the Suffolk coast, England, 118 miles N. E. of London, and 49 from Ipswich; has of late years rapidly grown in favor as a watering-place; the older part, which lies to the N., is built on a cliff facing the sea, on its summit being a lighthouse (1874) 123 feet above the sea-level, while at its base, on the Ness — the most E. point of land in England — stands another lighthouse (1866); the modern part, which has a fine esplanade 800 yards long, extends S. into the parish of Kirkley, and is separated from the old town by the harbor, formed partly by two piers extending seawards 1,300 feet, and partly by Lake Lothing; adjoining the harbor is a dock (1883) with a depth of water at low tide of 13½ feet, and extensive fish-markets (1865–1883), the property of the Great Eastern Railway. On the new South Pier is a splendid pavilion, opened in 1890. Other features of interest include the parish church (of which Whiston, the mathematician, and Potter, the translator of the Greek plays, were former vicars), 183 feet in length, and surmounted by a tower and spire 120 feet high, dating from the first half of the 14th century; town hall (1857), noticeable for its stained-glass windows; hospital (1882), with accommodation for 30 in-patients; and Bellevue Park (1874), not far from which was found the clay formerly used in making Lowestoft china. The town was visited by the plague in 1349, 1547, 1579, and 1603, on the last occasion the disorder raging with such fury that 280 persons died within five months and 316 in the year; in 1643 Cromwell entered the town at the head of 1,000 troopers, and, seizing several royalists, sent them prisoners to Cambridge; it was partially destroyed by fire in 1644; a great naval engagement took place off the coast June 3, 1665, when the Dutch were defeated with loss of 18 ships; George II. landed here on his return from Hanover, June 14, 1736. Pop., including Kirkley, (1901) 29,850.

Low German, a dialect much softer than that usually spoken, and which was formerly used over a great part of Germany and even now is employed by the common people in most parts of North or Lower Germany. It is not a corruption of the language, but a distinct form of speech. It is called in Germany Platt-deutsch or Nieder-deutsch.

Low Latin, a term often applied loosely to the Latin spoken and written after the fall of the Roman empire, as well as during the Middle Ages. The process of deterioration from classical models had already begun even in the time of Cicero, but it rapidly grew till were formed gradually in different divisions of the dismembered empire those distinct varieties out of which grew the modern Romance tongues.

Lowry, Robert, an American composer; born in Philadelphia, Pa., March 12, 1826. His music and hymns met with popular approval. He edited: "Chapel Melodies" (1868); "Bright Jewels" (1869); "Pure Gold" and "Hymn Service" (1871); "Brightest and Best" (1875); "Glad Refrains" (1886); and other collections of sacred music. He died Nov. 25, 1899.

Low Sunday, in the Roman Catholic Church, the first Sunday after Easter. It is so called in contrast to the great festival whose octave it ends. In France and Germany it is usually called *Quasimodo,* from the first word of the introit (I Peter ii: 2) in the mass.

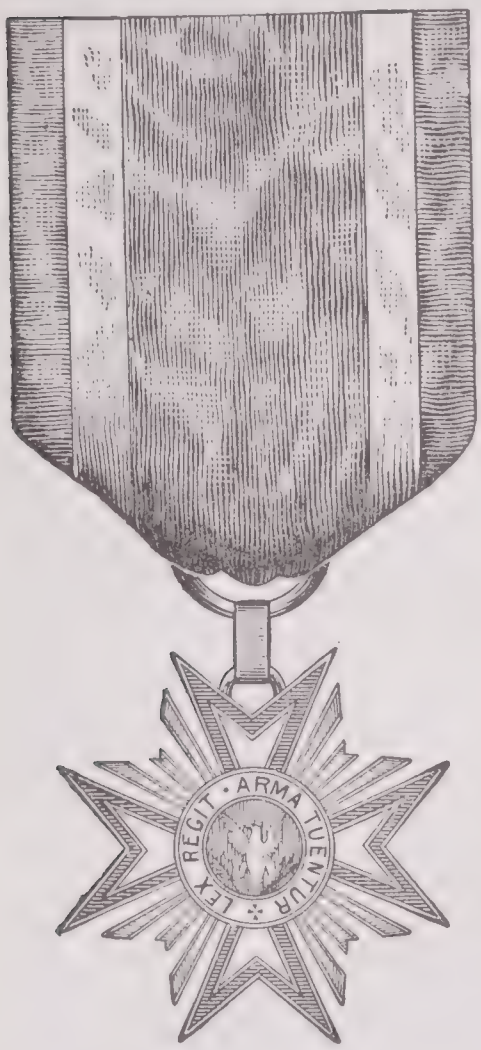
Lowth, Robert, an English clergyman; born in Buriton, Hants, England, Nov. 27, 1710. He was educated at Winchester and Oxford. In 1741 he was appointed Professor of Poetry, and hence arose his famous "Lectures on the Sacred Poetry of the Hebrews" (1753), one of the first books that treated the Bible poetry as literature. Though most of his criticism, save the doctrine of poetic parallelism, is long since obsolete, it gave a new direction to the Biblical criticism of Herder and later critics. Besides his lectures, his two principal works are: "Life of William of Wykeham" (1758) and "Isaiah, a new Translation" (1778). In 1750 Bishop Hoadley conferred on him the archdeaconry of Winchester, and in 1753 the rectory of East Woodhay in Hampshire. Lowth became D. D. of Oxford in 1754, prebendary of Durham and rector of Sedgefield in 1755, a Fellow of the Royal Societies of London and Göttingen in 1765, Bishop of St. David's in 1766, of Oxford a few months after, of London in 1777, and died Nov. 3, 1787.

Lowther Hills, a range of Scotch hills extending across the S. of Lanarkshire and N. of Dumfriesshire to the S. borders of Peebles and Selkirk shires; highest summits Green Lowther (2,403 feet) and Lowther Hill (2,377 feet).

Loxodromic Curve, in mathematics, a curve bearing a strong resemblance to the logarithmic spiral. It is traced on the surface of a sphere by a point moving in such a manner that its path cuts all the meridians at the same angle. In navigation, the loxodromic curve is the same as the rhumb line, and is the path of a ship sailing always on the same tack. The loxodromic curve turns continually about the pole, but

does not reach it till after an infinite number of turns.

Loyal Legion, Military Order of the, the first society formed by officers honorably discharged from the service of the United States in the Civil War. On the day after the assassination of President Lincoln, Col. S. B. Wylie Mitchell, Capt. Peter D. Keyser, M. D., and Lieut.-Col. T. Ellwood Zell met in Philadelphia to arrange for a meeting of ex-officers of the army and navy to adopt resolutions relative to the death of President Lincoln. It was decided to effect a permanent organization, and an adjourned meeting was held for this purpose in the hall of the Hibernia Fire Company in Philadelphia, May 3, 1865. There are State Commanderies in Pennsylvania, New York, Maine, Massachusetts, California, Wisconsin, Illinois, District of Columbia, Ohio, Michigan, Minnesota, Oregon, Missouri, Nebraska, Kansas, Iowa, Colorado, Indiana, Washington, and Vermont. Total membership (1900) 9,043.

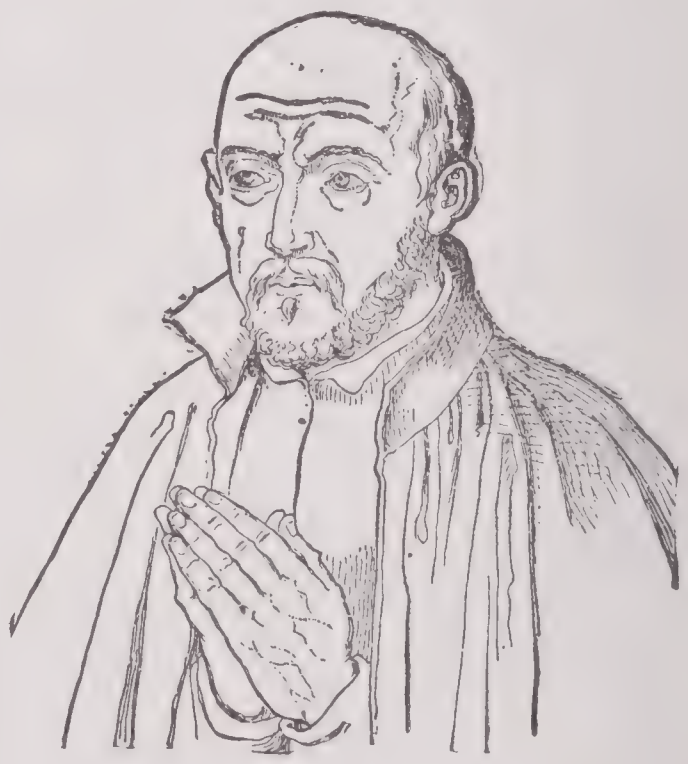


BADGE OF THE LOYAL LEGION.

Loyola, Ignatius (lō-yō'lä), original name Inigo Lopez de Recalde, a Spanish soldier and prelate, the founder of the order of the Jesuits; born in the castle of Loyola, Guipuscoa, Spain, in 1491. He was descended of a noble Biscayan family. He was attached in his youth as a page to the court of Ferdinand and Isabella, and trained up in all the vices and frivolities peculiar to his position. When still a young man he entered the army, and during the defense of Pampeluna in 1521 against the French he was severely wounded, and a long and tedious confinement was the result. The only books he found to relieve its tedium were books of devotion and the lives of saints. This course of reading induced a fit of mystical devotion in which he renounced the world, made a formal visit to the shrine of the Virgin at Montserrat, and vowed himself her knight (1522). After his dedication he made a pilgrimage to Rome and Jerusalem, and from 1524 to 1527 attended the schools and universities of Barcelona, Alcala, and Salamanca. In 1528 he went to Paris, where he went through a seven years' course of general and theological training. Here in 1534 he formed the first nucleus of the society which afterward became so famous, François Xavier, Professor of Philosophy, Lainez, and others having in conjunction with Loyola bound themselves together to devote themselves to the care of the Church and the conversion of infidels. Rome ultimately became their headquarters, when Loyola submitted the plans of his new order to Paul III., who, under certain limitations, confirmed it in 1540 (see Jesuits). Loyola continued to reside in Rome and govern the society he had constituted till his death, July 31, 1556. He was beatified in 1607 by Paul V., and canonized in 1622 by Gregory XV.

Loyson, Charles. See Hyacinthe, Pere.

Lozère (lō-zãr'), a department in the S. of France comprising the arrondissements of Mende, Florac, and Marvejols; area


IGNATIUS LOYOLA.

1,996 square miles, pop. (1906) 128,016; forms the S. E. extremity of the central uplands of France, and embraces the highest peaks of the Cévennes (Pic de Finiels, 5,584 feet); in the mountains the climate is severe, and little grain is produced; chief products, potatoes, chestnuts, fruits, hemp, and flax; cattle and sheep are extensively reared, and silkworms bred. The department contains some of the grandest scenery of France in the eroded limestone districts of the "Causses." Important prehistoric remains have been found in the caverns. Capital, Mende.

Lozier, Clemence Sophia, an American physician; born in Plainfield, N. J., Dec. 11, 1813. In 1829 she was married to A. W. Lozier, and in 1849 began the study of medicine, taking her degree in 1853 from the Syracuse Medical College. Establishing herself in New York as a homeopathic physician, she had remarkable success, showing rare surgical skill. In 1863 she started a movement resulting in the founding of the first medical college for women in the State. She was a prominent woman suffragist and active in reform and philanthropic movements. She died in New York city, April 26, 1888.

Lualaba (lōō-ä-lä′bä), a head-stream of the Kongo, which rises on the southern boundary of the Kongo Free State, near Kabinda, flows northward for 650 miles through a mountainous and forest region, and unites with the Luapula at Ankoro to form the Kongo river (*q. v.*). The last 250 miles of its course are navigable.

Luang-Prabang (lōō′äng-prä′băng), capital of a native state of that name in Upper Laos, French Indo-China, situated on the left bank of the Me-kong river, at the confluence of the Nam-kan. In the heart of the town rises a pagoda hill of about 200 feet; it also contains a royal palace and many old temples. What trade there is, is in the hands of a few Chinese or Shan merchants, and is of little importance. Population about 12,000.

Luapula (lōō-ä-pōōl′ä), a head-stream of the Kongo, rising in the mountains south of Lake Tanganyika, where it is known as the Chambesi. It joins the Lualaba (*q. v.*) at Ankoro.

Lubao (lōō-bä′ō), a town of the province of Pampanga, Luzon, Philippines, situated on the northwestern channel of the Pampanga delta, and about four miles southwest of Bacolor. It is a rich sugar, rice and indigo district, and the trade center of the region. Its products are readily marketed in Manila, water communication between the points being good. Pop. (1903) 19,063.

Lubberland, a slang term anciently applied to London—substituted for Cocaigne (*q. v.*) by the poets and wits of the sixteenth century.

Lubber's Point, a black vertical line drawn on the inside of the case of the mariner's compass. This line, and the pin on which the card turns, are in the same vertical line with the keel of the ship, and hence the rhumb opposite to the lubber's point shows the course of the ship at any time. The lubber's point, however, deviates from its proper position when the ship is heeled over; hence, seamen do not implicitly depend on it, as indeed its name implies.

Lubbock, Sir John. See AVEBURY, BARON.

Lübeck, or **Lübek,** one of the free towns of Germany and a constituent of the German empire; on a low ridge at the confluence of the Wackenitz with the navigable Trave; 38 miles N. E. of Hamburg and 12 miles from the Gulf of Lübeck, a bay of the Baltic. It was formerly surrounded by walls and bastions which have been leveled down and converted into pleasant walks and it is still entered by four gates of ancient feudal structure; and the whole town, with its numerous gable-ended houses, many of them richly decorated and highly picturesque, furnishes a striking specimen of the quaint architecture of the 15th century. It consists of four quarters and the communication between the opposite sides of the Trave is maintained by means of four bridges. The buildings and objects most deserving of notice are: the Dom or cathedral, a structure of red brick begun in 1173 but not completed till 1341, surmounted by two spires 396 feet high and containing a fine old choir screen, a fine altar-piece by Memling, a stone pulpit and brass font, and a number of interesting monuments; the Marienkirche (St. Mary's Church), also of red brick in the cathedral style, with two spires 404 feet high in elegant pointed Gothic, with various artistic treasures; the Ægidienkirche (St. Giles' Church) of small dimensions, surmounted by a lofty spire; the Petrikirche (St. Peter's Church), built in 1163, repaired and decorated in 1826; and several other churches; the town or senate house in ancient Gothic, somewhat defaced by modern repairs, but still a fine turreted structure, containing several noble halls with fine ceilings and carvings and possessed of considerable historical interest as the place where the deputies of the 85 Hanse towns held their sittings; the imperial post office; the gymnasium, school of design, normal, navigation and numerous other schools; the town library of over 100,000 volumes; several museums; the deaf and dumb, blind, and lunatic asylums; the orphan and other hospitals; the infirmary and a great number of well-endowed charitable institutions. The manufactures, once of much importance but now greatly decayed, consist of machinery, tobacco, vinegar, cigars, chemicals, etc.

The trade, chiefly in grain, timber, colonial produce, and manufactures, still continues to be extensive, though it is subjected to formidable competition, particularly from Kiel. A more serious obstacle to the prosperity of Lübeck is the gradual shallowing of the Baltic which threatens ultimately to leave it without a harbor. It is connected by railway with Hamburg and Berlin and the whole European railway system. Steamers in considerable numbers keep up regular communication with all important ports of Russia, Sweden, and Denmark.

Deepening operations on the Trave have been carried out and the opening of the Elbe-Trave canal in 1900 is expected to facilitate trade. The total import and export trade by sea and land amounts to more than £29,000,000 annually. The trade is chiefly with the N. of Europe. Lübeck possesses a territory of 115 square miles. This territory, instead of forming one contiguous whole, consists of 10 isolated portions, inclosed partly by Holstein, partly by Lauenburg and partly by Mecklenburg-Schwerin. The constitution of Lübeck was modified in 1875. It has a senate of 14 members and a council of burgesses of 120 members, with a committee of 30. The senate is the executive, the burgess council the legislative body, the latter having the initiative in all measures relating to finance, foreign treaties, and general legislation. The annual revenue and expenditure are each about £230,000. The town was founded or refounded by Adolphus II., Count of Holstein-Schauenburg, about 1144. In 1163 it became the seat of a bishopric. In 1202 it was taken by the Danes, whom it expelled in 1226, and placing itself under the protection of the Emperor Frederick II., it became an imperial free city. About 30 years later it became the head of the Hanseatic League. About 1530 the bishop embraced the Reformation and became a secular prince of the empire. Until the peace of Westphalia (1648) the history of Lübeck is intimately associated with that of the league. After this its prosperity, already seriously injured by the Thirty Years' War as well as by the rise of the Dutch towns and other rivals in commerce, continued to decline. The territory of Lübeck was incorporated with the French empire in 1810 and liberated in 1813. Pop (1885) of the town, 55,399; territory, 67,658; (1890) 69,874 and 83,324; (1905) 91,541 and 105,857.

Lübke, Wilhelm (lüb'kuh), a German historian of art; born in Dortmund, Jan. 17, 1826. He was Professor of the History of Art and of Archæology at the polytechnic school at Zurich, 1861–1866; at Stuttgart, 1866–1886; at the high school in Karlsruhe, 1885–1893. Chief among his works are: "Mediæval Art in Westphalia" (1853); "Outline of the History of Art" (1860; 11th ed. 1891); "History of Architecture" (2 vols. 1885); "History of the Renaissance in France" (1868); "History of the Renaissance in Germany" (1873); "History of German Art" (1888); "Recollections" (1891). He died in Karlsruhe, April 5, 1893.

Lublin (lö'blin), the capital of a Polish government (area 6,501 square miles; pop., 1897, 1,159,463), on a sub-tributary of the Vistula, 96 miles S. E. of Warsaw; has a 13th-century cathedral and manufactures of tobacco, beer, candles, soap, etc., and a large trade in corn and wool. It was plundered by the Mongols in 1240, 1344, and 1477; from the end of the 14th to the end of the 16th century was the principal commercial town between the Vistula and the Dnieper; except the gates, nothing now remains of its former walls. Here was signed in 1569 the treaty of union between Lithuania and Poland. Lublin was captured by the Russians in 1831. Pop. (1897) 50,152.

Lubliner, Hugo (löb'lin-er), a German dramatist; born in Breslau, April 22, 1846. His three-act comedy "The Women's Advocate" (1873) was produced on every stage in Germany. Of inferior merit are his "The Florentines," a tragedy; the comedies "The Woman Without a Mind," "On the Wedding Journey," "The Poor Rich." He wrote "Believers in Luck," "The Matron of Nineteen Years" (1887), "The Name" (1888), "In the Mirror" (1890), "At the Dawn of Day" (1891).

Lubovitch, Nikolas (löb'ō-vich), a Russian historian; born in Podolia, March 16, 1855. He wrote: "Marnix de Saint Aldegonde as a Political Writer" (1877); "History of the Reformation in Poland" (1883); "Duke Albert of Prussia and the Reformation in Poland" (1885); "Origin of the Catholic Reaction and of the Lapse of the Reformation in Poland" (1890).

Lubovski, Edward (löb-ov'skē), a Polish dramatist; born in Cracow, 1838. His first successful dramatic venture was made with "Bats." His dramas, "The Court of Honor" (1880), and "Jacus" (1883), are favorite pieces in the theatrical repertoire of Poland. He was the author of two books of fiction: "A Step Farther" (1885); "Stories Without a Moral" (1886).

Lubricant, a substance used to diminish friction of the working parts of machinery. The requisites of a good lubricant are that it must endure the heat even of melted lead without change in order to stand friction and lubricate the cylinders of steam engines. Lubricants must be fixed and not volatile oils, as produced by destructive distillation, otherwise they are decomposed by friction and burnt or dried up. They must not show or possess any acid reaction, either naturally or artificially, otherwise the bolts are cut in the steamchest, and the iron, particularly wrought iron, is made porous. They must possess a sufficient power of tenacity without oxidation, otherwise they will thicken.

Luca da Cortona. See SIGNORELLI, LUCA.

Luca. See LUCCA.

Lucan, George Charles Bingham, Earl of, a British general; born in London, England, April 16, 1800. He succeeded his father, the 2d earl, in the title in 1839. He

was put to school at Westminster, and on leaving entered the army. He accompanied the Russian troops under General Diebitsch as a volunteer against the Turks in 1828. As commander of a division of cavalry in the Crimea he fought at the Alma, Balaklava, and Inkermann. Appointed lieutenant-general in 1858 and G. C. B. in 1869 he became field-marshal in 1887. He died Nov. 10, 1888.

Lucan (lö′kan) **(Marcus Annæus Lucanus),** a Latin poet; nephew of Seneca; born in Cordova, Spain, in A. D. 39. His uncle introduced him to the court of Nero, and for a time he was a favorite; but Nero envied his poetic talents and banished him from court. His epic poem "Pharsalia" has for its subject the great battle between Cæsar and Pompey at Pharsalus. He died in Rome in A. D. 65.

Lucania (lū-kā′ni-ä), a province of ancient Italy, S. E. of Calabria, and bordering on the Gulf of Tarentum. It was inhabited by an Oscan people, and corresponds nearly to the present province of Potenza and part of Salerno.

Lucaris (lö-kā′ris), **Cyril,** a Greek theologian; born in Crete in 1572. He studied at Venice and Padua, and subsequently in Germany, where he became imbued with the Protestant doctrines. Taking holy orders, he rose by 1621 to be Patriarch of Constantinople. He corresponded with the Calvinists and with the English Church with a view to union and a reform of the Greek Church, and issued a confession of faith of a decidedly Calvinistic tendency. The Jesuits opposed his efforts and five times had him deposed. In June, 1637, he was seized in Constantinople, hurried on board a vessel, and it was never ascertained what became of him. According to some he was strangled in the ship which bore him off; according to others, he suffered this fate in a castle on the shores of the Black Sea. His doctrines have been repeatedly condemned by Greek synods.

Lucas van Leyden (lī′den), proper name LUCAS JACOBSZ, a Dutch painter and engraver; born in Leyden in 1494. An extremely precocious artist, he painted a picture of St. Hubert when only 12, and the celebrated print, "Mahomet and the Monk Sergius," was engraved when he was only 14. He practised successfully almost every branch of painting, and as an engraver ranks as the equal of Albert Dürer in everything except fertility of design. Among his most celebrated pieces are the "Hill of Calvary," by some regarded as his masterpiece; "Adam and Eve Expelled from Paradise"; "Ecce Homo"; "A Girl and a Dog"; the "Card Party"; "St. Jerome"; and "Christ Healing a Blind Man." He died in Leyden in 1533.

Lucayos. See BAHAMA ISLANDS.

Lucca (lök′kä), called "the Industrious," chief town of an Italian province, situated on a plain, bounded by picturesque hills and irrigated by the Serchio, 14 miles by rail N. E. of Pisa; has a great trade in olive oil and silk. The cathedral of St. Martin, begun in 1063, has a cedar crucifix reputed to have been brought to Lucca in 782; this Volto Santo ("Sacred Countenance") is mentioned by Dante; the church contains also several fine paintings, the tomb of Maria Guinigi, and valuable archives; there are nearly 40 other churches, some dating from the 7th and 8th centuries. A splendid aqueduct (1820) supplies the town with water from the Pisan hills. The municipal buildings (1578) contain a valuable collection of paintings; the town is exceptionally rich in artistic and scientific institutions, and the environs abound in delightful villas. Lucca (ancient Luca) was made a Roman colony in 177 B. C. It was a bishopric as early as 347, and in 1726 was made an archbishopric. It was erected into a duchy by the Lombards, and its merchants traded in English wool from the 9th, but more especially from the 12th century. The town had a most checkered history down to 1369, when it became an independent republic which lasted till 1797. In 1805 it was erected into a principality by Napoleon for his sister, Elisa Bacciocchi, and in 1815 passed to Maria Louisa of Spain, Queen of Etruria. Her son, Charles Louis, ceded it to Tuscany in 1847, on obtaining possession of Parma and Piacenza. In a charming valley, 16 miles N. of the town, are situated the mineral baths of Lucca, which have been famous since the 15th century. Pop. (1901) 74,718. The province is famed for the fertility of its soil and the superiority of its agriculture; area, 558 square miles; pop. (1901) 318,610. The Lucchesi are a frugal, shrewd race; they form a large proportion of the itinerant figure-vendors, organ grinders, and stucco-workers of Europe.

Luce, Siméon, a French historian; born in Bretteville-sur-Ay, Dec. 29, 1833. He was author of "History of the Jacquerie" (1859; 2d ed. 1894); "Chronicle of the First Four Valois" (1862); "History of Bertrand Duguesclin and His Time" (1876); "Joan of Arc at Domrémy" (1886); "France During the 100 Years' War" (1890). He edited Froissart's "Chronicle" (7 vols. 1869–1877). He died Dec. 14, 1892.

Luce, Stephen Bleecker, an American naval officer; born in Albany, N. Y., March 25, 1827; served on the Pacific Coast in the Mexican War; was promoted commander in 1866; captain in 1872; commodore in 1881; and rear-admiral in 1885; was retired the same year. He was naval editor of the "Standard Dictionary" and author of "Naval Songs" (1889); "Seamanship" (used as a text book at the United States Naval Academy, 1898); "Patriotic and Naval Songster"; etc.

Lucena (lö-thā'nä), a town of Spain, 36 miles S. by E. of Cordova; famous for its wine and breed of horses; pop. about 21,000.

Lucera (lö-chā'nä) (the ancient Luceria, of the Samnite war), a town of Southern Italy, 12 miles N. W. of Foggia; has a cathedral dating from 1302, and a famous ruined castle of Frederick II.; pop. about 14,000.

Lucernaria (-nā'ri-ä), the typical example of the *Lucernaridæ*, an order of the *Hydrozoa*, nearly allied to the *Medusidæ* or jelly-fishes. The most familiar member is the *L. auricula*, a little organism somewhat bell-shaped, and which is frequently found adhering by the smaller end to seaweeds, etc. In the center of the bell-shaped end is an opening into the cavity of the body, which is the stomach. It can detach itself at will and swim freely about by contracting and expanding the bell-shaped disk or "umbrella," as it is technically called.

Lucerne (lü-sărn'), the capital of a Swiss canton, 59 miles S. E. of Basel, 147 S. S. E. of Strasburg, and 177 N. N. W. of Milan; very beautifully situated at the point where the Reuss issues from the N. W. extremity of the Lake of Lucerne, and partly surrounded (on the N.) with mediæval towers. Near the lake, rising from the middle of the Reuss, is an old tower which is said to have been a lighthouse (*lucerna*) in Roman times, whence the name of the town. Outside one of the gates is the Lion of Lucerne, hewn (1821) out of the solid rock after a model by Thorwaldsen, a monument to the Swiss guard who perished at the Tuileries in 1792. Near by is the Glacier Garden, with rocks illustrating the action of ice. The town is a busy center for tourists and summer visitors to Switzerland. Pop. (1901) commune, 29,633. The canton is bounded by Aargau on the N., Zug and Schwyz on the E., Unterwalden on the S. E., and Bern on the S. and W.; area, 579 square miles; pop. (1901) 146,159; is fruitful in the valleys; in the more mountainous parts the rearing of cattle is carried on to a great extent, large quantities of cheese being made. The highest elevation is 6,998 feet, a peak of Mount Pilatus. The inhabitants are mostly of German race and language, and belong to the Roman Catholic Church, except about 5,650 Protestants, to whom the free exercise of their religion was first accorded in 1828. The canton threw off the yoke of Austria in 1332, and, joining Schwyz, Uri, and Unterwalden, formed the nucleus of the future Swiss Confederation. The constitution of Lucerne is a representative democracy. The legislative body is the Great Council, one member being elected by every 1,000 citizens; the executive is vested in seven members who are not of the council. See SWITZERLAND.

Lucerne, Lake of, called also VIERWALDSTATTERSEE ("Lake of the Four Forest Cantons"—Uri, Unterwalden, Schwyz, and Lucerne), one of the most beautiful sheets of water in Europe. In shape it resembles roughly a cross with a crumpled stem; its shores are mostly steep and rocky. Length from Lucerne to Flüelen, 23 miles; average breadth, about 1½ miles; area, 44 square miles. The chief places on its banks are Lucerne, Küssnacht, and Alpnach at the N. W., and Flüelen near its S. W. extremity. It forms part of the St. Gothard route, and is navigated by steamboats, but is liable to sudden and violent storms. See TELL, WILLIAM.

Luchaire, Achille (lö-chãr'), a French historian; born in Paris, France, Oct. 24, 1846. He held professorships at Pau, Bordeaux, and Paris, where he occupied the chair of mediæval history in the Faculty of Letters. An authority on the institutions of France in the Feudal Period, he published: "Monarchical Institutions of France Under the First Capetians" (1884), "Studies of the Acts of Louis VII." (1885), both of which received the Gobert prize offered by the Academy of Inscriptions. Among his recent works are: "The French Communes" (1890); "Louis VI." (1890); and several monographs with M. B. Zeller. In 1891 he was decorated with the Legion of Honor. He died Nov. 13, 1908.

Lucianus (-ā'nus), a Greek author, distinguished for his ingenuity and wit; born in Samosata, Syria, about 120 A. D. He was placed, while young, with an uncle, to study statuary; but being unsuccessful in his first attempts he went to Antioch and devoted himself to literature and forensic rhetoric. In the reign of Marcus Aurelius, he was made procurator of the province of Egypt. The works of Lucian, of which many have come down to us, are mostly in the form of dialogues; but none are so popular as those in which he ridicules the pagan my-

thology and philosophical sects. He died about 200.

Lucifer, the morning star. A name given to the planet Venus when she appears in the morning before sunrise. When Venus follows the sun, or appears in the evening, she is called Hesperus, the evening star. These names no longer occur except in the old poets. Also a name commonly, though unappropriately, given to the prince of darkness; Satan. Also a term originally applied to matches tipped with a mixture of chlorate of potash and sulphuret of antimony, which were inflamed by friction on a piece of emery paper. These have been superseded by a variety of mixtures containing phosphorus. The manufacture of lucifers now forms a vast trade, which in the United States alone consumes upward of eight tons of phosphorus and 26 tons of chlorate of potash in tipping them. The process of making them is almost wholly performed by machinery. In ornithology, a humming bird of Mexico and the S. W. of the United States. It has a forked tail and its throat feathers form a ruff.

Lucifer Match Disease, necrosis of the jaws, arising from the inhalation of the fumes of phosphorus during the manufacture of lucifer matches. It has been especially described by Von Bibra and Geist, who had abundant opportunities of observing the disease at the large manufactories at Nuremberg.

Luciferians, followers of Lucifer, a Bishop of Cagliari in the 4th century, who refused to hold communion with the clergy who had conformed to the Arian doctrines, and whom a Synod of Alexandria (A. D. 352) had resolved to readmit into the Church on their openly acknowledging their errors. The Luciferians were little heard of after the time of Theodosius the Great.

Lucilius (-sil'i-us), a Roman poet, the creator of that form of poetic satire which was wielded so brilliantly by his successors, Horace, Persius, and Juvenal; born in Suessa Aurunca, Campania, about 180 B. C. He is said to have served at Numantia under the Younger Scipio. He wrote 30 books of "Satires," of which nothing but fragments remain, which have been preserved in great part by the grammarians. He died in Naples, 103 B. C.

Lucina, a name applied both to Diana and to Juno — to the latter, Juno Lucina, as the especial divinity that presides over childbirth, corresponding to the Ilithyia of Greek mythology. See JUNO.

Lucius I., Pope. Succeeded Cornelius in 252, and suffered martyrdom under Gallus, in 253.

Lucius II., Pope, succeeded Cœlestine II. in 1144, led out his troops to suppress a disturbance, and was killed by a paving-stone, in 1145.

Lucius III., Pope (1181–1185). He was the first Pope elected solely by the cardinals, in consequence of which his reign was very turbulent. He died an exile in Verona in 1185.

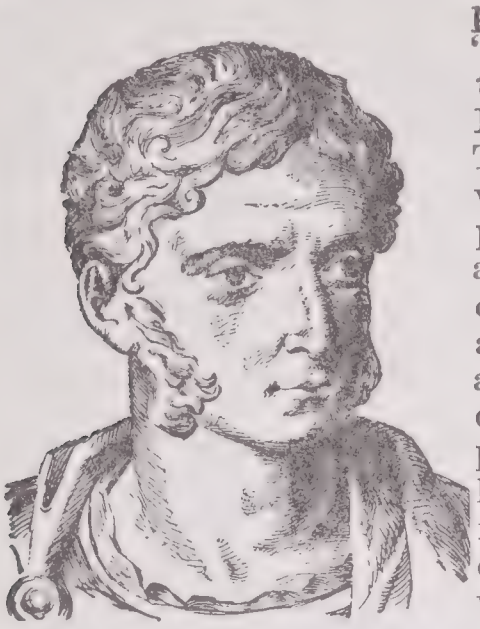
Lucknow (luk'nou), a city of Hindustan, capital of the former kingdom of Oude, on the Goomtee, a tributary of the Ganges, 150 miles N. W. of Benares, and 265 S. E. of Delhi. It is divided into three parts: The first is the city proper, containing the shops and private dwellings of the inhabitants, the streets very narrow and sunk below the level of the houses, and very filthy. The second is near the Goomtee toward the S. E., and consists of handsome streets, and houses built after the English style, the market-place with a lofty gateway at each extremity, one presenting a Grecian and the other a Moorish front, in this quarter being also the buildings of the British residency. The third quarter adjoins the Goomtee on the N. W. and consists chiefly of religious buildings, the styles of which are more purely Oriental, including the magnificent pile of Imaumbârah, or tomb and mosque of Asoph ud Dowlah, with its noble gateway, called Roumi-Derwasseh, so called from being supposed a copy of the gates at Constantinople, built in a light and elegant though fantastic style, and a mixture of Gothic and Moorish architecture; the splendid palace of Chutter-mungil; many stately khans, and handsome mosques and pagodas, etc. Lucknow is remarkable for the defense made by 300 British soldiers while besieged in the residency of the city for four months in 1857 during the Sepoy rebellion. Pop. (1901) 263,951.

Luckshmi, or **Luximee.** See LAKSHMI.

Luçon (lü-sô*ng'*), an episcopal town in the S. of La Vendée, France, on the railway from Nantes to Bordeaux, and on the canal of Luçon. Richelieu was Bishop of Luçon; and many battles were fought here in 1792–1797. Pop. (1901) 6,121.

Lucretia, the wife of L. Tarquinius Collatinus, famous for her heroic virtue. She was shamefully outraged by Sextus Tarquinius, whereupon she summoned her husband and a group of friends, and, after making them take a solemn oath to drive out the hated race of Tarquins from the city, plunged a knife into her heart. Of the poetic elaborations of the story the most famous is the "Rape of Lucrece" of Shakespeare's youth. See BRUTUS, L. J.

Lucretius, Titus Carus, one of the greatest Roman poets; born in Rome, probably about 96 B. C. He was author of the poem entitled "De Rerum Natura" (On the Nature of Things), in which he explains the atomic theory of Leucippus, and the moral and religious doctrines of the philosophy of Epicurus; leading to the conclusion that the world exists, and things go on, without any divine guidance or interposition. This theme, so unpromising for a poet, he succeeded in making attractive, interspersing the exposition of doctrines with many digressions of the most majestic and splendidly poetic character. The poem has been translated into most European languages, and several times into English. He died Oct. 15, 55 B. C.



LUCRETIUS.

Lucullus, Lucius Licinius, a Roman consul and commander, celebrated for his military talents and luxurious style of living; born about 115 B. C. He first distinguished himself in the social war, and afterward defeated Hamilcar in two naval battles. He was in great favor with the dictator Sulla, who made him guardian to his son and editor of his "Commentaries." In 74 B. C. he obtained the consulship and the command of the expedition against Mithridates. In 71 B. C. he finally broke up the hostile army, and Mithridates himself sought protection in Armenia, where Tigranes refusing to surrender him to the Romans, Lucullus attacked that monarch, and completely subdued him. On an occasion of a mutiny of his soldiers, who accused him of avarice and covetousness, he was deprived of the chief command and recalled. From this time Lucullus remained a private individual, spending in magnificent feasts, splendid gardens, parks, and fish-ponds, and all kinds of luxurious indulgence, the immense riches which he had brought with him from Asia, without, however, abandoning the more noble and serious occupations of a cultivated mind. He died about 57 B. C.

Lucumo (lō′kū-), plural **Lucumoes,** or **Lucumones** (-mō′nēz), in classical antiquity, an appellation of the Etruscan princes and priests, corresponding to the Roman *patricius* = of the rank of the Conscript Fathers; hence, noble. The Romans mistook this title of dignity for a proper name, and bestowed it on the son of Demaratus of Corinth, afterward Tarquinius Priscus, King of Rome.

Lucy, Henry W., an English journalist; born in Crosby, near Liverpool, England, Dec. 5, 1845. After some provincial experience as a journalist he went to London in 1868 and joined the "Daily News" as special correspondent, chief of the Gallery staff, and writer of the parliamentary summary. On the death of Tom Taylor, who had written the "Essence of Parliament" for London "Punch," he continued the work as "The Diary of Toby, M. P." He was the author of "Men and Manners in Parliament" (1874); "A Handbook of Parliamentary Procedure" (1880); "Gideon Fleyce" (1882), a novel; "East by West" (1885), an account of a journey round the world; "A Diary of Two Parliaments" (1885–1886); "Gladstone" (1896); etc. Knighted in 1909.

Lucy, St., a virgin who was martyred under Diocletian at Syracuse. She is the patron of the blind and is commemorated on Dec. 13.

Lud, a mythical king of Britain.

Luddites (according to Miss Martineau, from the name of Ned Lud, who, being tormented by boys, chased some of them into a house and there broke some stocking-frames; this was 30 years before the Luddite commotions; the Luddites called their mythical leader General or Captain Ludd, reviving the name of the imbecile), a band of operatives who broke out in a riot at Nottingham, England, Nov. 10, 1811, with the object of destroying some improved machinery for stocking-weaving. They extended their operations to Derby and Leicester, everywhere destroying stocking-frames. On July 24, 1812, Parliament granted additional powers for dealing with them. The militia were called out. Fourteen of the leaders were executed at York in 1813. The Luddites rose again in 1814 and 1816, and more of them were executed at Derby in 1817.

Luden, Heinrich (lō′den), a German historian; born in Loxstedt, April 10, 1780. He was appointed Professor of History in the University of Jena in 1810. He rendered a notable service to German historical literature by the example he set of histories written in elegant, spirited style. Among his writings are: "Manual of Universal History of the Mediæval Nations" (2 vols. 1821); "History of the German People" (2 vols. 1825–1837), his greatest work, but reaching only to the year 1237. He died in Jena, May 23, 1847.

Lüderitzland (lü'der-its-länd), a name sometimes given to ANGRA-PEQUENA (*q. v.*) and the adjoining territory, now part of German Namaqualand.

Lüders, Charles Henry, an American poet; born in Philadelphia, Pa., in 1858. On the completion of his university studies he visited Europe, subsequently settling in his native city, where he was a prominent member of "The Pegasus," a club of poets. He attained distinction by his contributions of verse to leading magazines, one of his best poems being "The Dead Nymph." With S. Decatur Smith, Jr., he published a volume entitled "Hallo! My Fancy," and a posthumous volume of his, "The Dead Nymph" appeared in 1891. He died in Philadelphia, Pa., July 12, 1891.

Ludhiana (lö-dē-ä'nä), capital of the Ludhiana district (area, 1,375 square miles; pop. 618,835), in Punjab, India, situated 8 miles from the Sutlej and the Scinde, Punjab, and Delhi railroad; is a thriving corn-mart and has manufactures of Cashmere shawls, scarfs, cottons, turbans, furniture, and carriages. The shrine of a Mohammedan saint here attracts a large concourse of pilgrims every year. Pop. (1901) 48,649.

Ludington, a city and county-seat of Mason co., Mich., on Lake Michigan and the Flint and Père Marquette railroad; 84 miles N. E. of Milwaukee. It is in a salt and fruit region; has an excellent lake harbor; regular passenger and steamboat connection with all important lake ports; and numerous lumber-working, foundry and machine shop establishments. There are electric light plants, high and graded public schools, public school library, street railroads; Holly system of waterworks, National banks, daily and weekly periodicals; and an assessed property valuation of $2,500,000. Pop. (1900) 7,166; (1910) 9,132.

Ludlow, a market-town and municipal borough of Shropshire, England, at the Corve's influx to the Teme, 28 miles S. of Shrewsbury. It is a very old and interesting place, with two noble monuments of antiquity: First, the massive Norman keep, 110 feet high, of the castle, where Prince Arthur wedded Catharine of Aragon, and died less than five months afterward; where, in the banqueting-hall, Milton produced his "Comus," and where Butler wrote "Hudibras"; captured by King Stephen, the Lancastrians, and the Roundheads, it was finally dismantled in 1689. Secondly, the cruciform collegiate church (restored in 1863), Perpendicular in style, with a tower 130 feet high. The grammar school, founded in 1282, and refounded in 1552, is almost the oldest in Great Britain; and one of seven gates still remains. Pop. (1901) 4,552.

Ludlow, Edmund, an English republican; born in Maiden Bradley, Wiltshire, England, in 1617. He studied at Trinity College, Oxford; and at the outbreak of the Civil War was a student in the Temple. He volunteered in Essex's lifeguards, saw service under Waller and Fairfax, was returned in his father's place to Parliament for Wiltshire in 1645, sat among the king's judges, and had a place in the council of state of the commonwealth. In 1651 he was sent to Ireland as lieutenant-general of horse, and held the chief command for six months between the death of Ireton and the arrival of Fleetwood. He refused to recognize Cromwell's protectorate, and till his death took no further part in public affairs. Returned to Parliament for Hindon in 1659, he urged the restoration of the Rump, held command again for a few months in Ireland, was nominated by Lambert to the committee of safety, and strove in vain to reunite the broken ranks of the old Republican party. Four months after the Restoration he fled to France for safety, making his way to Vevey, Switzerland, where he lived in security. After the Revolution he returned to England, but, the House of Commons presenting an address to William III. craving for his arrest, he returned to Vevey, and died there in 1692. Ludlow's "Memoirs" is one of the best contemporary sources of knowledge we possess, and its author was a man of solid, stubborn, and truthful temper.

Ludlow, Fitzhugh, an American journalist; born in Poughkeepsie, N. Y., Sept. 11, 1836. He received his education at Union College. He was editor of "Vanity Fair" from 1858 to 1860, and also wrote for the "World" and "Evening Post," besides contributing frequently to "Harper's Monthly." His most famous work is "The Hasheesh Eater" (1857), a glowing portrayal of the early delights and later horrors of addiction to the drug. In 1868 he published "The Opium Habit," a warning against that habit, to which he himself later became a victim. He wrote also "The Heart of the Continent" (1870). His poem "Too Late" is familiar in anthologies. He died in Geneva, Switzerland, Sept. 12, 1870.

Ludlow, James Meeker, an American author; born in Elizabeth, N. J., March 15, 1841. He was a minister in the Presbyterian Church, and a resident of East Orange, N. J. His best known works are: "The Captain of the Janizaries, a Story of the Times of Scanderbeg" (1886); "A King of Tyre" (1891); "That Angelic Woman" (1892); "History of the Crusades" (1896); "Baritone's Parish" (1897); "Deborah" (1901); etc.

Ludlow, William, an American military officer; born in Islip, L. I., Nov. 27, 1843; was graduated at the United States Naval Academy and appointed a 1st lieutenant in the Engineer Corps in 1864; served through the remainder of the war; was president of the United States Nicaragua Canal Commission in 1895; commissioned Brigadier-General of volunteers and was made chief engineer of the army destined for Cuba in May, 1898. During the Santiago campaign he commanded the 1st Brigade, 2d Division, of the American army, and participated in the battles of El Caney and San Juan Hill. He was promoted Major-General of volunteers, Sept. 7, 1898; was military governor of Havana from Dec. 12, 1898, to May 1, 1900; promoted Brigadier-General, U. S. A., Jan. 21, 1900; and appointed president of the War College Board, May 1, 1900. He was the author of "Exploration of the Black Hills and Yellowstone Country"; "Annual Reports of the Department of Havana" (1899, 1900); "Report of the United States Nicaraguan Canal Commission"; etc. He died Aug. 30, 1901.

Ludlow Formation, in geology, the highest part of the Upper Silurian rocks, consisting of Upper Ludlow and Lower Ludlow beds. The Ludlow formation is found in England. Of the fossils only 5 per cent. pass into the overlying Devonian.

Ludolf, Hiob (löd'olf), a German Orientalist; born in Erfurt, Jan. 15, 1624. He traveled extensively through Europe; and while visiting Rome made the acquaintance of the Abyssinian patriarch Gregorius, and from him acquired a knowledge of the Ethiopian language. He is said to have understood 25 languages. He wrote: "Sketch of the History of Ethiopia" (1681); "Grammar of the Amharic Language" (1698); "Ethiopic-Latin Dictionary"; "Ethiopic Grammar." He died in Frankfort-on-the-Main, April 8, 1704.

HIOB LUDOLF.

Lud's Bulwark, an old name for Ludgate Prison in London.

Lud's Town, a name sometimes anciently given to London, so called after Lud (*q. v.*).

Ludus Helmontii (-mon'shi-ī), or **Ludus Paracelsi,** a calcareous stone, the precise nature of which is not known, used by the ancients in calculous affections. The term was also applied to every species of calculous concretion occurring in the human body. Paracelsus gave the name *ludus* to a kind of cubical pyrites, from their resemblance in shape to a die, and held them in high esteem as a remedy in calculous affections. Hence the Latin name. Van Helmont was of the same opinion, though he was mistaken as to what really was the *ludus* of Paracelsus.

Ludwig, Karl (löd'vig), a German physiologist; born in Witzenhausen, Hesse, Dec. 29, 1816. He became Professor of Physiology at Leipsic University in 1865. There is hardly any department of physiology with which his name is not honorably associated; some of his works were of fundamental importance for medical science and natural history. His principal work is "Text-Book of Human Physiology" (2 vols. 1852–1856). He died in Leipsic, April 24, 1895.

Ludwig, Otto, a German dramatist; born in Eisfeld, Feb. 11, 1813. His first ambition was for music; and, at first self-taught, a melodrama he wrote gained him the means of becoming a pupil of Mendelssohn at Leipsic. But he soon abandoned this and went into retirement to write novels and dramas; many of the latter he never published, but in 1850 he brought out his tragedy "The Hereditary Forester," very faulty in construction, though with manifold great excellences. He essayed a higher flight in the tragedy "The Maccabees" (1855), but again failed in construction. He turned now to story-telling, and began a series of tales of Thuringian life. To this series belongs "Between Heaven and Earth" (1857), his masterpiece. He died in Dresden, Feb. 25, 1865.

Ludwig, Salvator, Archduke, an Austrian explorer; born in Florence, Aug. 4, 1847. His principal writings, all illustrated by himself and most of them published anonymously, are: "Levkosia, Capital of Cyprus" (1873); "Yacht Voyage to the Syrtes" (1874); "Los Angeles in Southern California" (2d ed. 1885); "The Caravan Route from Egypt to Syria" (1878); "The Balearic Islands," superbly illustrated (7 vols. 1869–1891); "Around the World Without Intending It" (4th ed. 1886); "The Lipari Islands" (1893).

Ludwigsburg (löd'vigs-börg), a town of Würtemberg, 8 miles N. of Stuttgart; is the second royal residence, and one of the principal garrison towns of the kingdom; and has a military school and a royal castle, with picture gallery and splendid gardens. It grew up round a hunting castle founded in 1704 by Duke Eberhard Ludwig. It was the birthplace of D. F. Strauss, Jus-

tinus Kerner, Möricke, and Friedrich Vischner. Pop. (1905) 22,550.

Ludwigshafen (-hä-fen), a town of the Bavarian Palatinate, on the Rhine, opposite Mannheim; has grown rapidly owing to its manufactures (soda, aniline dyes, wagons, etc.), and its trade in iron, timber, coal, and agricultural products. It was granted town rights in 1859. Pop. (1905) 72,286.

Lufiji. See RUFIJI.

Lugano (lö-gä′nō), a town in the Swiss canton of Ticino, on the N. W. shore of Lake Lugano, 49 miles N. by W. from Milan; is in appearance thoroughly Italian, villas studding the lower slopes of the hills embosomed in vineyards, olive and orange groves, chestnut and walnut woods; the church of Santa Maria degli Angioli has interesting works of art by Luini; and an important cattle fair is held here in October. Mazzini and the Italian patriots made Lugano their headquarters for some time after 1848. From Monte Salvatore (2,982 feet), in the vicinity, a magnificent view may be obtained. Pop. (1900) 9,500.

Lugano, Lake of, also called CERESIO (che-rā′zē-ō), a sheet of water at the S. foot of the Alps, 889 feet above sea-level; length, 14½ miles; average breadth, 1¼ miles; area, 18½ square miles. The depth varies very greatly, the maximum being 945 feet, while the average is only about 246 feet.

Lugdunum, the ancient name of Lyons and of Leyden.

Lugger, a small vessel, carrying two or three masts with a lugsail on each, and a running bowsprit, on which are set two or three jibs.

Lugo (lö′gō) (Lucus Augusti of the Romans), capital of a province in the N. W. of Spain, situated on the Minho, 72 miles by rail S. E. of Corunna; has a cathedral built in 1129–1177, and manufactures of linen and leather; is still surrounded with old walls, high and thick, with towers; and was celebrated as early as the time of the Romans for its warm sulphur baths. Pop. (1897) 18,909. Also the province, a mountainous but agricultural region, drained by the Minho and its tributary the Sil, and rich in minerals that are but little extracted; area, 3,787 square miles; pop. (1900) 465,386.

Lugo, a town of Italy, 18 miles W. of Ravenna; has a trade in corn, hemp, wine, and a celebrated fair (all September); pop. about 9,000.

Lugsail, a four-cornered sail bent to a yard, which is slung at a point two-thirds of its length from the peak.

Lugworm, *Arenicola piscatorum*, an annelid of the family *Telethusidæ*, sub-order *Tubicolæ*, sometimes classed with the *Errantia*. The body is composed of a number of segments, 13 of them furnished with red or purple arborescent branchial tufts, said by Gosse to be protrusile. The first six segments are furnished with setæ only. It attains an extreme length of 10 inches, and is found on various parts of the coast, near low-water mark, burrowing in the sand or in a muddy bottom. Its locality is easily detected from the spiral coils of sandy excrement near the aperture of the burrow. Called also lobworm.

Luini, or **Luvino, Bernardino,** the best painter of the Milan school; is supposed to have been born in the village of Luino near Lake Maggiore, about 1470; but it is only known for certain that his works were mostly executed between 1520 and 1530. He does not appear to have ever been at Rome. To the mildness and softness of the old Milan school he added the energy of Leonardo da Vinci, whose follower he was. His coloring is warm and rich even in his frescoes, his composition and design almost faultless and his expression often grand and admirable. He was one of the most industrious painters of his time. Among his earliest productions are a number of frescoes at Saronno and some figures in the Brera at Milan. Among his most celebrated pieces is the daughter of Herodias, in the Uffizi at Florence. Among his frescoes, which are both numerous and excellent, notice is particularly due to a "Crucifixion" in San Maria degli Angeli at Lugano. The National Gallery, London, contains a "Christ and the Doctors" by him. His son, Aurelio Luini, was also a good painter.

Luis de Granada Fray, a Spanish mystic and preacher; born in Granada in 1504. He entered the order of Preaching Friars or Dominicans in 1523. Though high Church dignities were repeatedly offered to him, he remained a simple friar all his life. Of his discourses or sermons, 13 were committed to writing and have been preserved. He wrote many works of devotion, among them "Sinners' Guide" (1556); "Meditations" (1556). He died in Lisbon in 1588.

Luitprand (lö′it-pränd), a Lombard historian; born in Pavia early in the 10th century. He was secretary of Berengarius, regent of the kingdom of Italy, who also employed him as his ambassador to Constantinople. He afterward became Bishop of Cremona. He wrote the history of the affairs of Europe in his time, and other works valuable for their historical information. He died about 970.

Luke, a New Testament evangelist, whose name was not a common one, but in its uncontracted form Lucanus was immor-

talized by Lucan, author of the celebrated Roman poem "Pharsalia." It has been supposed that the poet, who was born in Cordova, in Spain, may have been connected with St. Luke, who is mentioned three times in the New Testament. In Col. iv: 14, he is called "Luke the beloved physician." In Philemon he is called Lucas, and described as one of St. Paul's fellow-laborers, and when "Paul was ready to be offered" (II Tim. iv: 6), he adds, "Only Luke is with me." Identifying him with the writer of the Acts of the Apostles, his use of the pronoun "we," commencing with xvi: 10, shows that he joined Paul at Troas and accompanied him to Philippi (11–17). The resumption of the pronouns "he" and "they" (xvi: 19, xvii: 1, 17, etc.) shows that he remained at Philippi till the return of the apostle thither (xx: 6). He accompanied him on his subsequent missionary journeys (xx: 13–15, xxi: 1, etc.), was with him in his shipwreck (xxvii: 3, 27, xxviii: 2, 10), and his subsequent voyage to Rome (13–16). There is no trustworthy information as to the remainder of St. Luke's life.

The Gospel according to St. Luke, in the New Testament canon, the third Gospel. The writer had his information from those who "from the beginning were eyewitnesses and ministers of the word" (Luke i: 2), implying that he was not himself an eyewitness of the events that he records. It has been suggested that he may have got many details, as *e. g.*, of the birth of Jesus, from the "certain women" (Luke vii: 2, 3). When speaking of diseases, there is a technical accuracy, greater than that exhibited by the other evangelists, and in describing the failure of the physicians in the case of the woman with the issue of blood, he uses mild language (viii: 43), forcibly contrasting with that of St. Mark, written probably on information given by St. Peter (Mark v: 26). Universal tradition considers that the Gospel was penned under divine inspiration by St. Luke, "the beloved physician."

There exists, or rather is recoverable from the writings of Justin Martyr, Irenæus, Tertullian, and Epiphanius, a Gospel issued by the celebrated Gnostic, Marcion, so related to that of St. Luke that Marcion's Gospel must have been an abridgment of St. Luke's, or Luke's an expansion of Marcion's. They cannot have been independent shoots from the root of evangelical tradition, for of 53 sections peculiar to St. Luke, from iv: 16 onward, all but eight are found in Marcion's Gospel, and in the same order. The foregoing fathers charged Marcion with mutilating, for dogmatic ends, St. Luke's Gospel and the Epistles to the Galatians and Ephesians. This view has been generally accepted.

Marcion is believed to have begun to teach in Rome about A. D. 139 to 142 (Sanday), or 138 (Volkmar), or 130 (Tischendorf). "At that time St. Luke's Gospel had been so long published that various readings of it had already arisen."

The incidents recorded are not in chronological order. There is a marked superiority to Jewish caste-prejudice or to ceremonial bondage. It is the Gospel that tells of the Prodigal Son (xv: 11–32), the Good Samaritan (x: 30–37), the Pharisee and the Publican (xviii: 10–14). The third Gospel is exactly such a work as, under Divine inspiration, might be supposed to emanate from the companion of St. Paul.

Luke of Leyden. See LUCAS VAN LEYDEN.

Lukens, Henry Clay, pseudonym ERRATIC ENRIQUE, an American journalist; born in Philadelphia, Pa., Aug. 18, 1838. In 1884 he was associate editor of the New York "Daily News," and subsequently editor of the "Journalist," New York. He wrote: "The Marine Circus at Cherbourg" (1865); "Lean Nora," a travesty of Bürger's "Lenore" (1870); "Story of the Types" (1881); and "Jets and Flashes" (1883).

Lukuga (lö-ko'gä), an intermittent outflow from Lake Tanganyika, Central Africa, into the Kongo.

Lully, or Lulli, Jean Baptiste, a famous French composer; born in Florence, Italy, in 1634. Having discovered a passionate fondness for music when quite a child, he was sent to Paris in his 12th or 14th year, to be page to Mlle. de Montpensier. He rose rapidly till he obtained the appointment of musician to the court; and in 1670, was made joint director of the French opera, which situation he filled till his decease. He contributed much to the improvement of French music, and composed 19 operas which were popular for a century. He died in Paris, March 22, 1687.

Lully, Raymond, a Spanish philosopher of the Middle Ages; born in Palma, Balearic Isles, in 1235. He commenced life as a courtier and man of pleasure, but was converted when about 30 years of age to the religious life, chiefly by the exhortations of a married lady, to whom he had professed the most ardent devotion. For about 10 years, 1265–1275, he lived more or less in a solitary place, and became the subject of remarkable ecstasies and visions — the end being that his prayers for wisdom to convert the heathen were answered, he says, by a singular illumination of his mind, in which the principles of things became manifest to him. In this light, with the aid of his investigations in Arabian philosophy, he conceived a new system of dialectics, which may be consulted in his "Ultimate

Universal Art" (1480); "Short Art" (1481); and "Tree of Science" (1482). The general object of all his works is to demonstrate, by an infallible method, all the primary truths of religion; and they embrace in their scope the physical and metaphysical sciences, and, as a necessary consequence, the doctrines of the alchemists, who claim Raymond Lully as one of their greatest masters. Disappointed after the most indefatigable efforts to procure the adoption of his system, he embarked for Tunis, to commence his apostleship single-handed, and there, it is believed, he found the death of a martyr, June 30, 1315.

Lumbago, rheumatism of the muscles of the loins, with sudden and severe pain, sometimes extending to the ligaments underneath the muscles.

Lumber Industry. During the period 1890–1900 the lumber industry in the United States showed a general increase of 46.1 per cent. in the number of concerns and of 29.4 per cent. in the value of products. The statistics of the census years 1900 were as follows: number of establishments, 33,035; capital, $611,611,524; officials, clerks, and wage earners, 295,790; salaries and wages, $115,901,199; cost of materials used, $317,923,548; and value of products, $566,832,984. This statement excludes the combined paper and wood pulp industry, in which the proportion of wood is not separately given. In the fiscal year ending June 30, 1910, the exports of domestic manufactured and unmanufactured wood of all kinds and for all purposes aggregated in value $78,813,803, and in the same period the total imports of wood, manufactured and unmanufactured, had a value of $54,422,504.

Lumber By-products.— Nearly all of the formerly waste products of lumber and timber are now turned to some utility and some of the new products thus formed are of considerable value. Of this latter class may be mentioned sawdust, which was formerly considered an absolute waste material and was allowed to float down the stream or was thrown into a heap where it could be most conveniently disposed of. French cabinet makers have found a way of preparing this material which gives it a value far above that of solid timber by a process that has been in vogue for at least 25 or 30 years, combining the use of the hydraulic press and the application of intense heat. By this process the particles of sawdust are formed into a solid mass capable of being molded into any shape and of receiving a brilliant polish and possessing a durability and a beauty of appearance not found in ebony, rosewood or mahogany. This product is known as "bois durci." Artificial woodwork therefore seems to have a promising future. Alum, glue, and sawdust, kneaded with boiling water into a dough and pressed into molds when dried is hard and capable of taking on a fine polish. Ornaments of great beauty can be made from it very closely resembling carved woodwork.

The production of acetic acid, wood naphtha, and tar from sawdust is one of the latest enterprises in Norway. A factory has been started at Fredrikstad capable of distilling 10,000 tons of sawdust in a year. It also manufactures charcoal briquettes, which are exported to the Netherlands. The acids are chiefly placed on the German market, while the tar is mostly consumed at home. The factory is said to be the first of its kind erected in that country. According to an English patent of 1897 sawdust may be so prepared as to be non-inflammable and then applied to jacketing of boilers and other purposes.

In the "Journal of the Society of Chemical Industry" for 1898 is described a series of experiments for obtaining alcohol from either coarse or fine sawdust without affecting the yield. It was found that pine sawdust as compared with fir sawdust was superior as yielding a purer alcohol. It was also found that a high yield of sugar was obtained from birch sawdust, the yield of sugar being about 30.8 per cent. of the quantity of birch wood used. The quantity of alcohol obtained from 220 pounds of air-dried sawdust (20 per cent. water) was seven or eight quarts. The quality of the alcohol distilled from the fermented liquid was said to have been excellent.

The utilization of wood pulp in the manufacture of paper is not new, but its increased use is very marked, as will be seen by comparing the statistics of the census of 1890 with those of 1900 in the amount of raw materials used in paper making.

There is no limit to the range of wood suitable for paper making, though the pine family is most suitable for this purpose and invention has been mainly directed to methods for reducing wood to a suitable condition for use in paper manufacture. The first method of preparing pulp from wood was to reduce the wood to thin shavings which were soaked in water for a week or more, then dried and then ground to powder by a crushing mill of some kind. This powder was mixed with rags to form a pulp, in which condition it was suitable for converting into paper.

During the fiscal year 1909-1910 the United States imported 1,000,342 cords of pulp-wood, valued at $6,392,023, and the consumption of wood-pulp was as follows:

	Pounds.	Value.
Mechanically ground	319,317,992	$2,512,725
Chemically unbleached ...	374,576,834	5,831,016
Chemically bleached	153,515,933	3,394,273
Total.....	847,440,759	$11,768,014

The utilization of the needle-shaped leaflet of the pine tree, either alone or in combina-

tion with some other fiber, as cotton, for example, has frequently been attempted with more or less success to produce an article of commercial value for textile or other purposes. Near Breslau, in Silesia, there have been erected factories that convert the pine leaves into what is called "forest wool" for wadding. The products made from these pine tree leaflets have been exhibited at a number of expositions, where they attracted more or less attention as furnishing suitable material for stuffing mattresses and articles of furniture for manufacture into hygienic fabrics for medical use and for articles of dress, such as inner vests, drawers, shirts. In the preparation of the textile material an ethereal oil is produced which is employed as a curative agent and oftentimes as a useful solvent. Some attempt has been made in Oregon to make use of these leaflets by reducing them to a fibrous condition suitable for mixing with cotton to be spun into yarn for weaving.

Lumby, Joseph Rawson, an English clergyman and author; born in Stanningley, Yorkshire, England. He was Norris Professor of Divinity at Cambridge, 1879–1892. For the Early English Text Society he edited "King Horn," "Ratio Raving, etc."; for the Pitt Press, Sir Thomas More's "Life of Richard III." and "Utopia." He has written "A History of the Creed" (1873); "A Popular Introduction to the New Testament" (1883); and a small work on "Greek Learning in the Western Church During the Seventh and Eighth Centuries." He died in Grand Chester, England, Nov. 21, 1895.

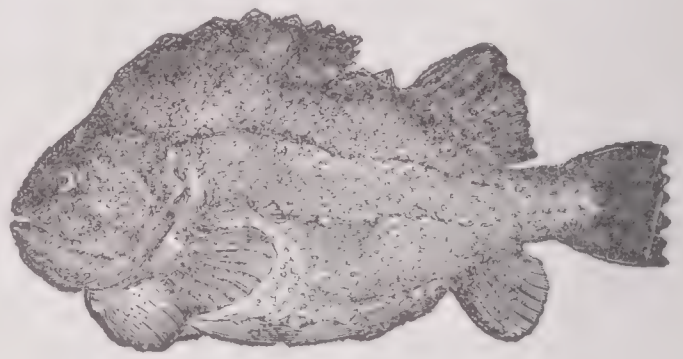
Luminiferous Ether, a hypothetical medium of extreme tenuity and elasticity, supposed to be diffused throughout all space, as well as among the molecules of which solid bodies are composed, and to be the medium of the transmission of light, heat, and other forms of energy. From the extreme facility with which bodies move about in this medium it might be called a fluid; but the undulations which it serves to propagate are not such as can be propagated by fluids. Its elastic properties are rather those of a solid; and its waves are analogous to the pulses which travel along the wires of a piano rather than to the waves of extension and compression by which sound is propagated through air.

Luminous Jar, a Leyden jar having the outer side coated with varnish, strewed over with metallic powder, and the upper part with a hooked piece of metal terminated in a knob, the lower part with a strip of tin connecting it with the ground. If suspended to an electrical machine and the latter put in action, large and brilliant sparks will be found outside the jar, illuminating it all around.

Luminous Paint, a paint containing phosphorus, which after exposure to strong light becomes luminous in the dark for a time.

Lummis, Charles Fletcher, an American author; born in Lynn, Mass., March 1, 1859. He was a resident of Los Angeles, Cal. He was devoted to the archæology and history of the aboriginal tribes of the Southwest. Among his works are: "The Land of Poco Tiempo"; "The Spanish Pioneers"; "The Man Who Married the Moon"; "The Gold Fish of the Grand Chimú"; "A New Mexico David, and Other Stories"; "The King of the Broncos" (1897); "The Enchanted Burro" (1897); and "The Awakening of a Nation" (1898).

Lump Fish, or Sucker (*Cyclopterus lumpus*), an acanthopterygious fish, so named from the clumsiness of its form. The back is arched and sharp, the belly flat, the body covered with numerous bony tubercles, the ventral fins modified into a sucker, by means of which it adheres with great force to any substance to which it applies itself. Before the spawning season it is of a brilliant crimson color, mingled with orange, purple, and blue, but afterward changes to a dull blue or lead color. It sometimes weighs seven pounds, and its flesh is very fine at some seasons, though insipid at others. It frequents the N. seas, and is also called cock paddle, lump sucker, and sea owl.



LUMP FISH.

Luna, Antonio, a Filipino insurgent; born in Manila, Philippine Islands, about 1854; was educated in Europe; returned to Manila early in 1898; became editor of "La Independencia"; and was the first Minister of War in the so-called government of Aguinaldo. He was conspicuous in opposing the Spaniards before and after the surrender of Manila to the Americans. Later he was placed in command of the Filipino insurgents with the rank of general. He was killed presumably by the guards of Aguinaldo, who, fearing that Luna might attempt to assassinate him, gave orders to his bodyguard to kill any one regardless of his rank who should try to enter

his headquarters. Luna endeavored to pass this guard and was shot dead, June 8, 1899.

Luna, the Latin name for the moon, among the Greeks Selēnē. Her worship is said to have been introduced among the Romans in the time of Romulus.

LUNA.

Lunar Tables, in astronomy, ponderous volumes of solid figures which are the numerical development and tabulation of some analytical theory of the moon's motions and perturbations. From these are constructed the annual ephemerides of the moon's hourly position, one of the principal features of a nautical almanac. Hansen's "Tables de la Lune" ("Lunar Tables") are the ones from which the principal ephemerides are constructed today.

Lunar Theory, in astronomy, the deduction of the moon's motion from the law of gravitation.

Lunatic Asylum. See INSANITY.

Lund (lönd), a city of Gothland, in the extreme S. of Sweden, 374 miles S. W. of Stockholm and 10 N. E. of Malmö. The principal building is the fine Romanesque cathedral, dating from the 11th century, with an imposing crypt. Lund owes its revival to the founding of a university in 1668 by Charles XI. It was attended in 1899 by 582 students, and has a library of 120,000 volumes and 3,000 MSS., an excellent zoölogical museum, and a botanic garden. Tegnér was a professor from 1813 to 1826, and here he composed his masterpiece "Frithjof." In the 10th century Lund was a large and powerful city, was made a bishopric in 1048, and an archbishopric in 1104. The archbishop claimed ecclesiastical supremacy over the whole of Scandinavia. At the same period Lund was the chief seat of the Danish power in the Scandinavian peninsula, and for a long period the capital of the Danish kingdom; at the epoch of its greatest prosperity it is said to have had 200,000 inhabitants. But after the introduction of the Reformation by Christian III. in 1536, the city began to decline, and had sunk down to a mere village before the end of the 17th century. Pop. (1906) 18,770.

Lundy, a granitic island of Devonshire, England, in the mouth of the Bristol Channel, 11¾ miles N. N. W. of Hartland Point; length 3½ miles, breadth 1 mile; has rocky and precipitous shores, with only one landing-place on the S. side; and an altitude of 525 feet; near the S. end is a lighthouse, built in 1820. The cliffs are the resort of multitudes of sea-fowl. The antiquities include prehistoric kists, remains of round towers and a chapel, and the ruined castle of the Mariscoes (11th to 14th centuries), from whose time on into the 17th century Lundy was a stronghold successively of pirates, buccaneers, privateers, and smugglers. It figures in Kingley's "Westward Ho!"; was the death-place of "Judas" Stukely; garrisoned till 1647 for Charles I.; and in 1834 purchased for $49,350 by the Heaven family.

Lundy, Benjamin, an American abolitionist; born in Hardwick, N. J., Jan. 4, 1789. He advocated emancipation in frequent contributions to periodicals till 1821, when he founded the monthly "Genius of Universal Emancipation," which was published under difficulties for some years. He started in Philadelphia a weekly anti-slavery journal, "The National Enquirer" (1836); and in 1839 was about to revive the "Genius of Universal Emancipation" at Lowell, when he died. "The Life, Travels, and Opinions of Benjamin Lundy" was published in 1847. He died in Lowell, Ill., Aug. 22, 1839.

Lundy's Lane, a locality in the province of Ontario, near the Falls of Niagara. Here, July 25, 1814, an obstinate and undecisive engagement was fought between an American force, numbering 3,000 men, under General Brown, and a body of about 4,000 British troops commanded by General Drummond. The loss of the Americans was 743 men; that of the British 878 men. In this battle, fought against the best disciplined English soldiers, the troops of Brown fought with a valor which did much to disabuse the country of the idea, then prevalent, that American troops could not cope with the trained veterans of Europe.

Lune, in geometry, the area included between the arcs of two circles which intersect each other. The Lunes of Hippocrates, the name given to the two semicircular figures, remarkable for their employment

by Hippocrates in his celebrated theorem. See CURVES.

Lunel (lü-nel′), a town in the S. of France, 14 miles N. E. of Montpellier, with a trade in Muscatel wine and brandy. Interesting human remains have been found in a cave at Pondres, 6 miles N. of Lunel.

Lunenburg, a S. E. county of Nova Scotia, bordering on the Atlantic Ocean; area about 600 square miles; rivers, Le Have river, and numerous smaller streams; surface, broken; soil in some parts fertile; the coast is deeply indented with bays and inlets, of which Margaret's Bay and Mahone Bay are the largest. Capital Lunenburg; sometimes called Malaguash; pop. (1901) 32,389.

Lunéville (lü-nā-vēl′), a town in the French department of Meurthe-et-Moselle, at the confluence of the Meurthe and the Vezouse, and 20 miles S. E. of Nancy; manufactures gloves, hosiery, cottons, etc. It was formerly a residence of the Dukes of Lorraine; their palace, built by Duke Leopold, and in which the Emperor Francis I. was born, is now used as a cavalry barrack, this town being one of the largest cavalry stations in France. Here was signed the peace of Lunéville, Feb. 9, 1801, between Germany and France, on the basis of the peace of Campo Formio. Pop. (1901) 18,-104.

Lungs, the sole breathing organs of reptiles, birds, mammals, and in part of amphibians (frogs, newts, etc.), the latter forms breathing in early life by branchiæ or gills and afterward partly or entirely by lungs. In the three first mentioned classes of vertebrates the lungs constitute the sole organs of respiration. The essential idea of a lung is that of a sac communicating with the atmosphere by means of a tube, the trachea or windpipe, through which air is admitted to the organ and through structural peculiarities to its intimate parts. The lungs are developed in embryonic life as two little sacs springing from the ventral or abdominal surface of the œsophagus or gullet. At first they are united anteriorly and at this point the future trachea is produced. The further development of the lung produces a series of tubular structures which finally become more and more cellular by the sacculation or division of their walls. The sacculation or division into cells of the fully developed lung is best marked and most perfect in the higher *Vertebrata*. In lower pulmonated or lung-bearing vertebrates (for example, amphibia and many snakes), the sacculation is most perfectly seen at the point where the bronchus or main division of the windpipe enters the lung. This is the most active part of the organ, and the hinder or posterior part may remain smooth, non-sacculated, and otherwise retain much of the character presented by the organ in early life. The air tubes — or ultimate divisions of the windpipe within the lung — may branch out and ramify throughout the whole interior of the organ, which thus assumes a perfectly sacculated or cellular structure throughout. In the *Chelonia* — tortoises and turtles — and in crocodiles, the lungs may be also entirely cellular, but the bronchi do not give off branches within the organs. In birds again, which exhibit certain peculiarities in the structure of their lungs, each lung is composed of fine air tubes with sacculated walls which tubes are given off at right angles from the larger tubes and these latter come off similarly at right angles from the main bronchi themselves. In birds, therefore, the thoroughly cellular condition of the lungs seen in *Mammalia* is represented by the mere sacculated walls of the air tubes. In fishes the lungs of higher forms are represented by the swimming or air bladder, which when traced throughout the fish class, and as observed in the *Lepidosiren* or mud fish, is seen ultimately to assume not only the form and relations, but also the functions of lungs. In the *Mammalia*, including man, the lungs are confined to and freely suspended in the cavity of the thorax or chest, which is completely separated from the abdominal cavity by the muscular diaphragm or "midriff." In birds the lungs are attached to the dorsal side of the ribs, the thorax or chest in all vertebrate classes lower than the *Mammalia* being more or less continuous with and not distinctly separated from the abdomen. In lower forms (for example, snakes, siren, etc.) the lungs may therefore extend throughout the whole length of the abdominal cavity. Sometimes even among mammals the lungs exhibit an inequality in size. Thus in the porcupines and musk deer the right lung is much larger than the left and in serpents particularly one lung is generally rudimentary and functionally useless, or may even be entirely absent and unrepresented. In birds and in cetaceans (whales, etc.) among mammals the lungs are not divided into separate portions or lobes. In man and in many other members of his class the lungs are lobular. Thus in the marmots the right lung has five lobes, the left exhibiting a division into three; and in the porcupine the right lung has six and the left five lobes. In *Ornithorhynchus*, or the duck-billed water mole of Australia, a median appendage or lobe exists and lies between the heart and midriff; and in the elephant's lung this little single lobe exists, though the lungs do not exhibit any division into lobes.

In man the right lung is shorter and broader than the left lung. Both lungs are invested by a delicate serous sac termed the pleura, each lung being inclosed within

Lungs

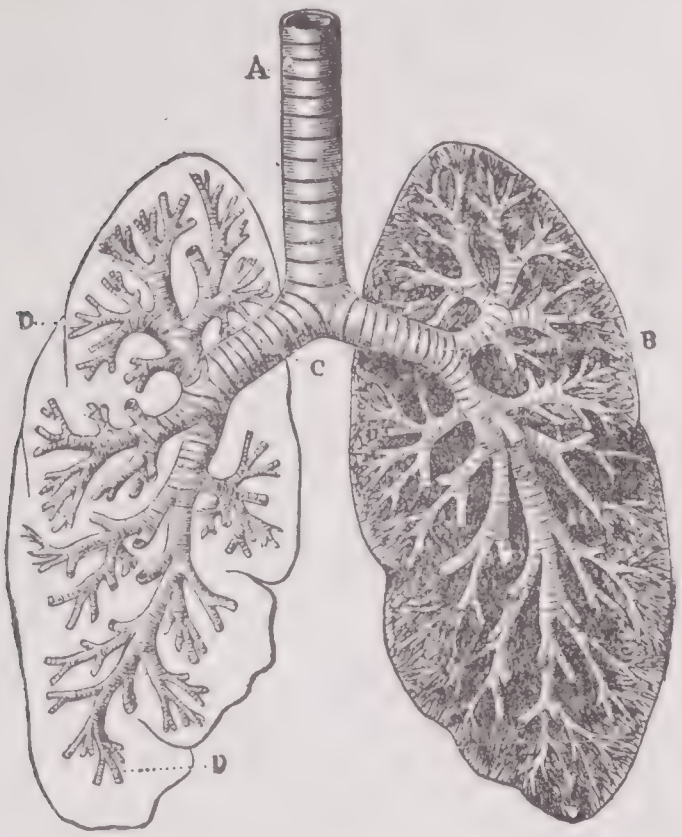
its own pleura. Each pleura is a completely closed double sac, one side of the sac lining the chest while the other side or part is reflected over the lung. The pleura thus lines the ribs and part of the breast bone and from this latter structure it is reflected backward over the pericardium or bag in which the heart is inclosed. It next passes over a great part of the root of the lung, or that portion where the great blood-vessels enter and leave the organ. Thence it is reflected over the whole lung to the back portion of the root, from which point it passes over the sides of the vertebræ and thence to the ribs, where our examination of the pleura began. The only fold or ligament formed by the pleura throughout its course is the *ligamentum latum pulmonis*, a broad fold which runs from the root of each lung to be attached to the diaphragm. The two pleural sacs inclose two spaces between them in the antero-posterior plane of the chest, which are known as the anterior and posterior mediastina; and some anatomists describe in addition a middle mediastinum. In the dead subject, and frequently in diagrammatic representations of the pleuræ a space is seen between the outer surface of the lung and the inner surface of the pleura, by which it was covered. This is due in the dead subject to the recoil of the lung on the admission of air by the opening of the chest to what has been a perfectly closed cavity. But in health and during life the surfaces of the lung (outer) and pleura (inner) are closely applied to each other. The inner surface of the pleura is smooth, glistening, and lubricated by serous fluid so that the surface of the lung slides easily over it in the movements of respiration. In disease and where inflammatory products especially have been thrown out on the surface of the pleura, the movement of the lung on the roughened surface produces the so-called "friction sound" of the physician.

The lungs are situated one on each side of the heart and in shape each presents a form which may be most nearly described as conical. The apex of each lung or cone fits into the upper corner of the chest, about an inch above the collar bone, at the point where it joins the breast bone. The base of each lung lies on the diaphragm. The outer surface is convex, the inner surface is concave and receives the heart. The right lung has already been stated to be shorter and broader than the left, this diminution in length being due to the limitation of the thoracic cavity of the right side by the pushing up of the diaphragm by the liver. Each lung exhibits a broad division into an upper and lower portion or lobe. This separation is marked by a deep cleft, which extends from below the apex and runs downward in an oblique direction to the front of the organ. The upper lobe of the right lung becomes divided in turn by a fissure which runs nearly at right angles to the main cleft, and which thus maps off a third portion of the right lung to form the middle lobe of that organ. The left lung has therefore but two lobes, while the right lung has three. Each lobe of the lung is subdivided into a large number of smaller portions, to which the name of lobules has been applied. These lobules may be readily seen, marked out on the surface of the human lung by deposits or lines of black pigmentary matter, each lobule measuring from one-fourth to one-half inch in diameter.

If we examine the intimate structure of one lobule of the lung we may gain an idea of the essential structure of the whole organ, since each lobule resembles its neighbors, and since the whole lung is merely an aggregation of lobules. Each lobule consists of numerous air cells supplied by a bronchial or air tube; of blood-vessels, by which the blood is brought to or returned from the lobule; of nerves; of lymphatic vessels; and of areolar tissue, by which these different parts and structures, as well as the lobules themselves, are connected or bound together. The trachea or windpipe divides about the level of the third dorsal vertebra into two main branches, the right and left bronchi, one of which enters the root of each lung. The right bronchus is shorter than the left and at the root of its lung each divides in turn into two branches, one branch going to supply the upper lobe or portion and the other the lower lobe of the lung; the lower branch of the right lung sending a third offshoot to supply the middle lobe. Within the lung these main divisions of the bronchus ramify and divide and subdivide, as the "bronchial tubes," till at length the ultimate and minute ramifications of the air tubes lead into the air cells, of which the lobules of the lung have been already stated to be chiefly composed. A small bronchial tube thus enters each lobule, and within the lobule it further subdivides, its walls gradually growing thinner till its ultimate and terminal branches exhibit widenings or funnel-shaped dilatations, each composed of numerous small sacs of air cells, and known as an ultimate lobule or infundibulum. The air cells of each infundibulum inclose and communicate with a central irregularly disposed oblong space known as the intercellular passage. This passage is merely the dilated extremity of the bronchial tube and it gradually becomes continuous with the better defined air tube before it becomes expanded to form the infundibulum. The air cells vary in arrangement upon the intercellular passage. They may exist singly and thus may resemble round recesses from the passage. Their more general arrangement is in groups or

Lungs

rows like sacculated tubes, between which free communication exists, while they all open by a single orifice into the common tube. Pressure may also cause the air cells of the lung to assume various forms and shapes.



Section showing the ramifications of the bronchi in the lungs. A, trachea; B, C, bronchi; D, D, bronchial tubes.

The walls of the air cells are generally in contact with each other, and the average diameter of the cells is about $\frac{1}{50}$ to the $\frac{1}{70}$ of an inch, though sometimes the diameter does not exceed $\frac{1}{120}$ of an inch. In transverse section the walls of the cells are seen to be composed of a delicate areolar membrane strengthened by elastic tissue, which supports the closely-set network of capillary blood-vessels, to be hereafter described. And internally the air cells, as also the interior of the terminal air tube, are lined by a layer of squamous or tessellated epithelial cells, which, unlike the epithelial cells of the windpipe are not furnished with cilia or vibratile filaments. The pulmonary network of capillary blood-vessels, resulting from the ultimate ramifications and subdivision of the blood-vessels of the lung, are situated outside and between the walls of the air cells. This network is the most dense and thickly-set in the body, the capillaries of which it is composed averaging $\frac{1}{3000}$ of an inch in diameter. The blood brought in the course of the circulation to be purified by the respiratory process, therefore ultimately finds its way into this dense pulmonary network of vessels, the venous or impure blood in the vessels being thus separated from the oxygen in the air cells only by the thin walls of the capillaries in which it is inclosed and by the equally delicate walls of the air cells. And through these thin membranes the essential part of the respiratory process, namely, the interchange of gases, is effected in the most simple yet admirable and effective manner. The central cells of the lung are the smallest in the organ, and the capillary network is more dense than that of the more superficial or peripheral cells. This arrangement is in relation to the greater amount of air which the central portions of the lungs receive.

The air cells of different and adjacent lobules communicate indirectly only through the tubes or intercellular passages, the occlusion of a main bronchial tube depriving of air all the lobules which are supplied by its subdivisions and branches. The larger bronchi have their walls strengthened and kept patent by cartilaginous rings, and in the walls of such larger tubes elastic tissue and unstriped muscular fibers are found, while internally they are lined with ciliated epithelium. As the main bronchi subdivide into smaller branches within the lung their walls become thinner, and the gristly rings less numerous. In the smaller tubes the rings are at length represented by mere cartilaginous particles, and when the tubes gradually become still more minute the cartilaginous rings disappear entirely, leaving the walls to be composed of elastic membrane encircled with muscular fibers; while the mucous membrane and ciliated epithelial cells form an inner lining. The elasticity of the lung tissue, by means of which the lungs spontaneously expel part of the air which may be injected into them, is due to the elasticity and action of the contractile tissues and membranes found in the walls of the bronchial tubes and air cells. The surface of the lung also exhibits a layer of delicate elastic tissue which aids in its elastic recoil, and which has been sometimes described by anatomists as a distinct or inner pleural layer. In some animals (for example, the seal) this latter tissue becomes highly developed.

The lungs are popularly termed "lights"; this from the reason that they are the lightest organs in the body and float when placed in water, except in diseased conditions, as after chronic inflammations, where the lung tissue becomes filled up with the product thrown out and exhibits a hepatized or solid and liver-like structure, when it at once sinks. This characteristic floating of healthy lungs is made use of in medical jurisprudence as a test — hydrostatic test — and proof that respiration has taken place in infants supposed to have been murdered, respiration being life in the eye of the law. The importance, therefore, of ascertaining whether or not the child has breathed, has led medical jurists to pay especial attention to this test. In the infant the lungs are of a light red color, but in

adult life the lung tissue becomes more or less infiltrated with black matter, probably of carbonaceous nature, and which has been inhaled in the process of breathing. This is proved to be actually the case in those individuals whose trade exposes them to the influence of such particles. Coal miners particularly may be cited as offering examples of this phenomenon; the lungs of these men in advanced life presenting a singularly black appearance which is known by the name of "coal miners' lung." And to show how liable the lung is to be affected by the atmospheric particles, it may be mentioned that stone masons and needle grinders generally suffer much from inhaling the particles by which they are surrounded; the former inhaling the stone dust and the latter the dust of steel. In either case much irritation leading to serious disease is set up in these organs.

The root of the lung has already been described as that portion of the lung situated toward the middle of the inner aspect of the organ by which the blood-vessels and nerves enter the structure. The pulmonary arteries bringing the venous or impure blood from the right ventricle of the heart to be purified and the pulmonary veins carrying the pure blood to the left auricle of the heart to be circulated anew through the body, enter and leave the lung respectively at the root. The pulmonary artery divides along with the bronchial tubes and ends as described in the dense capillary network of vessels surrounding the air cells. The lung tissue itself is nourished by the bronchial arteries which number two or more in each lung. They are distributed along the course and divisions of the bronchial tubes. The bronchial veins of the right lung, returning the venous blood from the lung tissue, empty themselves into the vena azygos; those of the left lung joining the superior intercostal vein. The lungs are supplied with nerves from the pneumogastric nerve and sympathetic system; the supply from the latter source indicating the semi-involuntary and organic nature of the respiratory movements. The nerves enter the lungs with the bronchial tubes and form a plexus or nervous network both in front and behind the tubes. These are known as the anterior and posterior pulmonary plexus respectively.

Lunge, Longe, or **Allonge,** in fencing, the third mode of attack, which is executed by first making the movement termed the "extension," and afterward advancing the right foot forward, as far as can be done with ease, toward the opponent. The right foot is firmly planted on the ground, the body quite erect, resting equally on both legs, the height of the shoulders equal, the right thigh nearly horizontal with the ground, and the leg perpendicular. The thrust of the weapon proceeds from the wrist, the point of the foil being elevated, and advanced toward the breast of the adversary.

Lungwort, *Sticta pulmonacea,* a lichen growing on the trunks of trees in moist, sub-alpine countries. It is sometimes prescribed in diseases of the lungs, like Iceland moss. In Siberia it is used as a substitute for hops. Called also lungs of the oak. Also the boraginaceous genus *Pulmonaria.* The narrow-leaved lungwort is *Pulmonaria angustifolia,* and the common lungwort, *P. officinalis;* the former is wild. Also *Hieracium pulmonarium.* Bullock's lungwort is *Verbascum thapsus;* tree lungwort.

Lunt, George, an American author; born in Newburyport, Mass., Dec. 31, 1803. During the Civil War he was associate editor, with George S. Hillard, of the Boston "Courier." He was a forceful, graceful writer. He published "Poems" (1839); "The Age of Gold" (1843); "The Dove and the Eagle" (1851); "Lyric Poems" (1854); "The Union," a poem (1860); "Origin of the Late War" (1866); "Old New England Traits" (1873). He died in Boston, Mass., May 17, 1885.

Lunt, William Parsons, an American clergyman; born in Newburyport, Mass., April 21, 1805. His writings are singularly felicitous in purity of taste and have been much admired. Among his published works are: "Gleanings"; "Discourse at the Interment of John Quincy Adams"; "Union of the Human Race"; "Sermon on Daniel Webster." He also compiled "The Christian Psalter." He died in Akabah, Arabia Petræa, March 20, 1857.

Lupercalia (-kā'li-ä), a festival among the ancient Romans, held on Feb. 15, in honor of Lupercus, the god of fertility. When Rome began to seek a Grecian origin for its religious ceremonies, Lupercus was identified with Lycæan Pan, and his worship was said to have been introduced by Evander, the Arcadian. The rites were of the rudest and most primitive character and indicate a high antiquity. Goats and dogs were sacrificed; afterward the priests (called *Luperci*) cut up the skins of the victims and twisted them into thongs, with which they ran through the city striking every one they met, especially women, who put themselves in their way hoping that the god of fertility would be propitious toward them. The place where the festival was held was called the Lupercal, and was situated on the Palatine Hill. It contained an image of Lupercus, covered with a goat's skin. Lupercalia were also held in other cities of Italy.

Lupercus (-per'-), the Roman name of Pan.

Lupine, a very extensive genus of hardy annual, perennial, and half-shrubby plants, some of which are cultivated in gardens for the sake of their gaily-colored flowers. They belong to the natural order *Leguminosæ*.

Lupulin (lū′-), the yellow granular aromatic powder situated at the base of the cones of the hop, and forming from 8 to 18 per cent. of the cones. It contains a volatile oil, a resin, a nitrogenous substance, and a bitter principle. The oil and resin give to beer its aromatic odor.

Lupus, in zoölogy: (1) a genus established by Buffon, to include the true wolves and the jackals, now generally considered as forming part of the genus *Canis*. (2) The first section of Hamilton Smith's subgenus *Chaon*. In this nomenclature *Lupus vulgaris* is the common wolf, *L. lycaon* the black wolf, *L. nubilus* the dusky wolf, and *L. mexicanus* the Mexican wolf. In pathology: A spreading tuberculous inflammation of the skin, generally of the face, tending to great destructive ulceration, often from syphilis. There are two forms, chronic lupus and *lupus exedens*, the latter characterized by the rapid eating away of the parts affected. In astronomy: The Wolf; one of the 15 ancient Southern constellations. It is situated between Centaurus and Ara, just under Scorpio. It contains no stars larger than the third magnitude.

Luray Cavern, a cave, not large, but remarkable for the vast number and extraordinary shapes of its stalactites, close to Luray village, Va., 90 miles N. W. of Richmond. Many of these wonderful columns exceed 50 feet in length; numbers of them are hollow, giving out bell-like notes when struck; and the colors range from waxy white to yellow, brown, or rosy red. The cavern, which is lit with the electric light, attracts thousands of visitors every year.

Lurcher, a name applied to any dog with a distinct cross of greyhound. The commonest form of the lurcher is the first cross between the collie and the greyhound, though in some instances they have been bred for many generations without a fresh cross. As the lurcher combines to a great extent the speed of the greyhound and the sagacity of the collie, no hare is able to escape him.

Luristan (lö-ris-tän′), a mountainous province in the W. of Persia; area 15,600 square miles; pop. about 300,000. It corresponds roughly to the ancient Susiana, was the seat of the ancient Elamite empire, and is now occupied by numerous minor tribes.

Lurlei. See LORELEI.

Luschka, Hubert von (lösh′kä), a German anatomist; born in Constance, July 27, 1820. He became Professor of Anatomy in the University of Tübingen in 1855. His principal work is "Human Anatomy as related to Practical Medicine" (3 vols. 1862–1869). He died in Tübingen, March 1, 1875.

Luscius. See FABRICIUS.

Lushais, a warlike race occupying the little-known Lushai Hills in Cachar (Assam), Chittagong (Bengal), and the adjoining parts of Burma. Their country is now British.

Luska, Sidney. See HARLAND, HENRY.

Lushwankan. See PORT ARTHUR.

Lusiad (lö′-), a celebrated Portuguese epic poem, by Camoens, on the establishment of the Portuguese empire in India; first published in 1571.

Lussigny, Baron de. See ANCRE, MARSHAL D'.

Luster, a sconce with lights; a chandelier ornamented with drops or pendants of cut glass. Also a kind of dress goods with a cotton chain, woolen filling, plain or self color, and highly-finished surface. In mineralogy, a physical character dependent on the refractive power and manner of reflecting light. The luster of crystal faces often differs from that of the cleavage planes of the same crystal, and sometimes different faces of a crystal are characterized by a different luster. The kinds are: (1) Metallic, the luster of metals; (2) adamantine, that of the diamond; (3) resinous, that of the fracture of amber; (4) vitreous, that of a glass free from lead; (5) waxy; (6) pearly; (7) silky. These are further distinguished by their intensity, as submetallic, sub-adamantine, sub-resinous, subvitreous, splendent, shining, glistening, and glimmering. A total absence of luster is designated as dull.

Luster Ware, a stone ware on whose surface are burnt metallic oxides of brilliant colors. It is made of a mixture of clay, flint, China-stone, and felspar, coated with a peculiar glaze on which is applied, by means of camel-hair brushes, a pigment prepared from metallic oxides, simulating the luster of various metals, etc. Platinum produces a luster like that of polished steel; gold and silver, those of the precious metals. Iron and copper lusters may also be produced. A beautiful iridescent appearance is derived from chloride of silver in combination with other substances. The luster is brought out by the heat of the oven in the process of baking.

Lustration, purification. It is scarcely too much to say that lustration or symbolical purification is to be found in every known form of faith. Tylor says that the thought which underlies these ceremonies is the "transition from removal of bodily

impurity to deliverance from invisible, spiritual, and at last moral evil." Lustration by sprinkling with water is the most common form, but it was also effected by fumigation, and by passing through fire; and Mahomet, failing water, commanded his followers to use fine sand. Among the Jews ceremonial washings and purifications were prescribed for the consecration of priests (Lev. viii: 1–13); they appear to have been practised as a preparation for private prayer (Judith xii: 7–9); and the importance attached to ablutions before ordinary actions gave rise to some of the reproaches leveled by the Scribes and Pharisees against Jesus (Matt. xv: 2, 20; Mark vii:1–5). From Judaism lustration passed into Christianity; all branches of the Church retain it in baptism, and the Roman and Greek communions in the additional form of HOLY WATER (*q. v.*). It has given rise to some of the most beautiful imagery in the Old and in the New Testament (see Ezek. xxxvi: 25; Zech. xiii: 1; Matt. xxvii: 24; Rev. vii: 14).

Lute, an instrument of the guitar family, formerly very popular in Europe. It was used for accompaniments and the performance of solos, duets, etc. It had five to six pairs of strings, each pair tuned in unisons or octaves. The several frets of the lute were distinguished by the letters of the alphabet, "one for each fret as many as there may be." The frets divided the strings into semitones. It consists of four parts: The table; the body, which has 9 or 10 sides; the neck, which has as many stops or divisions; and the head or cross, in which tuning screws are inserted.

Luther, Martin, a great religious reformer; born in Eisleben, Lower Saxony, Nov. 10, 1483. He was educated in the deepest respect for religion. At the age of 14 he was sent to school at Magdeburg, whence he removed in 1498 to Eisenach. At first he obtained his support by singing songs at the doors, like many other poor scholars; but he was soon taken under the care of a benevolent lady named Ursula Cotta. At school he made rapid progress in Latin and other studies; in 1501 entered the University of Erfurt; in 1503 received the degree of Master and delivered lectures on the physics and ethics of Aristotle. About this time he discovered in the library of the university a Latin Bible and found to his no small delight that it contained more than the excerpts in common use. He was destined by his father to the law, but his more intimate acquaintance with the Bible, of which the clergymen of that time knew only the Gospels and Epistles, induced him to turn his attention to the study of divinity. The impression produced on him by the sudden death of his friend Alexis, uniting with the effect of his early religious education and his poverty decided him to devote himself to the monastic life. Contrary to the wishes of his father he entered the monastery of the Augustines at Erfurt in 1505 and submitted patiently to all the penances and humiliations which the superiors of the order imposed upon novices. But he always regarded himself as an unprofitable servant. Pure and innocent as he was he tortured himself with bitter reproaches and was attacked by a severe fit of sickness, during which one of the elder brothers consoled his troubled heart and promised him the forgiveness of his sins through faith in Jesus Christ. This doctrine, almost forgotten in the zeal of the clergy for good works, as they called them, and in the traffic in indulgences brought a new light into the soul of Luther. He was also encouraged by the paternal mildness of Staupitz, the provincial of the order, who, perceiving his extraordinary talents and acquirements delivered him from the menial duties of the cloister and encouraged him to continue his theological studies.

In 1507 he was consecrated priest, and in 1508, by the influence of his patron, Staupitz, he was made Professor of Philosophy in the new University of Wittenberg. In this sphere of action his powerful mind soon showed itself. He threw off the fetters of the scholastic (Aristotelian) philosophy, so intimately connected with the papal hierarchy, asserted the rights of reason and soon collected a large number of disciples. In 1510 he visited the court of Pope Leo X. at Rome on business connected with the order. This journey revealed to him the irreligion and corruption of the clergy at Rome and destroyed his reverence for the sanctity of the Pope. After his return he became a preacher at Wittenberg, and in 1512 he was made a Doctor in Theology. As such his oath bound him, as he thought, to the fearless defense of the Holy Scriptures. His profound learning which embraced an intimate acquaintance with the ancient classics, the fathers of the Church, and the spirit of the Greek and Hebrew languages, together with the fame of his eloquence, soon made Luther known to the principal scholars and esteemed as a powerful advocate of the new light which was breaking upon the world. Great, therefore, was the attention excited by his 95 propositions given to the world Oct. 31, 1517, and intended to put an end to the sale of indulgences by the Dominican Tetzel. Luther was compelled to this course solely by the love of truth and by his indignation against the traffic in indulgences, the unhappy effects of which had appeared already in his congregation at Wittenberg. His propositions were condemned as heretical as soon as they appeared. Hogstraaten, a Dominican at Cologne, Dr. Eck at Ingolstadt, and Prierias, an officer of the Roman court, im-

mediately began an attack on Luther; but neither their invectives nor the papal summons to Rome which he did not obey, nor the mild exhortations of the Cardinal Cajetan at Augsburg in 1518, and of the Nuncio Miltitz at Altenburg in 1519, with alluring offers from the Pope himself, were sufficient to induce him to recant. He replied to his opponents with boldness and determination and even after his dispute with Eck at Leipsic in 1519 he still maintained the invalidity of indulgences and of the papal supremacy. No one answered him, and he appealed with justice from the decision of Cajetan to the Pope, and from the Pope to a general council.

In 1520 Luther and his friends were excommunicated. His writings were burned in Rome, Cologne, and Louvain. Indignant at this open act of hostility after his modest letter in which he had showed himself desirous of reconciliation, declared his submission to the Pope, and advised a reform in the Church, Luther burned the bull of excommunication and the decretals of the papal canon at Wittenberg Dec. 10, 1520. By this act he dissolved all connection with the Pope and the Roman Church. Frederick, the Elector of Saxony, seemed in doubt whether he should protect him. But the worthiest of the German noblemen, Hutten, Sickingen, Schaumburg, whom he called on to defend the new opinions, hailed him as the champion of religious liberty and offered him the protection of their fortresses and their arms. But Luther wished no protector but God. A few months later he was summoned by the newly elected German Emperor, Charles V., before the Diet of Worms and resolved to go in spite of all the remonstrances of his friends. He was met by about 2,000 persons on foot and on horseback at the distance of a league from Worms. Such was his conviction of the justice of his cause that when Spalatin sent a messenger to warn him of his danger he answered, "If there were as many devils in Worms as there are tiles upon the roofs of its houses I would go on." Before the emperor, the Archduke Ferdinand, 6 electors, 24 dukes, 7 margraves, 30 bishops and prelates, and many princes, counts, lords, and ambassadors Luther appeared, April 17, in the Imperial Diet, acknowledged all his writings, and on the following day made his defense before the assembly. He concluded his speech of two hours in length with these words: "Let me then be refuted and convinced by the testimony of the Scriptures or by the clearest arguments, otherwise I cannot and will not recant, for it is neither safe nor expedient to act against conscience. Here I take my stand; I can do no otherwise, so help me God! Amen." He left Worms in fact a conqueror; but it was so manifest that his enemies were determined on his destruction that Frederick the Wise conveyed him privately to the Wartburg to save his life. Neither the proscription of the emperor nor the excommunication of the Pope could disturb him in his retirement of which he took advantage to translate the New Testament into German. But this retirement continued only 10 months. When informed of the disturbances excited by Carlstadt on the subject of images he could no longer endure restraint, notwithstanding the new outlawry which the emperor had just issued against him at Nuremburg, and at the risk of provoking the displeasure of the elector he hastened to Wittenberg, through the territory of George, Duke of Saxony, who was one of his most bitter enemies. The letter to Frederick in which he justified his departure, proves, not less than his conduct before the Diet at Worms, his fearless courage and the greatness of his soul. The sermons which he delivered for eight successive days after his return (in March, 1522) to quell the violence of the enraged insurgents in Wittenberg are patterns of moderation and wisdom and popular eloquence. They show in a striking light the error of those who consider Luther only as a violent and rude fanatic. He was violent only against malignity or when he thought the great truths of religion in danger. Such motives sufficiently account for his caustic reply to Henry VIII., King of England, and the bitterness of spirit manifested in his controversies with Carlstadt and Erasmus. The latter, not without reason, he charged with worldliness and lukewarmness in a good cause. He viewed the attack of Carlstadt on his doctrine of the sacrament as an open apostasy from the faith and an act of ambitious jealousy.

Amidst these disputes and attacks his plans for a total reformation in the Church, which was called for by the voice of the nation, were matured. In 1523 at Wittenberg he began to purify the liturgy from its empty forms and by laying aside his cowl in 1524 he gave the signal for the abolition of the monasteries and the better application of the goods of the Church. In 1525 he married Catherine von Bora, a nun who had left her convent. After overcoming numerous difficulties he took this important step at the age of 42 years as much from principle as inclination, with the design of restoring the preachers of the Gospel to their natural and social rights and duties. Warm as was the zeal of Luther for a reform in the Church he was desirous of avoiding disorder and violence. While he went hand in hand with the imperial cities and foreign princes both in words and actions he opposed most decidedly the violence of the peasantry and of the Anabaptists. His enemies have shown great injustice in implicating him as the author of those outrages which arose from the en-

Luther

thusiasm of the ignorant. The opposite fault of having too little sympathy with the blind striving of the masses after a purer light and his constant leaning to the nobility for coöperation and assistance may be with more reason laid to his charge. Luther prepared from 1526 to 1529 a new Church service corresponding to the doctrines of the Gospel, under the patronage of the elector and with the aid of Melanchthon and other members of the Saxon Church. His larger and smaller catechisms to be used in schools were also of great service. But everyone must look with pain on the severity and intolerance which he manifested toward the Swiss reformers because their views differed from his own in regard to the Lord's Supper. He was thus the chief cause of the separation which took place between the Calvinists and the Lutherans. But without his inflexible firmness in matters of faith he would have been unequal to a work against which artifice and power had arrayed all their forces.

The rapidity with which the Reformation advanced after the Confession of Augsburg in 1530 rendered the papal bulls and the imperial edicts against Luther inefficient. But he was obliged to be continually on his guard against the cunning of those who strove to make him give up some parts of his creed, and it required a firmness bordering on sternness and obstinacy to maintain the victory which he had won. With a spirit incident to such a state of things Luther wrote in 1537 the "Schmalkaldic" articles; he gave a refusal to the ambassadors of Brandenburg and Anhalt, who were sent in 1541 by the Diet of Ratisbon to make him more compliant toward the Catholics, and in 1545 he refused any participation of his party in the Council of Trent.

The severity which he used in the defense of his faith by no means diminishes the merit of his constancy, and an apology may easily be found for the frequent rudeness of his expressions in the prevailing mode of speaking and thinking, in the nature of his undertakings which required continual contest, in the provocations by which he was perpetually assailed, in his frequent sickness, and in his excitable imagination. The same excitability of temperament will serve to explain those dreadful temptations of the devil which disquieted him oftener than would seem compatible with his strength and vigor of mind, for that age regarded the devil as a real personage, an evil principle ever active; and if anyone devoted himself to the cause of God he was constantly obliged to resist attacks of the evil one on his virtue.

No one can behold without astonishishment his unwearied activity and zeal. The work of translating the Bible, which might well occupy a whole life, he completed with some assistance from Melanchthon and other friends from 1521 to 1534, and thus rendered his name immortal. This translation bears the same relation in Germany as the Authorized Version does elsewhere to the religious life and literature of the people. He equalled the most prolific authors in the number of his treatises on the most important doctrines of his creed. After the year 1512 he preached several times every week and at certain periods every day; he officiated at the confessional and the altar; he carried on an extensive correspondence in Latin and German on various subjects with men of rank and of distinguished literary attainments and with his private friends, and notwithstanding all this press of occupation he allowed himself some hours every day for meditation and prayer and was always accessible to visitors. He gave advice and assistance wherever it was needed, and interested himself for every indigent person who applied to him. In company he was always lively and abounded in sallies of wit and good humor, preserved in his "Tischreden" ("Table-talk"); and he was temperate in his enjoyments. Luther was no stranger to the elegant arts. His excellent hymns ("Ein' feste Burg," "Aus tiefer Noth," etc.) are well known. His fondness for music too was such that as often as circumstances permitted he would relax his mind with musical composition, singing, and playing on the flute and lute.

But few men are equal to such excessive labor, and with a weaker constitution such a constant round of action and vicissitude and toil would soon have overcome the great reformer. Indeed from the year 1531 he had a painful disease (the stone, accompanied with vertigo) to contend with, and in several fits of sickness was brought near the grave; but he lived to the age of 63.

On the 18th of February, 1546, Luther died in Eisleben, and he was buried in the castle church of Wittenberg. He left a wife whom he tenderly loved, and four children (two others having previously died) in straitened circumstances. His wife died in 1552. The male line of his posterity became extinct in Martin Gottlieb Luther, who was a counsellor at law and died in Dresden in 1759. Against his will his adherents styled themselves Lutherans; against his will they engaged in a war which broke out immediately after his death and desolated Germany. As long as he lived Luther was for peace and he succeeded in maintaining it; he regarded it as impious to seek to establish the cause of God by force; and in fact during 30 years of his life the principles of the Reformation gained a firmer footing and were more widely propagated by his unshaken faith and unwearied endeavors than by all the wars, treaties, and councils. Luther's works are partly in German, partly in Latin. Of earlier editions the most complete is that

by Walch (24 vols. Halle, 1740-1753); and of later, the Erlangen-Frankfort edition (German writings, 67 vols. 1826-1857; Latin writings, 38 vols. 1829-1886), and that published at Weimar (1883 onward). There are separate collections of his letters and his table talk.

Lutherans, followers of Martin Luther; that body of Christians who adopted the principles set forth by Luther in his opposition to the Roman Church, to the Swiss theologians, and to various sectaries of the Reformation period. The name was first applied by Luther's great opponent, Eck—when he published the papal bull against the Reformer in 1520—to all who took part against the Pope, and it was afterward adopted by Luther's adherents to distinguish them from those of other leaders in the Reformation. They called themselves "Evangelical" in distinction from the "Reformed" or followers of Calvin, and constituted one of the two principal divisions of the Protestant Church.

The early Lutheran Theology reflected the character of the Reformer himself. Filled with the life and power of the Scriptures, it yet was lacking in systematic theological form. Hence it was subjected to many trials of bitter controversy, out of which at length emerged the Formula of Concord (*Formula Concordiæ*), drawn up at Torgau in 1576, and in the following year revised and published. The doctrines of the Lutheran Church are contained in the three ecumenical or general creeds of the early Christian Church—the Apostles', the Nicæo-Constantinopolitan in its Western form, and the so-called Athanasian—and in the Augsburg Confession (*q. v.*), the Apology for the Augsburg Confession, the Schmalkaldic Articles, framed by Luther at a meeting of electors, princes, and states in Schmalkalden in 1537, Luther's two catechisms, and the Formula of Concord. These are all contained in the Book of Concord (*Liber Concordiæ*), which appeared in 1580 and which is regarded as the fundamental symbol or collective body of symbols of the Lutheran Church. Only the three general creeds, however, together with the Augsburg Confession, are accepted by all Lutherans. The acceptance of Luther's catechisms—especially the shorter one—has been almost universal.

The Augsburg Confession and Luther's Shorter Catechism may be said to embody the distinctive principles of Lutheranism which all Lutherans unite to maintain. The Augsburg Confession perhaps owed its universal recognition to the fact that it grew out of the very depths of the Christian consciousness in a severe testing time, and hence was stated in terms of a broad catholic experience. Slight divergences of view prevailed respecting the Lord's Supper. Luther himself believed in the real presence of the body and blood of Christ in the eucharist, though he denied transubstantiation. The term consubstantiation, which has been used to characterize this view, is universally rejected by Lutherans. For it implies a physical union between the present Christ and the sacramental elements. But Lutheranism denies any such materialistic notion, holding that the bread and wine are but the means or vessels of the spiritual grace they convey, but are not to be confused with it.

The history of Lutheranism has been somewhat stormy. Extending in the time of its founder over the greater part of Germany, it became the established religion of Sweden and Norway in 1527, and of Denmark in 1539. It has since made no considerable addition nor suffered any serious diminution of territory in Europe. In Germany it is far the leading church numerically; it is strong in the Baltic provinces, Hungary, and Iceland; in the United States it has obtained a secure position; in South America it has a good foothold; and its missionary enterprises have carried its work into almost every land on the globe. During Luther's lifetime the state of the church was comparatively quiet, but after his death internal dissensions arose. In 1548 Melanchthon, his successor, was attacked by Flacius and Amsdorf for making concessions to the Roman Catholics on questions of ritual. In the lifetime of Luther the Antinomian controversy was begun by Johann Agricola (see ANTINOMIANISM), who maintained that salvation was neither assisted by good works nor hindered by evil works. This doctrine Luther successfully combated, but after his death it was brought forward again.

Another controversy was that between the Synergists, led by Melanchthon, and the followers of Flacius. Melanchthon held that man's will must play an active part in his regeneration—co-operating with the divine Spirit—implying "that the soul has not lost in the fall all inclination toward holiness nor all power to seek for it under the influence of ordinary motives." According to the Flacians, the sinner was actually dead, and grace must be the actual cause of the new life. This led to further controversy about original sin, Flacius declaring that sin was part of the substance of man in his present natural condition, and that man was no more able to co-operate with grace in conversion than was a stick or a stone. To this it was replied that sin had not totally destroyed man's ethical nature, but that grace by its action changed what was morally insensible into what was morally living and sensible, so that there could be an actual synergy or co-operation between God's grace and man's will. Attempts by Melanchthon and his supporters to secure union with the Calvinists led to another series of controversies. The Philippists or Crypto-Calvinists, as the followers of Me-

Lutherans

lanchthon were called, had their theological center at Wittenberg, and that of their opponents, the stricter Lutherans, was at the University of Jena.

These discords seemed to threaten a fatal disruption of the Lutheran Church, but out of them came at length the Formula of Concord, in which most of the disputes were settled, and which was finally adopted by nearly all the Lutherans in Germany. The chief controversies of the seventeenth century arose from the proposal of Georg Calixtus that all Christian churches should unite on the basis of the Apostles' Creed, and from the movement originated by Philipp J. Spener (*q. v.*), "the Father of Pietism" (see PIETIST). The eighteenth century saw the establishment of the first Lutheran missions. Ziegenbalg (*q. v.*), the German Lutheran missionary, sailed for India in 1705, almost a century before Carey, the English missionary. During the latter part of the same century rationalism (*q. v.*) stirred the Lutheran churches of Germany, the learned Johann S. Semler being its first systematic exponent. Early in the next century a reaction against rationalistic teaching was led by Klaus Harms.

Various conferences had been held from the seventeenth century onward with a view to securing a union of the Lutheran and Reformed churches in Germany, and such a union was effected for Prussia and Nassau in 1817, other states soon following their example. Many strict Lutherans, however, refused to join such united churches and still formed separate bodies under the name of Old Lutherans. The general term Evangelical is applied to the united bodies. When, after the wars of the French Revolution were over, the Prussian government executed a scheme for the union of the Lutheran and Reformed churches into one national church, an active opposition arose on the part of those who now began to be known as Old Lutherans. Separate congregations were formed, and an attitude of open hostility to the government was assumed by some; others, holding the same theological opinions, continued to maintain them within the United Evangelical Church. The separatists were for some time severely dealt with, and about 1837 many left their native country to found Old Lutheran communities in America. Greater toleration was afterward practised, and in 1841 the Old Lutherans were legally recognized in Prussia. A freer New Lutheranism after 1848 became practically dominant in most parts of Protestant Germany, in Prussia as well as elsewhere, under the leadership of such men as Hengstenberg, Hofmann, Harless, Luthardt, Thomasius and Kahnis.

The government of the Lutheran Church in German countries is neither episcopal nor presbyterial, but is exercised through courts called consistories and having supervision over the clergy, public worship, and other matters of ecclesiastical administration. The episcopate prevails in Scandinavian lands. In the United States, where polity varies somewhat between that of Presbyterian and Congregational churches, synods and general bodies have certain governmental powers. Final authority, in all types of Lutheranism, is vested in the congregation, that is, in the pastors and other officers and the people of the several communions. There is no hierarchical organization; the ministry is not an order, but is a divinely appointed office, to which men must be rightly called. The right to choose a pastor belongs to the people, who may either exercise it by direct vote or delegate it to their representatives. Synods possess such powers as the congregations delegate to them.

The Lutheran Church regards preaching as an indispensable part of divine service. All worship is to be in the vernacular; the wants of the heart as well as of the reason are to be met. Whatever of the past is spiritual, beautiful, and appropriate is to be retained. A liturgic service, scriptural, historic, brief, is used responsively by minister and congregation. The "Common Service" is in use by all the various bodies. The hymns are sung by all the people with the organ accompaniment. The clergymen in their official functions wear a distinctive dress, usually a black robe, with the bands. A preparatory service of confession precedes communion. Persons are received to communion by confirmation performed by the pastor. "The Lutheran Church," according to the late Philip Schaff, "draws the fine arts into the service of religion, and has produced a body of hymns and chorals which, in richness, power, and unction, surpasses the hymnology of all other churches in the world."

By its emphasis on the supreme authority of the Scriptures, together with its doctrine of justification by faith, Lutheranism determines its attitude toward the sacraments of religion and toward the practical conduct of life. The sacraments become efficacious through the determination of the sacred word, whereby also worship, the keeping of festivals, the service of the ministry, the polity of the church, and all its labors for individual and social improvement are authoritatively inspired and directed. The same loyalty to the Scriptures has impelled Lutherans to their great tasks of church organization, and world-wide missions, of education in various fields, and of endeavor in social reform.

In the United States the history of the Lutheran Church begins with the coming of Dutch Lutherans to New Amsterdam, Manhattan Island, in 1623. Their first pastor came to them in 1664. In 1637 and 1642 Swedish Lutherans settled on the Delaware; early in the eighteenth century Germans

began to arrive there, and in 1742 came Heinrich Melchior Mühlenberg, who organized them and may be called the chief founder of the Lutheran Church in the United States. The General Synod was founded in 1821, the General Council in 1867, the Synodical Conference in 1872, and the United Synod of the South, which grew out of the Civil War, was organized in 1886. These are the four general organizations of the Lutheran Church in the United States, and there are independent synods embracing two hundred congregations. Of these bodies the Synodical Conference is the largest, having (1910) 2,595 ministers, 3,246 congregations, and 726,526 communicants. In the same year the total number of Lutheran ministers in the United States was 8,421; congregations, 13,533; communicants, 2,173,047. The institutions comprised 24 theological seminaries, 41 colleges for men and 10 for women, 38 academies, and 114 benevolent institutions. Their total church population for the world is estimated by the Lutherans at about 70,000,000.

The Lutheran Church has produced many eminent theologians and biblical scholars and many great hymn-writers, and its standard of theological education is high in all parts of the world. In the United States alone it has at least twenty-five theological seminaries, some of which are of the highest rank. In its numerous periodical publications, in various languages, it also possesses a vast equipment for educational and propagandist enterprise. The following works may be commended to the reader: Sack, "Die Evangelische Kirche und die Union" (1861); Dorner, "History of Protestant Theology" (1867); Krauth, "The Conservative Reformation and its Theology" (1871); Wolf, "The Lutherans in America" (1889); Nicum, "Die Lutheraner in Amerika" (1891); Jacobs, "A History of the Evangelical Lutheran Church in the United States" (1893); Lenker, "Lutherans in all Lands" (1893); Köstlin, "Luther's Theology" (1898); Jacobs and Haas, "Lutheran Cyclopedia" (1899); Remensnyder, "Lutheran Manual" (1901); Laury's "History of Lutheran Missions" covers its field in an interesting manner. Pre-eminently Schmid's "Doctrinal Theology of the Lutheran Church" shows how that great "triumvirate," Melanchthon, Chemnitz, Gerhard, and the profound religious thinkers of the seventeenth and eighteenth centuries, constructed an edifice of systematic Lutheran theology unsurpassed, if not unrivaled, by any church in the world.

JUNIUS B. REMENSNYDER, D.D., LL.D.

Lützen (lüt'sen), a small town in the Prussian province of Saxony, famous for two great battles fought in its vicinity. The first, a brilliant victory of the Swedes in the Thirty Years' War, took place Nov. 6, 1632. The battle on May 2, 1813, was a great conflict of the Russian and Prussian armies with the army of Napoleon, the French being left in possession of the field.

Lützow, Karl von (lüt'sō), a German historian of art; born in Göttingen, Dec. 25, 1832. He wrote: "Munich Antiques" (7 vols. 1861-1869); "Masterpieces of Ecclesiastical Architecture" (1862), fruit of his studies in France and England; "Monuments of Art," in association with Lübke (6th ed. 1892); "History of German Copperplate and Wood Engraving." He died in 1897.

Luxembourg (lü-ksong-bör'), **François Henri de Montmorency-Bouteville, Duke of,** a marshal of France; born in Paris Jan. 8, 1628. He was the posthumous son of the Count de Bouteville, who was beheaded in the reign of Louis XIII. for fighting a duel. He served when young under the Prince of Condé; was made a duke and peer of France in 1662, and in 1667 a lieutenant-general; commanded during the invasion of Holland, in 1672; and having gained the battle of Senef in 1674, was created a marshal. Later he distinguished himself at the battles of Fleurus, Steenkirke, etc., and died Jan. 4, 1695.

Luxemburg, a grand-duchy of Europe; bounded N., E. and S. by Germany, S. W. by France, and W. by Belgium; area, 998 square miles. A chain of hills, branching from the Ardennes, traverses the country from S. W. to N. E. Its drainage belongs almost wholly to the basin of the Moselle. The chief branch of rural industry is the raising of live stock for exportation. Iron is very abundant. The inhabitants, generally of German origin, are nearly all Roman Catholics. Charles IV. erected Luxemburg into a duchy in 1354. It came to Philip of Burgundy in 1443, and through him passed to the house of Spain. Part of it was ceded to France in 1659. It was merged in the house of Austria in 1714, and a century later, having been incorporated with the French empire, was made a grand-duchy under the King of Holland. A portion of it was assigned to Belgium in 1831, and a fresh division was made in 1839, the King of Holland retaining the title of Grand-Duke of Luxemburg. In 1867 it was declared neutral territory. On the death of William III. in 1890 it passed over to Adolf, Duke of Nassau. Capital, Luxemburg (*q.v.*). Pop. (1900) 236,543.

Luxemburg, the capital of the grand-duchy of Luxemburg; on the Alzette, 25 miles S. W. of Trèves. From 1815 its strong fortifications were garrisoned by Prussian troops, but when in 1867 the grand-duchy was rendered neutral it was agreed that the city should cease to be a fortified place. The works were soon after dismantled.

Luzon, the largest and principal of the Philippine Islands; save the Babuyan and Batan groups, the northernmost, lying

Luzon

between 12° 30′ and 18° 40′ N. lat., and between 119° 40′ and 124° 10′ E. long. At the S. is the Visayan Sea; on the S. E. the island is separated from Samar by San Bernardino strait, on the S. W. from Mindoro by the Verde Island passage.

Area and Topography.—Luzon is of irregular contour. The extreme length is 530 miles, the extreme breadth 140, the minimum breadth 8. The total area is 40,969 square miles, which is 4,677 square miles (or 10 per cent.) greater than that of Mindanao, the island second in size. This is but slightly less (91 sq. m.) than that of the state of Ohio. Adjacent to its coasts and assigned to its provinces are 448 islands and islets, with an approximate area of 820.5 square miles. The island consists of three general territorial divisions: N., C., and S. Luzon. N. and C. Luzon run N. and S.; S. Luzon is in the form of a peninsula running N. W. and S. E. The coast is much broken and indented, with many large bays, among which are on the E. Lamon bay, San Miguel bay, Lagonoy gulf, and Albay gulf; on the S. Port Sorsogon, the gulf of Ragay, and Tayabas bay; and on the W. Manila bay and the Lingayen gulf. The larger part of the harbors afford shelter during only a portion of the year.

The mountain-system may be divided into three greater ranges. The Sierra Madre extends from the N. E. extremity of the island to Laguna de Bay (14° 30′ N. lat.), a distance of 350 miles, and forms the watershed in N. Luzon for streams flowing E. to the Pacific and N. and N. W. to the China Sea. Its general elevation is from 3,500 to 4,500 feet, and in the main it is a continuous range, rising in but a few instances above this height and little intersected by gaps or defiles. At the west of the Sierra Madre is the valley of the Cagayan river, and beyond, with a distance of about 50 miles between the two ranges, stand the Caraballos Occidentales, the central ridge of which forms the watershed between streams flowing E. to the Cagayan and W. to the China Sea. The length of the range is about 200 miles; its breadth, including branch ridges and outlying spurs, about 65. In its N. part it is known as the Cordillera Norte, in the C. as the Cordillera Central, in the S. as the Cordillera Sur. The Cordillera Norte contains Mt. Pagsan, 7,261 feet, and the Cordillera Sur Mt. Data, 7,364 feet; on one of the western spurs, in the province of La Union, is Mt. Santo Tomas, 7,298 feet. At about 16° N. lat. a short E.-and-W. range, the Caraballos Sur, extends between the Sierra Madre and the Caraballos Occidentales. In S. Luzon, instead of a somewhat systematic arrangement of ranges, are found isolated volcanic peaks. Rising from the coast at the head of the gulf of Albay, Albay province, is Mt. Mayon, 7,916 feet, a symmetrical cone which has been in active and destructive eruption several times since Spanish occupancy, and still constantly emits smoke and steam. Among other peaks of the sort are Mt. San Cristobal, 5,000 feet, on the southeastern shore of Laguna de Bay, and Mt. Banajao, 7,382, close at hand; Mt. Isarog, 6,634 feet, in Ambos Camarines; and Mt. Bulusan, 4,053 feet, in Sorsogon. S. of the Caraballos Sur and the Lingayen gulf, and extending S. as far as the provinces of Batangas and Tayabas, is a valley about 150 miles in length, with an average breadth of about 50 miles. Of this great depression the shallow Manila bay is obviously a part. In this valley is the centre of settlement.

Hydrography.—Luzon is well watered. The principal three rivers are the Agno, the Cagayan, and the Pampanga. The first rises in the N. of the province of Benguet, flows S. into the central valley above mentioned, and enters the Lingayen gulf through several channels. The second, the largest river of the island, rises in the Caraballos Sur, S. Isabela, flows N. E. through Isabela and N. through Cagayan, and empties at Aparri. The third, which is the next in size, rises in the N. of Nueva Ecija, flows S. W., and empties into Manila bay through a delta. The channels of the Agno are all navigable, but for various different distances; the Cagayan is navigable for native craft to Echague (160 miles from its mouth, or ⅘ of its approximate total length of 220 miles); for smaller native boats the Pampanga is navigable to Cabanatuan. Among other rivers are the Abra and the Pasig. The latter connects Laguna de Bay with Manila bay. Laguna de Bay is the largest lake of Luzon (32 miles from N. W. to S. E., 28 miles from E. to W.; coastline 108 miles), with a maximum depth of but 20 feet. Both the Pasig river and the Laguna de Bay may be navigated by vessels drawing five or six feet. Lake Taal, province of Batangas, is supposed to occupy the crater of a large extinct volcano. It extends N. and S., and is 17½ miles long by 12 broad. The active volcano of Taal, 1,050 feet, is on an island in the lake.

Geology and Mineralogy.—The geology of Luzon is but slightly known. As is true throughout the Philippines, the crystalline schists and older massive rocks must be sought for in ravines and among mountains, and the study of them is greatly hampered by the fact that they are covered with the decomposed earthy rock known to geologists as saprolite, with soil, and with the characteristic dense vegetation. In N. Luzon large areas are underlain by granites, schists, etc., the mountain systems being composed largely of such rocks. The S. part

of the Zambales range of mountains, which borders the coast in Zambales province, is of volcanic rock, and although crystalline schists occur in Ambos Camarines, the larger part of the region between San Bernardino strait and Manila bay is also occupied by volcanic rock. The more important minerals are asphalt, clays, coal, copper, gold, gypsum, iron, kaolin, lead, lithographic stone, marble, rock salt, serpentine, and zinc. In S. Luzon hot springs are common, the best-known being those at Los Baños at the foot of Mt. Maquiling on the Laguna de Bay. In S. E. Luzon is one of the chief seismic centres of the Philippines, and the most active volcanic section.

Agriculture.—The staples common to the archipelago (coffee, copra, hemp, rice, sugar, tobacco) are grown in abundance in Luzon. Of these the most valuable is hemp, which is grown mainly in the provinces of Albay, Ambos Camarines, and Sorsogon. In all the C. and S. provinces sugar is important; tobacco is the chief product of Cagayan and Isabela, rice of Bulacan, Cavite, and Pangasinan, coffee of Abra, Benguet, and the adjacent provinces. The banana, lemon, orange, and pineapple are among the native fruits. In the mountainous part of N. Luzon the cereals, nuts, small fruits, and vegetables of the United States may be grown.

In 1903, of a total area of 10,610,971 hectares (hectare = 2.471 acres), 1,592,288, or 15.1 per cent., were classed as agricultural. Of the land so classified, 50.7 per cent. was under cultivation, 14.7 per cent. forest land, and 85.5 per cent. non-forest. Nearly all the farms are occupied by Filipinos of various tribes. The following returns for the leading products were made for 1903:

PRODUCT	AREA UNDER CULTIVATION (HECTARES)	AMOUNT PRODUCED
Coffee	912	157,344 liters
Copra		30,782,552 kilog.
Hemp	116,937	24,941,363 "
Rice (unhulled)	431,015	6,189,448 hectoliters
Sugar Cane	35,524	69,230,884 kilog.
Tobacco	25,523	14,006,254 "

The coffee crop had been much damaged by insect-pests. Other products are cocoa, corn, cotton, sweet potatoes, and tuba (sap of the nipa palm). The value of the livestock on farms was placed at 28,390,593 pesos.

Manufactures, Industry, and Commerce.—With the exception of Luzon, Cavite, and some other centres, the manufactures are confined to "cottage" industries. Manila produced in 1903 more manufactured goods than all the rest of the islands combined, the total product there having a value of 23,591,807 pesos, or 67.2 per cent. of that for the entire archipelago. The capital invested was 20,005,306 pesos; the number of establishments, 876; the number of employees, 19,640. At Cavite are located three ship- and boat-building yards. Among the principal industries were ship- and boat-building, carriage- and wagon-making, and the manufacture of bread and other bakery products, liquors, boots and shoes, lumber, tobacco and tobacco goods, soap, and clothing. Export trade is largely coastwise and interisland.

Pop. (1903), 3,798,507; of these 223,506 were classified as wild, the most important of such tribes being the Moros and Igorots. For *Climate, Finance, Flora and Fauna, Government*, and *History*, see the article on the PHILIPPINE ISLANDS.

Luzula (lö′), wood-rush; a genus of *Juncaceæ* (rushes). It has soft, plane, generally hairy leaves, a glumaceous perianth of six leaves, and a one-celled, three-valved capsule with three seeds. About 40 are known, all from temperate or cold climates.

Luzzatti, Luigi (lö-sä′tē), an Italian statesman; born in Venice in 1841. He was author of a series of works on political law, among them "State and Church in Belgium" and "Embryology and Development of Political Constitutions."

Lyall, Sir Alfred Comyn, an English administrator and author; born in Coulston, Surrey, England, Jan. 4, 1835. In the course of a long and useful career in India he was home secretary, foreign secretary, and in 1882 lieutenant-governor of the Northwest Provinces, having in the previous year been created K. C. B. As an author his reputation is due chiefly to his "Asiatic Studies, Religious and Social" (1882); a biography of Warren Hastings (1889) in the "English Men of Action" series; and "The Rise of the British Dominion in India" (3d ed. 1893).

Lyall, Edna. See BAYLY, ADA ELLEN.

Lycanthropy, or **Lykanthropy** (-kan′-), a term in anthropology. In a wide sense the term lycanthropy is used for what Tyler calls the Doctrine of Werewolves—"That certain men by natural gift or magic art can turn, for a time, into ravening wild beasts." Less widely it denotes a belief in the temporary change of man into a wolf. See WEREWOLF.

Lycaon (lī-kā′on), in Greek mythology, a son of Pelasgus, who is said to have first civilized Arcadia and to have built the town of Lycosura. The number of his sons is given as 22 or 50; their impiety led Zeus to visit them in the guise of an old man, and when they placed before him a meal of human flesh, they were by him, according to Pausanias, changed into wolves; but Apollodorus (iii: 8, 1) merely says that they, with their father, were killed by a thunderbolt.

Lycaonia (lik-ā-ō′ni-ä), in ancient geography, a country in Asia Minor, bounded on the E. by Cappadocia, on the N. by Galatia, on the W. by Pisidia, and on the S. by Isauria and Cilicia; its capital was Iconium.

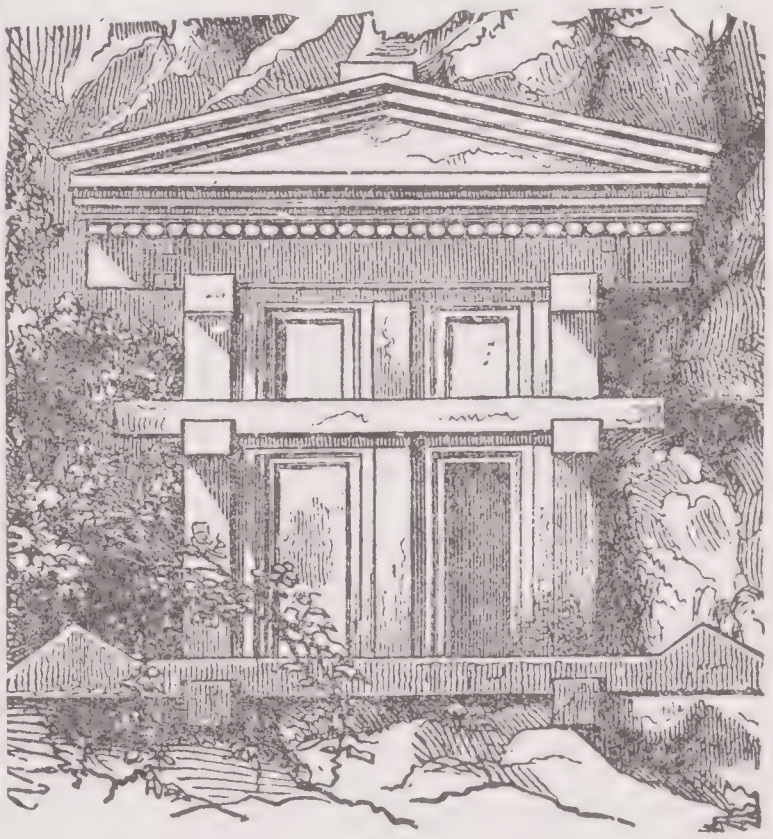
Lyceum (-sē′-), the name of an academy at Athens, so called from its position near the temple of Apollo Lyceus. Here Aristotle and his disciples taught, and were called Peripatetics, from their habit of walking up and down its porches while delivering their lectures. In the present day, in France, the name (*lycée*) is given to preparatory schools for the universities, as in them the Aristotelian philosophy was formerly taught. Of these there are now many. The payment to be made by the children is fixed by laws made in 1853 and 1857, and varies according to the classes or divisions, of which there are three: elementary, of grammar, superior. A *pensionnaire* (boarder) in a lyceum at Paris pays 950, 1,050, 1,150 francs per annum in these three classes respectively. There are also *demipensionnaires*, and *externes* or day-boarders. In the United States the name is applied to an academy or literary seminary between the common school and a college; also to a literary association designed for the object of mutual improvement.

Lychnis (lik′-), in botany, Campion, a genus of *Caryophyllaceæ*, sub-order *Sileneæ*. The corolla is monophyllous, tubular, five-toothed; the petals five-clawed, sometimes divided on the limb; stamens, 10; styles, usually five, capsule opening by 5 or 10 teeth. About 30 species are known, all from the Northern Hemisphere. Rock lychnis: The genus *Viscaria*.

Lycia (lish′i-ä), in ancient geography, a country on the S. coast of Asia Minor, extending toward Mount Taurus, and bounded on the W. by Caria, on the N. by Phrygia and Pisidia, and on the E. by Pamphylia. The most ancient inhabitants are said to have been two Semitic races called the Solymi and Termilæ, the former of whom were driven from the coast to the mountains in the N. by adventurers from Crete under the command of Sarpedon, a brother of Minos, who first gave the country the name of Lycia. Lycia shared the vicissitudes of the other States of Asia Minor, becoming subject to the Persian and Syrian monarchies, and then to Rome. During the time of its independence it consisted of 23 confederate cities, of which the principal were Xanthus, Patara, Pinara, Olympus, Myra, and Tios. Many monuments and ruined buildings (temples, tombs, theaters, etc.), exquisite sculptures, coins, and other antiquities, testify to the attainments of the Lycians in civilization and the arts, in which they rivalled the Greeks themselves.

Lycomedes (lik-ō-mē′dēz), a king of the island Scyros, among whose daughters Achilles for some time concealed himself in woman's apparel, to avoid going to the Trojan War.

Lycophron (lī′kof-ron), a Greek poet; born in Chalcis, Eubœa; lived in the 3d century B. C. He had a part in organizing the Alexandrine Library. He was classed as a tragic poet with the "Pleiad," so called. One poem alone of his numerous compositions remains: "Alexandra," which contains, in 1,474 iambic verses, a prophecy of Cassandra relating to the fall of Troy and the fortunes of the heroes therein concerned.



LYCIAN TOMB.

Lycopodiaceæ (-ā′se-ē), clubmosses, an order of Acrogens, alliance Lycopodales. It consists of moss-like plants, the rootstock running, creeping, constituting a corm, or wanting. Stem dichotomously branched; leaves imbricate, all round or in two to six rows; capsules, called sporangia, sessile in the axis of the leaves, or in that of the scales of a terminal or axillary sessile or stalked cone; one to three-celled, with macrospores and microspores, the former marked at the top with two radiating lines. Distribution world-wide. Known genera, four or five; species, 250. The *Lycopodiaceæ* seem to have begun in the Upper Silurian, with the *Lepidodendroids*, *Pachytheca* and *Psilophyton*. The genus *Lepidodendron*, to which some species of plants from the Devonian, and about 40 (half of them British) from the Carboniferous, with a few

from the Permian, have been referred, is believed to have been Lycopodiaceous. They were gigantic when compared with modern *Lycopodiums*. Their fruits were Lepidostrobi. There are also, in the Devonian and Carboniferous, *Lepidophloios*, *Cordaites*, and *Lycopodites*, the second of which may, perhaps, have been coniferous. Mr. Carruthers considers *Sigillaria* to have been Lycopodiaceous. It is found in the Devonian and Carboniferous, being a very marked feature of the latter rocks.

Lycurgus (lī-kur'gus), the lawgiver of Sparta; usually dated about 820 B. C. He was uncle of the young King Charilaos, and governed the states wisely during his nephew's infancy, then traveled over Crete, Ionia, and Egypt, and on his return, finding his country in complete anarchy, made a new division of property, and remodelled the whole constitution, military and civil. Next he bound the citizens by oath not to change his laws till he came back, and then left Sparta to be no more seen. His memory was honored as that of a god with a temple and yearly sacrifices.

LYCURGUS

Lycurgus, an Attic orator; born about 396 B. C. He was a pupil of Plato and Isocrates, and warmly supported the policy of Demosthenes. Thrice appointed Tamias or manager of the public revenue, he distinguished himself by his virtue and integrity and love of splendid architecture. Of his 15 speeches but one has descended to us. He died in 328.

Lydgate, John, an English poet; born in Lydgate, near Newmarket, England, in 1370. He was a monk of Bury St. Edmunds. He translated Benoit de St. Maure's "History of Troy" at the command of Henry V.; wrote a poem on the "Battle of Agincourt," and one on the coronation of Henry VII.; his "Story of Thebes" is written as though it were one of the "Canterbury Tales" of Chaucer. He wrote some ballads that became popular favorites, as "The London Lackpenny"; "A Satirical Ballad on the Times"; "A Lover's Complaint." He died in Bury St. Edmunds, Suffolk, England, about 1450.

Lydia, in ancient geography, a country of Asia Minor, bounded on the W. by Ionia, on the S. by Caria, on the E. by Phrygia, and on the N. by Mysia. It was celebrated for its fruitful soil and for its mineral wealth, particularly for the gold of the river Pactolus and of the neighboring mines, but was infamous for the corruption of morals which prevailed among its inhabitants, and especially in Sardis, its capital. Lydia attained its highest prosperity under the dynasty of the Mermnadæ (about 700–546 B. C.). The first of this dynasty was the half mythical Gyges; the last was the famous Crœsus, celebrated for his prodigious wealth.

Lydian Stone, a siliceous flinty slate, having the appearance of black velvet, found in many countries, but first brought from Lydia and used as a touchstone.

Lye, a solution of an alkali; water impregnated with alkaline salt imbibed from the ashes of wood. Used in soap-making, in neutralizing an acid, in cleansing grease from objects, such as thin iron plates in the operation of tinning, etc.

Lyell, Sir Charles, a British geologist; born in Kinnordy, Forfarshire, Scotland, Nov. 14, 1797. He was educated at Oxford, began to study law, but afterward resolved to devote his time and fortune to geological research. For this purpose he visited the continent of Europe and the United States. He became professor in King's College, London, in 1831; president of the Geological Society in 1835, 1836, 1849, and 1850; of the British Association in 1864. He distinguished himself as an opponent of the old catastrophism in geology. His first important work was the "Principles of Geology" (1830–1833), and a portion of this book afterward formed the basis of the "Elements of Geology." Another important work was the "Antiquity of Man" (1863), in which he summarized the evidence in favor of the theory that the race of man was much older than was currently believed. Lyell was knighted in 1848, and made a baronet in 1864. His "Life and Letters" were published in 1881. He died in London, England, Feb. 22, 1875.

Lyle, William, a Scottish poet; born in Edinburgh, Scotland, Nov. 17, 1822. After coming to the United States he resided in Rochester, N. Y. His poems were widely read in the United States and Canada. Among his most popular Scotch dialect poems is "The Grave of Three Hundred." He also wrote several English poems, including "Diotima." "The Martyr Queen" was published in 1888.

Lyly, John (lil'i), an English dramatist; born in 1554. He was graduated at Oxford in 1573; went to London, where he engaged in literary work and tried to establish himself at court; was a member of Parliament in 1589, 1593, 1597, and 1601. He is noteworthy principally on account of his two books "Euphues, or the Anatomy of Wit" (1579), and "Euphues and his England" (1580), which were the

first serious attempts in English to use words as mere musical notes, quite subordinating the matter to the sound. Fantastic as the form was, the recognition of new possibilities in the language intoxicated the cultured classes, and set the literary fashion for many years: story-writers who wished to assure themselves an audience entitled their books "Euphues his ——," and the influence is clear and strong on Sidney and Spenser. He died in London in 1606.

Lyman, Azel Storrs, an American inventor; born in Potsdam, N. Y., in 1815. He was graduated at the Illinois University. It was his desire to become a clergyman, and he studied for some time with Dr. Albert Barnes; but an incurable deafness compelled him to relinquish his purpose. He afterward removed to New York. Here he prepared an historical chart which was adopted in many schools and colleges. He also contributed many articles to scientific periodicals. Devoting himself to inventions, he made valuable discoveries in refrigeration and a new process of ventilation. His fiber gun for disintegrating wood for paper pulp is largely used. Among his later inventions is the multicharge cannon known as the Lyman-Haskell gun. He died in 1885.

Lyman, Joseph Bardwell, an American agriculturist; born in Chester, Mass., Oct. 6, 1829. In 1867 he became agricultural editor of the New York "World." The following year he was editor of "Hearth and Home," and shortly after joined the staff of the "Tribune." He wrote, with his wife, "The Philosophy of Housekeeping" (1867). He published: "Resources of the Pacific States" (1865); "Women of the War" (1866); and "Cotton Culture" (1867). He died in Richmond Hill, L. I., Jan. 28, 1872.

Lyman, Laura Elizabeth Baker, pseudonym KATE HUNNIBEE, an American journalist; born in Kent's Hill, Me., April 2, 1831. She became widely known from a series of articles which appeared in "Hearth and Home." She edited the Home-Interest department in the New York "Tribune" (1869–1870), and the "Dining-Room Magazine" (1876–1877).

Lyman, Theodore, an American philanthropist; born in Boston, Mass., Feb. 20, 1792. He was graduated at Harvard College in 1810. He founded the State Reform School, to which he gave $72,500. Among his works are: "Three Weeks in Paris" (1814); "The Political State of Italy" (1820); "Account of the Hartford Convention" (1823); and "The Diplomacy of the United States with Foreign Nations" (2 vols. 1828). He died in Brookline, Mass., July 18, 1849.

Lymph, the fluid resulting primarily from the assimilation of food, and also obtained from the blood and tissues, and which is contained within a system of vessels ramifying throughout the bodies of vertebrates. To these vessels the names of lymphatics and lacteals are applied. The clearest and simplest view which may be taken of the nature and functions of the lymphatic system of vessels is that of considering them as forming a connecting link between the digestive and blood or circulatory systems; or in other words, to view these vessels as the media through which matters are absorbed from the alimentary canal on the one hand, and from the blood and tissues on the other. The matters so absorbed are elaborated and converted in the lymphatic glands into lymph, a fluid which may be considered as presenting us with the initial and essential features of the more highly elaborated blood. Hence it is that the lymphatic system, concerned in absorption, receives the general and comprehensive term of absorbent system. This system of vessels is peculiar to the *Vertebrata.* In none of the invertebrate groups do we find such a defined set of vessels; and in the lower animals, matters formed from the digestion of food simply pass from the digestive system into the blood system directly and without the intervention of any absorbent vessels. Most frequently in invertebrates the products of digestion pass from the alimentary tract without further elaboration into the great venous sinuses, or spaces between the organs and tissues of the body. These sinuses form irregular channels leading to the current of the circulation, generally through the respiratory or breathing organs, where those exist. It may be premature, or even incorrect to assert that the products of digestion undergo in these sinuses no elaboration whatever. On the contrary we are entitled to believe, and from analogy to maintain, that in these venous channels the chyle or digestive product will be mixed with, and will assume the character of the blood itself. But in vertebrates we find that this further assimilation and elaborative process is specialized and performed by the lymphatic or absorbent vessels; the presence of which thus constitutes a distinctive character of the highest sub-kingdom of animals.

Through this system, therefore, the continual loss which the blood and body suffer from the efforts of living and working is made good. Fresh supplies of nutritive matter are thus poured from the lymphatic system into the current of the circulation, and this new material is derived not only from the digestion of food but from the tissues themselves. The blood-vessels may be deemed absorptive agents, in that they return from the tissues to which they are distributed material which may be either ex-

Lymph

creted from the body by the lungs, or made to subserve nutrition by being again elaborated and incorporated with the current of the blood. In this view the true lymphatic or absorbent vessels, and the blood-vessels themselves, become perfectly correlated in nature and in function; and this view may serve to show how difficult or even impossible it is to determine or say where the function of the circulation ends, or where that of absorption begins. The one process insensibly merges into and accompanies the other. The lymph as it exists in the lymphatic vessels is a colorless, transparent fluid, destitute of smell, and like the blood is alkaline in its nature. It is said to possess a saline taste. When viewed through the microscope lymph is seen to consist of a clear fluid or plasma, in which colorless corpuscles exist. The lymph which has passed through the lymphatic glands contains a larger number of these corpuscles than lymph which has not undergone this process, and lymph after passing through a gland is also richer in albumen, while it contains less water. The lymph resembles blood in that it is an alkaline fluid, and in that it coagulates or clots by the separation of the fibrinous part of the plasma; but the lymph differs from the blood in that its corpuscles are nearly all if not all colorless, and because its solid matters are present in very small proportions — these amounting to about 5 per cent. of its weight only.

Blood contains about 8 per cent. of solid matters; and if it were diluted with water, and had no colored or red corpuscles, it would resemble lymph in its essential features. The lymph corpuscles may, indeed, be viewed as the source not only of the white globules, but also of the red corpuscles of the blood; since when passed into the current of the blood circulation they then, and by a simple change of medium, become the white corpuscles of the blood, and when partially disintegrated or altered they give origin to the red corpuscles of the latter fluid. The blood may be regarded as being recruited by the absorbent system from two points of supply. Thus the lacteals or lymphatic vessels of the intestines absorb the chyle or product of digestion directly from the alimentary canal; and pour the chyle, already existing as rudimental blood, into the current of the circulation. Then secondly, from the tissue, and from all parts of the body generally, the ordinary lymphatic or absorbent vessels bring the lymph, which becomes further elaborated in the lymphatic glands, and pour it into the current of the blood. In both cases the actual termination of the lymphatic vessels is in the large veins in the neighborhood of the heart. The lymphatic circulation may thus be regarded as corresponding in its general direction to the course of the venous blood. The lymph from the tissues consists of the excess of fluid transuded from the blood-vessels, to bathe the tissues and yield up to them material for their nourishment and oxygen along with waste products of the tissue activity, which the lymph is thus the means of removing from the tissues. Both are poured into the blood, the excess of transudate being restored to the blood, the waste to be afterward removed by the various excretory organs. The chyle absorbed by the lacteal vessels from the digestive tract resembles lymph in its essential characters and composition; the chyle containing, however, a greater amount of fatty matters.

During fasting, or in the intervals of digestion, the fluid contained in the lacteal vessels is clear, and resembles ordinary lymph; but during digestion it becomes of a milk-like appearance, and is then known as chyle. It has a neutral, or if anything a slightly alkaline reaction. The white color is on microscopic examination seen to be due to the presence in the fluid of immense numbers of minute particles of fatty or oily matter. As the chyle passes upward and through the lacteal or lymphatic glands of the mesentery toward the circulation, it becomes further elaborated. The oily particles decrease in number, and the characteristic white corpuscles seen in the lymph become developed within it; the corpuscles increasing in number as the chyle advances nearer the current of the circulation. It thus assumes more and more of the character of ordinary lymph, save for its containing, as already remarked, more fatty matters. And then finally we observe the lymph and chyle to be mixed together in the thoracic duct, from which vessel these fluids are poured into the circulation, as a uniform fluid destined to recruit the great nutritive stream flowing through the blood-vessels. The lymphatic or absorbent vessels themselves resemble small veins in their general structure. Thus they are provided like the veins with valves, these valves permitting the flow of the lymph in one direction only, namely toward the large veins near the heart, into which the lymph is poured.

The most minute of the lymphatic vessels or lymph capillaries, have their origin in the finest tissues throughout the body; the only structures in which lymphatic vessels do not exist being the non-vascular parts — such as the hair, nails, and outer skin, and the cartilaginous tissues. The capillary lymphatics take origin in close meshwork-like masses, or in the spaces or lacunæ which exist between the parts and structures of which the various organs and tissues are composed. Those lymph capillaries which commence in the superficial tissues of the body begin in a capillary network; while the lymphatics of organs and more definite structures, arise from the lacunar spaces which exist among the minute or constituent parts of the tissues com-

Lymph

posing these organs. In either case the primary lymph capillary or lymph channel is lined by epithelial cells, this arrangement recalling the similar structure of the blood capillaries, or those in which arteries end and veins begin. The lacteals of the intestines take origin within the villi of the intestines in a looped arrangement or in a network; the commencement of these vessels being thus of the nature of a closed or cæcal tube. In the lower animals (for example, sheep), the network arrangement of the lacteals in the villi is best seen; those of man take origin in a simple looped fashion. The larger lymphatics closely resemble ordinary veins in structure, three coats or tissues being discernible in their structure — an outer fibro-elastic coat; a middle layer of fibro-cellular tissue with muscular fibers; and an inner coat of longitudinal fibers, which is lined by epithelial cells. The valves are generally placed in pairs, and open only toward the heart. In the smaller lymphatics the valves are arranged in a close series, this conformation giving the vessels a knotted appearance when filled with lymph.

The flow of lymph toward the heart is induced partly by the general pressure and action of the muscles of the body, the valvular structure aiding its propulsion as in the veins; and to this, as well as to the absorptive power, must be added the action of the contractile muscular fibers of the lymph vessels themselves. The mode in which the minute lymph vessels and blood-vessels communicate, and through which the fluid parts of the blood find their way into the lymph capillaries, was long made a subject of much discussion among physiologists; but we now know that the fluid part of the blood readily transudes through the capillary walls into the surrounding spaces, while in these spaces the lymphatics have already been seen to commence. And so far as the migration of the white corpuscles of the blood is concerned, the fact of such migration has been clearly stated and proved — first by Waller in 1846, and afterward by Cohnheim in 1867. Thus even the solid parts of the blood — the white and red corpuscles of that fluid — can pass through the apparently solid capillary wall into the surrounding tissues. And the explanation of this seemingly strange phenomenon rests on the fact that the capillary wall is not a solid unyielding structure, but a living contractile tissue, which can be readily conceived to allow a similarly soft living particle to pass through the membrane, and to close up again without any aperture being perceptible. Recklinghausen's observations have led to the belief that definite openings or stomata exist in various parts of the body, through which communication between closed cavities (such as the cavity of the peritoneum and of the pleura) and the lymphatic capillaries may take place. These stomata have thus been supposed to admit milk injected into the peritoneal cavity into the lymphatics of the diaphragm or midriff; and in the pleura openings have been alleged to place the cavities of that membrane in similar communication with the lymphatic vessels. In this view it has been suggested and argued that the large serous cavities are to be viewed as merely the enormous dilatations of the lymph capillaries themselves.

The lymphatics and lacteal vessels sooner or later in their course run into and emerge from bodies generally of comparatively small size, and to which the name of lymphatic glands has been given. These glands are highly important structures, for, as already remarked, it is only after passing through them that the lymph contains lymph corpuscles in any abundance. They are thus concerned with the elaboration of the lymph fluid. In size they may be stated to average that of a small almond, and they are generally arranged in groups. Each gland is entered by a number of vessels bringing lymph to it, these being known as the afferent vessels. The vessels which leave the gland and carry away the lymph from it are in contradistinction known as efferent vessels. In structure a lymphatic gland presents externally an envelope of connective tissue; and from this outer covering we find a fibrous framework of processes (*trabeculæ*) prolonged into the interior of the gland. This fibrous framework or stroma occupies the interior, and exhibits at the surface or cortical part of the structure larger spaces or alveoli; while in the center, or medullary part, the trabeculæ form a network of finer kind. The essential gland structure is contained within the stroma or network structure; and this glandular structure exists at the surface of the gland as a series of nodules occupying the meshes, and as an arrangement of rounded cords in the more central portions of the organ. And interlacing with the preceding structures, and forming a network within the other portions of the gland, a tissue known as retiform tissue is found. The meshes of this latter tissue, and of the stroma also, are crowded with lymph corpuscles, especially in the center of the meshes, a channel being left in the outer portion of the alveoli and other interspaces. The channel throughout the gland unoccupied by the corpuscles, and which contains retiform tissue only, is known as the lymph channel or lymph path. As implied by the term, the lymph coming to and sent from the gland passes through this channel; the afferent vessels entering the gland at its outer or cortical portion, and opening into the alveoli. The epithelial

lining alone, of the various coats of the lymph vessels, is continued into the lymph channel, with which the afferent vessels thus become continuous, and into which their contents are poured. While the efferent vessels, or those leaving the gland, take origin from the same lymph path, its epithelial lining is continued onward to form that of the efferent vessel.

Within the stroma of the gland, and also within the softer portions or pulp contained in the meshes of the fibrous network, minute blood-vessels are distributed. The changes which occur in the lymph as it passes through the glands have been already noted. Thus corpuscles are added to it in the glands, while in the composition of its fluid it undergoes further elaboration. The lymphatic trunks of the greater part of the body finally pour their contents into the thoracic duct, a tube about the size of an average crow quill, which opens into the current of the blood at the point of junction of the internal jugular and subclavian veins of the left side of the body. On the right side of the body a smaller duct is found, which receives the contents of the lymphatics of the right half of the chest, the right arm, and right side of the head and neck; and this smaller lymphatic channel — or right lymphatic duct as it has been named — opens into the angle formed by the junction of the right jugular and subclavian veins, similarly to its larger neighbor of the left side. The thoracic duct begins in the upper part of the abdomen, and runs up in front of the spine to the root of the neck, where it opens into the great veins, as already described. The receptaculum chyli, or cistern of the chyle, is the dilatation at the commencement of the thoracic duct in the abdomen, which receives the contents of the lacteals or intestinal lymphatics. The orifices by which the thoracic duct and right lymphatic duct open into their respective great veins are guarded by valves which permit the lymph to flow from the ducts into the veins, but prevent the flow of blood into the ducts.

Certain curious contractile dilatations found in fishes, reptiles, and birds, and which are apparently concerned in the propulsion of lymph and chyle, are termed lymph hearts. There may be one or two pulsating sacs of this description, for example, in the tail of the eel and of other fishes. In frogs, four contractile sinuses exist, two being situated near the tail vertebræ and two in the neighborhood of the scapula or shoulder blade. And in reptiles and birds there is generally a posterior pair of lymphatic hearts, corresponding to the hinder pair in the frogs and toads. In birds and reptiles, however, the lymphatic hearts or sinuses are not contractile as in the lower vertebrate forms; but notwithstanding this difference in function there is no doubt of their homology with the true pulsating lymph hearts above noted. Into each of the pulsatile lymph hearts several afferent lymphatic trunks open, the orifices being protected by valves which prevent regurgitation of the lymph backward into the vessels. And from each lymph heart one or more venous trunks arise, into which the lymph is propelled by the contractions of the sac: the lymph being in this way introduced directly into the venous system, instead of being conveyed through the thoracic duct or main lymphatic channel. In the frog the anterior lymph hearts pump the lymph into the subclavian veins, while the posterior hearts propel their contents into the crural vein. These lymph hearts are invested by muscular fibers transversely striated like those of voluntary muscle generally, or like the muscle of which the heart — an involuntary muscle, however — is composed. The contractions of the lymphatic hearts average about 60 per minute, but are comparatively feeble when compared with the movements of the true heart; nor do the lymph hearts, where a pair of these organs exist, necessarily beat synchronously (in time with each other or with the companion pair). The innervation of the lymph hearts further appears to be connected with a limited portion of the spinal cord, and this limited portion alone appears to control the movements of these organs. Lastly, it may be well to remind the reader that the spleen is by physiologists considered to be merely a lymphatic gland of large size, since it appears to be concerned in the elaboration of the blood; and according to the most recent theories to be a place of disintegration of the red, and a manufactory of the white corpuscles of the blood. And the thymus gland has also been supposed to be connected with the function of blood elaboration, and thus to be associated with the lymphatic system; though confessedly this latter subject is one concerning which few trustworthy observations have yet been made. Extended researches will doubtless greatly further the views now entertained, and widen the analogies between certain of the so-called "ductless glands," and the true lymphatic system of glands and vessels.

Lynch, James Daniel, an American author; born in Mecklenburg Co., Va., Jan. 6, 1836. His best-known poems are: "The Clock of Destiny"; "The Star of Texas"; and "The Siege of the Alamo."

Lynchburg, a city in Campbell Co., Va., on the James river, and the Norfolk and Western, the Southern, and the Chesapeake and Ohio railroads; 66 miles N. of Danville. It is an important manufacturing city; has several foundries, rolling-mills, tobacco factories; manufactories of farm-

ing implements and furniture; and has an abundant water-power furnished by the James river. The chief industry of Lynchburg is the handling, shipping, and manufacture of tobacco. The city is the seat of Randolph-Macon College; has gas and electric light plants, waterworks, National banks, daily and weekly periodicals, and an assessed property valuation of $7,500,000. Pop. (1900) 18,891; (1910) 29,494.

Lynch, Charles, a Virginia planter; born in 1736. He was a Revolutionary soldier, and after the war took up his residence in Pittsylvania co., Va. The region in which he lived became at one period of the Revolution infested by bands of Tories and outlaws; deserters from both armies added strength and a semblance of organization to their operations. Wherever they appeared the terror-stricken inhabitants were plundered, harassed, and mercilessly subjected to every variety of insult and outrage. Colonel Lynch succeeded in organizing a body of patriotic citizens, men of known character and standing. At the head of his followers he promptly got on the track of the unsuspecting enemy, captured many and caused the others to flee from the country. When any of these outlaws fell into his hands they were not taken at once to a tree and hanged or tied to a stake and shot; a jury was selected from Lynch's men, over which he presided as judge; the captives were tried separately, the accused being allowed to make his own defense, and to show cause, if he could, why he should not be punished. If found guilty the punishment was inflicted on the spot. The general impression has been that in all cases of lynch law the penalty was death. This is a mistake. Colonel Lynch is said to have never willingly condemned a criminal to capital punishment, and to have frequently let prisoners off with a severe flogging and then liberated them on the condition that they would leave the country. He died in 1796.

Lynch Law, punishment, especially capital, inflicted by private individuals independently of the legal authorities. The origin of the term is doubtful; by some it is said to be from James Lynch Fitz-Stephen, warden of Galway, Ireland, who, about 1526, sentenced his son to death for murder, and to prevent a rescue by a mob, executed him with his own hands without due process of law. By others the term is said to have had its origin in the State of Virginia (see LYNCH, CHARLES). At first in the United States, "lynch law" was not mob law, as it is now understood. It was orderly, methodical, and fair in its practices, and was strongly opposed to violence or mob rule. Its distinctive feature was simply that its decrees and findings were executed sternly and swiftly on the spot where they had been decided upon.

Lyncus (lĭn'kus), a King of Scythia, changed by Ceres into a leopard for attempting to kill Triptolemus, who had been sent by Ceres to teach the Scythians husbandry.

Lyndhurst, John Singleton Copley, Baron, an English statesman; born in Boston, Mass., May 21, 1772. Intended by his father, J. S. Copley, the artist, to be a painter, he studied for some time under Reynolds and Barry, then entered the University of Cambridge in 1791, took his M. A. degree in 1797, became a fellow of Trinity College, and was called to the bar at Lincoln's Inn in 1804. In 1817 he ably defended Watson and Thistlewood for high treason, was appointed chief-justice for Chester, and in 1818 entered Parliament. In 1819 he became solicitor-general in the Liverpool administration, in 1824 attorney-general, and in 1826 master of the rolls. He was raised to the peerage as Baron Lyndhurst, and became lord-chancellor in 1827, a post he retained till 1830. During the ministry of Earl Grey (1830–1834) he held the position of chief baron of the exchequer. He was a formidable opponent of the reform bill. He was again chancellor in 1834, and a third time when the Conservatives returned to power in 1841. His eloquence was much appreciated by the Tory party, especially in the House of Lords, where he continued to take an interest in foreign politics down to the year 1859, when he vigorously attacked the policy of Napoleon III. He died in England, Oct. 12, 1863.

Lyndsay. See LINDSAY.

Lyne, Joseph Leycester, called FATHER IGNATIUS and IGNATIUS OF JESUS, an English clergyman and religious writer; born in London, England, Nov. 23, 1837. He was a mission curate in London, but withdrew to begin the attempt of restoring monasticism in the Church of England. He built Llanthony Abbey in Wales, and established there a community of monks on the pattern of the Benedictine order. He was the author of many published sermons, poems, tales, etc., among which are: "The Catholic Church of England" (1864); "Brother Placidus" (1870); "Leonard Morris, or the Benedictine Monk" (1871); "Mission Sermons and Orations" (1886); "Tales of the Monastery." He died Oct. 10, 1908.

Lynedoch, Thomas Graham, Lord, a British general; born Oct. 19, 1748. He raised in 1793 the 90th regiment of foot, and with it served at Quibéron and Isle Dieu. He distinguished himself at the capture of Minorca (1798), conducted the siege of Valetta (Malta), which capitulated (1800) just after he was superseded in the command, took part in the retreat to Corunna and in the Walcheren expedition

(1809), at Barrosa, near Cadiz, gained a splendid victory over the French (1811), and then under Wellington distinguished himself at the siege of Ciudad Rodrigo (1812), was present at Badajoz and Salamanca, commanded the left wing at Vittoria (1813), captured Tolosa and St. Sebastian, and, lastly, commanded a body of troops in Holland, with which he defeated the enemy at Merxem, but failed in an ill-advised attempt to storm Bergen-op-Zoom (1814). Three months later he was created Baron Lynedoch of Balgowan, and in 1821 was promoted to the rank of general. He was the founder of the Senior United Service Club in London in 1817. He died in London, England, Dec. 18, 1843.

Lynn, a city in Essex co., Mass., on Massachusetts Bay, and the Boston and Maine and the Boston, Revere Beach, and Lynn railroads; 5 miles S. W. of Salem, and 11 miles N. E. of Boston. The city contains the villages of East Lynn, Glenmere, Highlands, Linwood, Lynnmere, West Lynn, and Wyoma. The chief industries are the manufacture of shoes, morocco leather and electrical appliances. There are two public libraries, National and savings banks, waterworks owned by the city, daily, weekly, and monthly periodicals and an assessed property valuation of $42,000,000. Pop. (1900) 68,513; (1910) 89,336.

Lynx, a common name for the different varieties of *Felis lynx,* or, as some zoölogists think, of the different species of the genus *Lyncus.* The Greek *lyngx* was probably the caracal. Lynxes shared with leopards the duty of drawing the chariot of Bacchus; Pliny calls them the most "sharp-sighted of all quadrupeds," hence the epithet lynx-eyed. The lynxes are all of moderate size, but larger than the true cats; limbs long, tail short and stumpy; ears tipped with a pencil of hair, the cheeks bearded, and pads of the feet overgrown with hair; color, light-brown or gray, more or less spotted with a darker shade. They are fierce and savage and prey on sheep and poultry. Their skins are valuable as fur. *Felis lynx* is the common lynx, found in Scandinavia, Russia, the N. of Asia, and formerly in the forest regions of Central Europe; *F. cervaria* is a native of Siberia; *F. pardina* of Turkey, Greece, Sicily, Sardinia, and Spain; and *F. isabellina* of Tibet. North America has also four lynxes; *F. canadensis,* the Canadian lynx, the most N. species; *F. rufa,* the bay or red lynx, extending nearly over the United States, but giving place in Texas and the S. of California to *F. maculata,* and in Oregon and Washington to *F. fasciata.* Professor Flower is of opinion that, on further investigation, all these will be found to be varieties of a single species.

In astronomy, a constellation of Hevelius, between the head of Ursa Major and the star Capella. None of the stars in the group are larger than the fourth magnitude.

Lyon, Mary, an American educator; born in Buckland, Mass., Feb. 28, 1797. After more than 20 years of teaching she founded at South Hadley, Mass., the Mount Holyoke Female Seminary, of which she was president until her death. Many of her pupils afterward established schools on the same plan. She died in South Hadley, March 5, 1849. See MOUNT HOLYOKE COLLEGE.

Lyon, Nathaniel, an American military officer; born in Ashford, Conn., July 14, 1818. He was graduated at the United States Military Academy in 1841 and saw active service in the Mexican War in 1846–1847. In 1861, at the breaking out of the Civil War he was in command of the United States arsenal at St. Louis, Mo. In June of that year he was appointed to the command of the military department of Missouri and on the 17th defeated the Confederates at Boonville. He was killed at the battle of Wilson's Creek, Aug. 10, 1861.

Lyons (lē-ôn*g′*), a city of France, capital of the department Rhône, and the second of the republic in population and commercial importance, situated chiefly on a peninsula between the rivers Rhône and Saône, and on the Paris and Marseilles and other railroads, 275 miles E. N. E. of Bordeaux, 172 miles N. N. W. of Marseilles, and 245 miles S. E. of Paris; lat. 45° 45′ 44″ N., lon. 4° 49′ 34″ E.; is the great warehouse of the S. of France and of Switzerland; principal manufacture silk stuffs, giving employment directly or indirectly to 100,000 hands. It is the seat of an archbishop, and is the *chef-lieu* of the 7th military division. The cathedral and Church of St. Nizier, the Hotel de Ville (town hall), the finest edifice of the kind in the country, the hospital, the public library with 130,000 volumes, and the Palais des Beaux Arts, are perhaps the most notable among numerous and important institutions. There are also a university-academy, an imperial veterinary school — the first founded in the country, and still the best — schools for agriculture, medicine, and the fine arts, etc. The two rivers are crossed by 19 bridges; 12 over the Saône, and 7 over the Rhône. The quays, 28 in number, are said to be the most remarkable in Europe. There are several large and important suburbs — La Guillotière, Les Brotteaux, La Croix-Rousse, etc.; several fine squares, of which the Place Bellecour is one of the largest in Europe. The fortifications extend in a circle of 13 miles round the city. Lyons, the ancient Lugdunum, was founded about 42 years before the Christian era, and suffered greatly during the Revolution from the conflicts of hostile parties. It is the

birthplace of Germanicus, the emperors Claudius, M. Aurelius, and Caracalla; of Jussieu, Jacquard, and Camille Jourdan. Pop. (1906) 472,114.

Lyons, Gulf of, a bay of the Mediterranean, on the S. E. coast of France; principal ports Toulon, Marseilles, and Cette.

Lyons, Richard Bickerton Pemell, Lord, an English diplomatist; born in Lymington, England, April 26, 1817. He succeeded to his father's title of baron in 1858. He was educated at Winchester and Christ Church, Oxford, and in 1839 was appointed unpaid attaché at Athens. Five years later he was made paid attaché at Dresden, and in 1852 at Florence, being promoted to secretary of legation there after one year's service. In 1858 he was appointed envoy to Tuscany, and in December of the same year he was accredited to Washington as envoy extraordinary to the United States. It was in this position that he first came prominently before the world as a diplomat. In 1865 he was sent to Constantinople, and in 1867 to Paris. He was made a Knight Commander of the Bath in 1860, and a G. C. B. in 1862. He was sworn of the Privy Council in 1865, and made an honorary D. C. L. at Oxford in the same year. He died in London, England, Dec. 5, 1887.

Lyra, in anatomy, a triangular portion of the *corpus callosum*, marked with transverse longitudinal and oblique lines. In astronomy, the Lyre or Harp, one of the 20 ancient Northern constellations. It is situated to the S. E. of the head of Draco, having Hercules on the W. and S. and Cygnus on the E. Though a small constellation, it contains the large star Vega, with nearly 20 others visible to the naked eye, and, according to Bode, 166 in all, including telescopic stars. In zoölogy, a subgenus of *Brachiopoda*, genus *Terabratella*.

Lyre, one of the oldest forms of stringed instrument. It was introduced into Egypt from Palestine during the 18th dynasty, and was common among the Greeks even in the heroic times. Most of the barbarians who invaded the Roman empire were acquainted with the lyre, and must have independently attained the knowledge of it. The common Greek lyre was made of a tortoise shell, with blocks inside similar to those used in a violin, to modify the strain of the strings. The shell was covered with bull's hide, and two horns were fastened to one side of it, one horn at each extremity of the side. A piece of wood served as a crosspiece, and was fastened from the tip of one horn to the tip of the other. Seven strings of gut were tied to the crosspiece, the other ends being secured at the bottom of the shell. Pegs for the strings were added to the crosspiece by the later Greeks, likewise a bridge to prevent the strings touching the shell, and two sound holes cut in the shell in order to increase its resonance. The lyre, unlike the lute, cannot be stopped by the fingers, and its sounds thereby multiplied. Its sounds can be no more in number than its strings. Consequently, since the rise of the modern scale, the lyre, whose strings were originally seven in number and subsequently increased to 16, has been unable to cope with the growing exigencies of intricate music.

Lyre Bird, *Menura superba* (or *novæ hollandiæ*), an insectivorous Australian bird, placed by Professor Huxley in his Coracomorphæ. Habitat New South Wales, the S. part of Queensland, and perhaps some parts of the colony of Victoria. The lyre bird is not so large as a hen-pheasant; plumage, sooty-brown, relieved by rufous on chin, throat, some of the wing-feathers, and the tail-coverts. The 16 rectrices are developed in the male in the extraordinary fashion that gives the bird its English name. The two exterior have the outer web very narrow, and the inner very broad, and they curve at first outward, then somewhat inward, and near the tip outward again, bending round so as to present a lyre-like form. The middle pair of feathers have the outer web broad and the inner web very narrow; they cross near their base, and then diverge, bending round forward near the tip. The remaining 12 feathers are thinly furnished with barbs and present a hair-like appearance. The lyre bird is becoming rare; and though specimens have been carried to other countries than its own, none have long survived in captivity.

Lyric Poetry, originally poems intended to be sung to the accompaniment of the harp or lyre; now poems intended for musical recitation, and especially poems expressing or referring to the poet's individual thoughts and emotions, as distinguished from epic or dramatic poetry, which is concerned with external circumstances and events.

Lys (lēs), or **Leye** (lī'e), a tributary of the Scheldt, rises in France near the little town of Lysbourg, in the department of Pas-de-Calais, and flows in a N. E. direction, joining the Scheldt at Ghent in Belgium after a course of 130 miles.

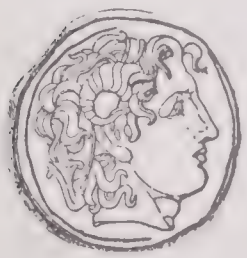
Lysander, a Spartan naval and military commander; lived in the 4th century B. C. He had the command, 407 B. C., of the Spartan fleet off the coast of Asia Minor, where he defeated the Athenians under Antiochus, and gained great influence, both among the Greeks and Persians. His great exploits were the victory of Ægos-Potami, in 405, which virtually closed the Peloponne-

sian war; the capture of Athens in the following year, and the establishment there of the government of the Thirty Tyrants; and securing the succession of Agesilaus to the Spartan kingdom in 397. The new king, however, slighted him and crossed his plans. Lysander fell at the battle of Haliartus in 395.

Lysias (lis'i-as), a general of Antiochus Epiphanes, King of Syria, who sent him against Judas Maccabæus, by whom he was surprised and defeated with the loss of 5,000 men. Lysias saved himself by flight, and, after the death of Epiphanes, returned to power, as regent, under Antiochus Eupator. He laid siege to Jerusalem; but learning that Philip, who disputed the regency with him, had taken possession of the capital of Syria, he raised the siege, marched against Philip, and defeated him. Both Eupator and himself were subsequently abandoned by their partisans, and slain by their guards in 162 B. C.

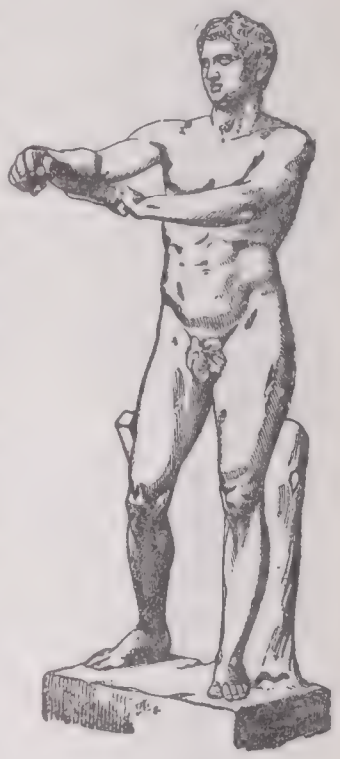
Lysimachia (lis-i-mā'ki-ä), loosestrife, a genus of *Primulaceæ*, family *Primulidæ*. The calyx is five-partite, the corolla rotate, the stamens glabrous or glandular, the capsule opening at the summit, with 5 to 10 teeth or valves. The herb grows erect or creeping. Known species, 40, chiefly from the temperate zone. Four (*Lysimachia vulgaris, L. nemorum, L. nummularia*, and *L. thyrsiflora*) are British. The first and second are the most common; they have yellow flowers. Professor Watt says that *L. candida* is eaten by many of the inhabitants of Munipoor as a pot-herb with fish.

Lysimachus (lī-sim'a-kus), one of the generals and successors of Alexander the Great; born in 361 B. C. He was a Macedonian of low origin, early remarkable for physical strength and courage. On the death of Alexander, 323 B. C., Thrace and the neighboring countries were the share of Lysimachus, who became also King of Macedonia in 286. The murder of his son Agathocles, a great favorite of the people, at the instigation of his wife Arsinoe, provoked a revolt in Asia; Seleucus took up the cause of the widow Lysandra, and Lysimachus was killed in the battle which ensued, 281 B. C. Lysimachus had assumed the title of king in 306. He was founder of a city on the Hellespont, named after him Lysimachi.



COIN OF LYSIMACHUS.

Lysippus (lī-sip'pus), a Grecian sculptor who worked with such extraordinary diligence that he is said to have left behind him 1,300 pieces, every one of which evinced marks of superior genius. He received from Alexander the Great the singular privilege of exclusively making his effigy in cast metal; and he accordingly executed a series of figures of that prince from childhood to maturity. He greatly improved the art of statuary, and gave to the human figure a degree of symmetry and beauty unattained by his predecessors.



STATUE BY LYSIPPUS.

Lyte, Henry Francis, a British hymn-writer; born in Ednam, near Kelso, Scotland, June 1, 1793; in 1812 entered Trinity College, Dublin; and took orders in 1815. His "Poems, Chiefly Religious" (1833); "Miscellaneous Poems" (1868); "Memoir of Henry Vaughan," etc., are well-nigh forgotten; but "Abide With Me," "Pleasant are thy courts," and other hymns by him will keep his memory green. His health having failed three years earlier, he died in Nice, Nov. 20, 1847.

Lythraceæ (-thrā'se-ē), loosestrifes or lythrads, an order of perigynous exogens, alliance Saxifragales. It consists of herbs, or rarely shrubs, frequently with four-cornered branches, generally opposite, entire, and solitary, or clustered regular or irregular, axillary or terminal, spikes or racemes; calyx tubular, ribbed petals inserted between the outer lobes of the calyx, very deciduous or wanting. Stamens equal in number to the petals, or two or three times as many, inserted into the calyx below them; ovary, superior, generally two to six celled, rarely one-celled; seeds, numerous, small; capsule, membranous and dehiscent. Known genera, 30; species, 250, chiefly from the tropics.

Lytle, William Haines (lī-tl), an American general and poet; born in Cincinnati, O., Nov. 2, 1826. He graduated at Cincinnati College and studied law. He was a captain in the Mexican War; and in the Civil War served as colonel in 1861, and later as Brigadier-General of volunteers, having been promoted to that rank for gallant conduct. His best-known poems are "Antony and Cleopatra" and "Jacqueline." No complete collection of his works was published. He was killed

at the battle of Chickamauga, Tenn., Sept. 20, 1863.

Lyttelton, George, Lord, an English author and politician; born in Hagley, Worcestershire, England, Jan. 17, 1709; was educated at Eton and Oxford; entered Parliament in 1730, where he soon acquired eminence as a speaker; held several high political offices and was raised to the peerage in 1759. His best-known prose works are "Observations on the Conversion and Apostleship of St. Paul" (1747); "Dialogues of the Dead" (1760); and "History of Henry II." (1764). His poetry won him a place in Johnson's "Lives of the Poets." He died in Hagley, Aug. 22, 1773.

Lyttleton. See LITTLETON.

Lytton, Lord. See BULWER-LYTTON, EDWARD.

Lytton, Edward Robert Bulwer-Lytton, Earl of, an English diplomatist; born in London, England, Nov. 8, 1831. He was the only son of the well-known novelist, who sent him to Harrow, and afterward to Bonn, where he devoted himself chiefly to the study of modern languages. He then entered the diplomatic service in 1849, being apointed attaché at Washington, where his uncle, Sir Henry Bulwer, was minister. Subsequently he was transferred to Florence (1852), Paris (1854), The Hague (1856), St. Petersburg (1858), Constantinople (1858), and Vienna (1859). After being employed for a short time as consul at Belgrade, he became secretary of legation successively at Copenhagen, Athens, Lisbon, and Madrid. He was then promoted in 1869 to be secretary of embassy at Vienna, from whence in 1872 he was transferred to Paris; and in 1874 he was appointed minister at Lisbon. It was while here that he was made Viceroy of India by Mr. Disraeli in 1876. He immediately proceeded to Calcutta, and from thence to Delhi, where, at a great durbar, Queen Victoria was proclaimed Empress of India. He adopted an active policy in Afghanistan, which brought about the second Afghan war. In 1880 he was created Earl of Lytton, and when the Conservative government retired in that year he sent in his resignation of viceroy. In 1887 he was appointed British ambassador at Paris. There he remained till his death on Nov. 24, 1891. He died very suddenly from aneurism of the aorta. For many years Lytton was better known as a poet than as a diplomatist, under the pseudonym of OWEN MEREDITH. His published works include: "Clytemnestra and other Poems" (1855); "The Wanderers" (1859); "Lucile" (1860); "The Ring of Amasis" (1863; "Fables in Song" (1874); "Speeches of Edward, Lord Lytton, with a Memoir by his Son" (1874); "The Life and Letters of Edward Bulwer, Lord Lytton" (1883, 2 vols., but the narrative comes down only to 1832); "Glenaveril," an epic of modern life (1885); and "After Paradise" (1887). "Marah," a volume of lyrics and "King Poppy," one of his best poetical works, were published after his death.

M

m, the 13th letter and the 10th consonant in the English alphabet, a labial, produced by a slight expiration with a compression of the lips. It is one of the liquids or semivowels, and was not therefore considered by the Romans a consonant; but was very faintly pronounced, rather as a rest between two syllables than as an articulate letter (Quint. ix: 4), which explains why it was subject to elision. It is one of the first sounds which children learn to pronounce in connection with the easy vowel a, yet there are some tongues in which it does not appear to occur. In English it has a well-marked and uniform sound, and unless, perhaps, when doubled and in a few words, such as mnemonic, the letter is never silent. If the m is fully pronounced the sound passes partly through the nose, as is also the case with n. Hence, in French, it is generally nasal at the end of a syllable, as in *parfum, empereur.* The *mem* of the Hebrews, as a numeral, signified forty; the same was the case with the Greek μ'; $,\mu$, however (characterized by the stroke before it), signified 40,000. In Latin M signified 1,000; the original designation of this number was double D or (CIↃ), which gradually became an M. MM denotes 2,000, and M with a line above it 1,000,000. In numismatics M stands for a great number of words; for Macedonia, as LEG. M. XX., Legio Macedonia Vicesima; Malea, Massilia, Mamertini, and many other places or countries; for Marcus, Manlius, Marcellus, and other names. M. D. signifies *medicinæ doctor* (doctor of medicine); A. M. *artium magister* (master of arts); MS. *manu scriptum* (manuscript); MSS. (manuscripts). M in French often stands for Monsieur; MM. for Messieurs. M is used by printers for the unit of measure of printed matter. Types of the same font have bodies of equal thickness in one direction, and the square of this dimension is used in determining the amount of printed matter in a given space, as a page for instance, and is termed an m. See ABBREVIATIONS.

Maartens, Maarten (mär'tenz), pseudonym of J. M. W. VAN DER POORTEN-SCHWARTZ, a Dutch novelist; born in Amsterdam in 1857. He wrote in English. Among his books are: "The Sin of Joost Avelingh" (1890); "A Question of Taste" (1891); "God's Fool" (1892); "The Greater Glory" (1894); "Her Memory" (1898); etc.

Mabie, Hamilton Wright, an American editor; born in Cold Spring, N. Y., Dec. 13, 1845. He was graduated at Williams College, practised law for a time in New York city, and then entered journalism, becoming in 1879 associate editor of the "Christian Union" afterward the "Outlook." He supplemented the written word by much work on the lecture platform. He was also a very acceptable lecturer on literary subjects. He wrote "Norse Stories Retold from the Eddas"; "My Study Fire"; "Under the Trees and Elsewhere"; "Short Studies in Literature"; "Essays in Literary Interpretation"; "Essays on Nature and Culture"; "Essays on Books and Culture"; "Life of the Spirit"; "Shakespeare"; etc.

Mac, a prefix used extensively in Scotch names; as MacGregor, MacDonald, etc. It corresponds with son in surnames of Teutonic origin, Fitz in those of Romance origin, Ap or Ab in Welsh surnames, and O in Irish.

Macaber (ma-kä'bur) **Dance,** or **Danse des Morts,** a name given to a certain class of allegorical representations, illustrative of the universal power of death, dating from the 14th century, and long a favorite subject of painting and poetry, in which persons of all ranks and ages were represented as dancing together with the skeleton form of Death, which led them to the grave. The dance and the drama being at that time intimately connected, the grotesque allegory soon assumed a dramatic form. This drama was most simply constructed, consisting of short dialogues between Death and 24 followers, and was undoubtedly enacted in or near churches by religious orders in Germany during the 14th century, and at a rather later period in France. It would appear that the seven

brothers whose martyrdom is recorded in the 7th chapter of the 2d Book of "Maccabees" either played an important part in the drama, or the first representation, which took place at Paris in the Cloister aux Innocents, fell on their festival, and hence the origin of the ancient name, Chorea Machabæorum, or La Danse Macabre. As early as 1400, the dramatic poem was imitated in Spain, and appears there in 79 strophes of 8 lines each (*La Danca General de los Muertos*), but it did not spread. From Paris both poem and pictures were transplanted to London (1430). But nowhere was the subject so variously and strikingly treated as in Germany. The celebrated Dance of Death on the cloister walls of the Klingenthal, a convent in Basle, departs somewhat from the original form; but a picture in one of the chapels of the Marienkirche, at Lübeck, still, in spite of repeated repaintings, bearing the unmistakable impress of the 14th century, exhibits the very simplest form of the drama, and has some genuine Low-German verses attached to it. Here we see 24 figures, partly clerical, partly lay, arranged in a descending scale, from the Pope himself down to a little child, and between each of them a dancing figure of Death, not in the form of a skeleton, but a shrivelled corpse, the whole being linked in one chain, and dancing to the music of another Death. In the 15th century the Danse des Morts, or dance of death, became only a subject of pictorial representation; and, descending from the walls of the quiet convent into public places, it gave a new impulse to popular art. But Holbein has the credit of availing himself most effectually of the original design, and giving it a new and more artistic character. Departing from the idea of a dance, he illustrated the subject by 53 distinct sketches for engravings, which he called "Imagines Mortis" (Pictures of Death), in which Death assumes ironical costumes, while meeting with and overcoming persons in every condition of life.

Macadam, John Loudon, a Scotch engineer, inventor of the system of road-making known as "macadamizing"; born in Ayr, Scotland, Sept. 21, 1756. He went to New York in 1770, entered his uncle's counting house, became a successful merchant, and on his return to Scotland in 1783 bought the estate of Sauchrie, Ayrshire. He began in 1810 to make experiments in the construction of roads, which became a passion with him, and in gaining experience he traveled 30,000 miles, and spent $25,000. In 1816 he was appointed surveyor to the Bristol Turnpike Trust, and remade the roads there cheaply and well. His methods formed the subject of a select committee of the House of Commons in 1819. Impoverished through his labors, he petitioned Parliament in 1820 for his expenses and some reward. His petition was repeated in 1823, and he was voted $50,000 and appointed Surveyor-general of Metropolitan Roads in 1827. He declined knighthood. He published "A Practical Essay on the Scientific Repair and Preservation of Public Roads" (1819); "Remarks on the Present State of Roadmaking" (1820), and "Observations on Roads" (1822). He died in Moffat, Dumfriesshire, Nov. 26, 1836.

MacAfee, Mrs. Nelly Nichol (Marshall), an American novelist, daughter of Gen. Humphrey Marshall of the Confederate army; born in Louisville, Ky., in 1845. Among her works are: "Sodom Apples" (1866); "Wearing the Cross" (1868); "A Criminal through Love" (1882); etc.

McAfee, Robert Breckinridge, an American historian; born in Mercer co., Ky., in February, 1784. He was United States chargé d'affaires at Bogota, Colombia, 1833–1837; and was a member of the Royal Antiquarian Society of Denmark. He wrote a "History of the War of 1812" (1816). Much valuable information has been obtained from his private journal, relating to the early history of Kentucky. He died in Mercer co., Ky., March 12, 1849.

MacAlester College, a coeducational institution in St. Paul, Minn.; chartered in 1864; opened in 1885, under the auspices of the Presbyterian Church; has grounds and buildings valued at over $270,000; productive funds, $200,000; volumes in the library, over 10,000; scientific apparatus, etc., $12,000; ordinary income, about $28,000; average number of faculty, 25; average student attendance, 280.

McAll Mission, the largest Protestant mission in France; founded in 1871 by the Rev. Robert Whitaker McAll (1822–1893) and his wife. It possesses more than 100 stations (about 40 in Paris), and is supported by Protestant Christians of all denominations in Great Britain and the British colonies and the United States. Twelve years after its foundation the mission held within the year 15,000 meetings, attended by about 1,000,000 persons (mainly of the most neglected and irreligious classes), paid 20,000 house-to-house visits, and distributed more than 500,000 Bibles and tracts.

McAllister, Fort, a Confederate earthwork on the Ogeechee river, the capture of which by General Hazen, Dec. 13, 1864, was the closing feat of General Sherman's victorious march to the sea.

McAnally, David Rice, an American educator and prose-writer; born in Tennessee, Feb. 17, 1810. He was long associated with Horace Mann in efforts to improve

methods in education. He was the author of "Life of Martha Laurens Ramsay" (1852); "Life and Labors of Bishop Marvine"; "History of Methodism in Missouri," etc. He died July 11, 1895.

Macao (mä-kä'ō), a Portuguese settlement on the coast of China, on the W. part of the estuary of the Canton or Pearl river, Hong Kong being about 40 miles distant, on the opposite side of the same estuary; the trade, mostly transit, is in the hands of Chinese. In 1910 the Portuguese had a brief but spirited war with Chinese pirates here. Camoens, in exile, here composed his "Lusiad." Pop. (1900) 63,-991.

Macarias, the Monothelites of Antioch, so called from Macarius, who was patriarch at the time of the second Council of Constantinople (A. D. 620), at which he defended his opinions, but was condemned. See MONOTHELITISM.

Macaroni, or **Maccaroni** (-ō'nē), an article of food composed of the dough of fine wheaten flour, made into long, slender tubes varying in diameter from one-eighth of an inch to an inch; it is a favorite food in Italy. Figuratively, a fop, a dandy, an exquisite. They led the fashion from 1770 to 1775. They were distinguished by the immense knot of artificial hair worn by them, a very small cocked hat, jacket, waistcoat, and small clothes very tight to the body, and a walking-stick ornamented with long tassels. Macaronis, a body of soldiers from Maryland during the War of Independence, so called on account of their showy uniform.

Macaronic Verse, properly a kind of humorous poetry, in which, along with Latin, words of other languages are introduced with Latin inflections and construction; though the name is sometimes applied to verses which are merely a mixture of Latin and the unadulterated vernacular of the author. Thus "lassas kissare bonæas" ("to kiss the bonnie lassies"), and "burnantem extinguere thirstum," are parts of macaronic hexamenters. Teofilo Folengo, called Merlinus Coccaius (1491–1554), a witty and graceless Benedictine, has been erroneously regarded as the inventer of macaronic poetry; but he was the first to employ the term in this sense. His "Maccaronea" (1517) is a long satiric poem, in which Latin and Italian are mingled. A predecessor of his by half a century was Odassi or Odaxius of Padua. Good specimens are found in the "Malade Imaginaire" (Imaginary Invalid), and in the "Epistolæ Obscurorum Virorum" (Letters of Obscure Men). The "Polemo-Middinia" (1683), ascribed to Drummond of Hawthornden, is probably the best-known British example.

MacArthur, Arthur, an American military officer; born in Massachusetts, June 1, 1845; enlisted in the volunteer service of the United States in Wisconsin, and was appointed 1st lieutenant of the 24th Wisconsin volunteers, Aug. 4, 1862; promoted major Jan. 25, 1864; lieutenant-colonel and brevet-colonel in May, 1865, for gallant and meritorious conduct in the battles of Perryville, Ky., Stone River, Tenn., Mission Ridge and Danridge, Ga., and "for gallant and meritorious services in the battle of Franklin, Tenn., and in the Atlantic campaign"; and was mustered out of the volunteer service, June 10, 1865. After the Civil War he entered the regular army with the rank of lieutenant in the 17th United States Infantry; served bravely in Indian Wars; in 1889 was promoted major and detailed at Washington as assistant adjutant-general in 1889; was detailed to the Department of Dakota, and took up his residence in St. Paul. In the war against Spain he went to Mobile as one of General Wade's staff, but had been there only a short time when he was appointed a Brigadier-General of volunteers, and assigned to the Philippine expeditionary forces, then at Camp Merritt, San Francisco; commanded the third expedition, which left San Francisco June 27, 1898, and reached the Philippines July 31, two weeks before the final assault on the city of Manila; was promoted Major-General of volunteers; was promoted Brigadier-General in the regular army, Jan. 2, 1900; commander of the Military Division of the Philippines, promoted Major-General U. S. A., 1901, returned to the United States in the summer of 1901; shortly afterward was assigned to the command of the Department of the Lakes; and in July, 1902, succeeded Gen. J. R. Brooke, as commander of the Department of the East, with headquarters at New York city. He commanded the land force in the war game along the Atlantic coast in 1902; was promoted lieutenant-general in 1906; retired in 1909.

MacArthur, Robert Stuart, an American Baptist clergyman; born in Dalesville, Quebec, Canada, July 31, 1841; was graduated at the University of Rochester (1867); at the Rochester Theological Seminary (1870); received the title of D. D. from Rochester Theological Seminary (1880); of LL. D. from Columbian University (1896). He was pastor of Calvary Baptist Church, New York, after 1870, and editor of the "Christian Inquirer" and the "Baptist Quarterly Review." He published "Quick Truths in Quaint Texts"; "Calvary Pulpit, or Christ and Him Crucified" (1890); "Lectures on the Land and the Book"; etc.

Macartney, George Macartney, Earl of, a British administrator and diploma-

tist; born in Lissanoure, Ireland, May 14, 1737. As envoy-extraordinary to Russia, he concluded (1767) a commercial treaty; from 1769 to 1772 he was Chief-secretary of Ireland; and from 1775 to 1779 governor of Grenada, W. I., but was compelled, after an honorable defense, to give up the island to Count D'Estaing, and was himself carried prisoner of war to France, though he soon contrived his exchange. The East India Company, in December, 1780, appointed him governor of Madras, and six years later promoted him to be governor-general; but his weak state of health obliged him to decline the honor. He had already had some experience as member of both the English and the Irish Parliaments, and had been raised from a knight(created in 1764) to a baron in Ireland (1776). The first diplomatic mission to China from Great Britain was headed by Macartney, now an Irish viscount, in 1792; before his return home he was made an Irish earl (March 1, 1794). After undertaking a confidential mission to Italy (1795–1796), he went out as governor of the new colony of the Cape of Good Hope (1796); but ill-health compelled him to return home in November, 1798. In 1796 he was made Baron Macartney in the British peerage. He died in Chiswick, England, March 31, 1806.

Macassar, or **Makassar,** the extreme S. portion and a department in the residency of Celebes. Chief town and port, Macassar, on the W. coast of the S. peninsula; made a free port in 1846; pop. (1892) 18,787. See CELEBES.

Macassar Oil, an oil used for promoting and strengthening the growth of the hair, so named from having been originally brought from Macassar. The name is now commonly given to a prepared mixture of castor and olive oil.

Macaulay, Catharine (Sawbridge), an English historian; born in Kent, England, in 1733. She is best known by her "History of England" (8 vols. 1763–1783). Her "History of England from the Revolution" (1778) was called "the republican history of England" and was severely criticized. Only one volume appeared. She died June 22, 1791.

Macaulay, James, a Scotch novelist and writer for the young; born in Scotland, May 22, 1817. He was educated at Edinburgh University and Paris; editor for 10 years of the "Literary Gazette"; of the "Leisure Hour" (1858–1895); for 35 years editor-in-chief of the Religious Tract Society; founded the "Boy's Own Paper" and the "Girl's Own Paper." He wrote "Across the Ferry" (1871); "All True" (new ed. 1880); "From Middy to Admiral of the Fleet"; "Sea Pictures" (new ed. (1884); "Victoria, her Life and Reign" (1887); "Luther Anecdotes"; etc. He died June 20, 1902.

Macaulay, Thomas Babington, an English historian; born in Rothley Temple, Leicestershire, England, Oct. 25, 1800. He composed a compendium of universal history before he was eight years old; went to school at Shelford and entered Cambridge in 1818. In 1826 he was called to the bar, but not succeeding in law practice he soon abandoned it. He was in constant attendance in the galleries of the House of Commons, where he imbibed political views and studied the oratory of the speakers. In 1825 he contributed to the "Edinburgh Review" an essay on Milton. Its effect was electrical, and its reception created such

THOMAS B. MACAULAY.

a blaze of popularity for its author that he at once took his place as one of the great literary characters of his time. His conversational wit and brilliancy added to his fame. By the failure of the firm of which his father was a member he was left without a fortune. At this juncture he was offered a seat in the Commons by Lord Lansdowne, entering in 1830 to represent what was then known as a "pocket borough." For three years he worked assiduously in the House of Commons and in the production of essays for the "Edinburgh Review." When the Reform Act of 1832 prevailed, and Earl Grey's cabinet triumphed, he was made a commissioner of the Board of Control for Indian Affairs, devoting himself to a thorough study of India. In 1833 he was returned for Leeds, where he advocated the abolition of slavery and engaged in debate with O'Connell. In 1834 he accepted a seat on the Supreme Council of India. Here he drafted a penal code which became the basis of the criminal code of India. In 1838 he returned to England, and was at once sent to Parliament from

Edinburgh. In 1839 he became Secretary of War in Lord Melbourne's cabinet. In 1846 he was appointed Postmaster-General in Lord John Russell's cabinet, where he had time to devote himself to his "History of England," which he had now begun. He soon retired entirely to private life in order to prosecute this work, refusing a seat in the cabinet in 1852. He accepted a seat in the House, however, in 1853, but only to give public duties a small measure of his attention. In 1848 the first two volumes of the "History" appeared. No other historical work ever met with so favorable reception or circulated so rapidly. The next two volumes were published in 1855. It was translated into 10 European languages. Its circulation in America has been exceeded by few books ever published. His writings show a comprehensive practical knowledge, a great range of vocabulary, a witty, epigrammatic yet melodious and easy flow of sentences, and a positive, not to say dogmatic, tone, that at times is nearly oracular. In 1857 he was raised to the peerage as Baron Macaulay of Rothley. He died in Kensington, London, Dec. 28, 1859.

Macaw, the popular name for any member of the South American family *Araidæ,* and more strictly of the genus *Ara* (Brisson), or *Macrocercus* (*Vieillot*). The macaws are remarkable for their size and the beauty of their plumage. They are less docile than the true parrots, can rarely be taught to articulate more than a few words, and their cry is harsh and disagreeable. The scarlet macaw, *Ara macao,* is a very handsome bird; the principal color is bright-red, with blue rump, vent, tail coverts, and quills, and greenish-blue and yellow wing coverts, tail, two-thirds of whole length blue and crimson. The red and blue macaw, *A. aracanga,* resembles the first species, but the middle of the wing coverts is bright yellow. The green macaw, *A. militaris,* has lively green plumage, lower back, upper tail, and wing coverts blue, the under surface orange-yellow. The blue and yellow macaw, *A. ararauna,* is one of the handsomest of the genus .

Macaw Tree, the name given to several species of trees of the genus *Acrocomia,* natives of tropical America, as *A. fusiformis* and *A. sclerocarpa,* the fruit of which last yields an oil of a yellowish color of the consistence of butter, with a sweetish taste and an odor of violets, used by the natives of the West Indies as an emollient in painful affections of the joints, and largely imported into Great Britain, where it is sometimes sold as palm oil, to be used in the manufacture of toilet soaps.

Macbeth, the hero of Shakespeare's tragedy of that name; a Scotch chief related to the reigning King Duncan, whom he assassinated in order to usurp his power, 1040. He fell in battle by the hand of Macduff in 1057.

McBurney, Charles, an American surgeon; born in Roxbury, Mass., Feb. 17, 1845; was graduated at Harvard College in 1866; and at the Columbia Medical School in 1870. He was Professor of Surgery in the College of Physicians and Surgeons, New York city, and consulting surgeon at St. Luke's, the Presbyterian, the New York Orthopedic, and other hospitals. When President McKinley was shot Dr. McBurney was summoned as consulting surgeon.

McCabe, Charles Cardwell, an American clergyman; born in Athens, O., Oct. 11, 1836; was educated at Ohio Wesleyan University. In 1860 he joined the Methodist Episcopal Conference; in 1862 became chaplain of the 122d Ohio Infantry; and at the battle of Winchester was captured and held in Libby Prison for four months. Soon after his release he entered the service of the United States Christian Commission and succeeded in raising a large amount of money for its work. At the conclusion of hostilities he removed to Portsmouth, O., and became financial agent for Wesleyan University; and in 1884 was made secretary of the Methodist Episcopal Missionary Society. He became widely known through his success in raising money for missionary purposes; was elected a bishop in 1896; and lectured on "The Bright Side of Libby Prison." He died Dec. 19, 1906.

Maccabees, a name applied to a patriotic family whose achievements were most notable. Antiochus Epiphanes, a Syrian king, having been expelled from Egypt by the Romans, relieved his vexation by attempting to put down the Jewish worship. Palestine then being under his sway, the aged Mattathias, priest of Modin, was urged to set his people the example of sacrificing to the Greek gods. In place of doing so he killed the king's messenger and escaped to the mountains, his sons being companions of his flight. Their names were John called Caddis, Simon called Thassi, Judas called Maccabæus, in connection with whom the name Maccabees originated, Eleazar called Avaran, and Jonathan called Apphus. The revolt began 168 B. C., and in 165 Judas took Jerusalem and purified the Temple in commemoration of which the winter festival called the Feast of Dedication was annually kept, and is alluded to in John x: 22. After achieving success, a Maccabean, called also an Asmonæan, dynasty reigned for about a century, Herod

the Great, slaughterer of the infants of Bethlehem, putting to death Hyrcanus, the last scion of the house, though he was inoffensive, pious, and the high priest.

The Books of Maccabees: Four books of our present Apocrypha, with a fifth not in that collection.

(1) Maccabees: A work giving an account of the Maccabean struggle with a simplicity and candor which render its statements eminently credible. It seems to have been written originally in Hebrew by a Palestinian Jew, probably a Sadducee. The Roman Church considers it an inspired production; the Protestant, uninspired but of high historical value.

(2) Maccabees: A much less valuable production than I Maccabees. It was compiled by a person whose name is not given, from a more extended narrative written by Jason of Cyrene. Jason's book seems to have been published about 160 B. C.

(3) Maccabees: A book narrating events earlier than the Maccabean times. It commences with Ptolemy IV. (Philopator) 217 B. C. The author seems to have been an Alexandrian Jew who wrote in Greek.

(4) Maccabees: A work written to encourage the Jews who lived in the midst of a contemptuous heathen population to remain true to the Jewish faith. It contains the history of the Maccabean martyrdoms. It seems to have been written A. D. 39 or 40.

(5) Maccabees: This work embraced the history of 178 years, from Heliodorus's attempt to plunder the treasury at Jerusalem, 184 B. C. to 6 B. C., when Herod was on the throne. There are many parallelisms with Josephus. It is a valuable historical production.

Maccabees, Order of Knights of the, a fraternal and beneficiary organization founded in 1881 by Maj. N. S. Boynton, of Port Huron, Mich., on the traditions of the ancient Maccabees. The order has steadily and rapidly increased in numbers and importance. It has a ladies' auxiliary branch entitled the Ladies of the Maccabees. Their lodges are designated as hives and those of the Maccabees as tents. The plan for the organization of the ladies' auxiliary was originally conceived by Mrs. A. G. Ward, of Muskegon, Mich., who drafted a portion of the original constitution for the first hive organized. The order, like that of the Maccabees, proved to be remarkably successful, and there is today no auxiliary order in the world better or more favorably known than the Ladies of the Maccabees. In 1900 reports showed 3,800 subordinate tents and hives; 227,936 members; benefits disbursed in last fiscal year, $1,700,928; benefits disbursed since organization, $9,600,000.

McCall, George Archibald, an American military officer; born in Philadelphia, Pa., March 16, 1802. He was graduated at the United States Military Academy in 1822, and saw active service in the Seminole War and in the Mexican War. In May, 1861, he was commissioned Brigadier-General of volunteers, and took part in the Virginia campaign of 1861–1862. He was in command at the battle of Mechanicsburg, June 26, 1862, and on June 30 was taken prisoner, and confined for several weeks in Libby Prison. He resigned from the army in 1863. He died in Chester, Pa., Feb. 25, 1868.

McCalla, Bowman Hendry, an American naval officer; born in Camden, N. J., June 19, 1844; was graduated at the United States Naval Academy in 1864; promoted master in 1866; lieutenant and lieutenant-commander in 1868; commander in 1884; and captain in 1898. In 1890 he was court-martialed on charges of cruelty toward the officers and crew of his ship, the "Enterprise," and was sentenced to suspension for three years. In the following year the President remitted the unexpired portion of the suspension because of his general record for gallantry. He commanded the protected cruiser "Marblehead" during the war against Spain in 1898, and rendered invaluable service to the American fleet by arranging a code of signals with the insurgents on shore, by personal communication with them, and by scouting. His conduct here was so meritorious that the Secretary of the Navy recommended to the President the restoration of Captain McCalla to the place on the list of officers he occupied prior to his suspension. This recommendation was supported by an unusual document, a statement of all of the officer's classmates who would be affected by such restoration that they would be pleased to have him restored. In October, 1899, he sailed for Manila in command of the "Newark," and on Dec. 12 received the surrender of all insurgent military forces in the provinces of Isabella and Cagayan, Northern Luzon, and in the Batan Islands. When the Boxer troubles broke out the "Newark" was ordered to Chinese waters. In June, 1900, he landed with 112 men, with whom he formed part of the column under Vice-Admiral Seymour that made the memorable but unsuccessful attempt to reach and relieve the legations in Peking. For his services at this time he received the congratulations of the Navy Department, and the following compliment in the official report of Vice-Admiral Seymour: "I must refer specially to Commander McCalla of the American cruiser 'Newark,' whose services were of the greatest value to me and all concerned. He was slightly wounded in three places and well merits recognition." On March 16,

1901, he was given command of the new battleship "Kearsarge." He died May 6, 1910.

Maccaluba (mäk-kä-lö'bä), a small mud volcano, 138 feet in height, 6 miles N. of Girgenti in Sicily. The sides are studded with numerous small cones, which usually emit hydrogen, and occasionally mud and stones, often sending them to a great height.

MacCarthy, Denis Florence, an Irish poet; born in Dublin, Ireland, in 1817. He first became known as one of the young poets of that famous newspaper, the "Nation," founded by Charles Duffy in 1842, and his collected "Ballads, Poems, and Lyrics" appeared in 1850. His "Bell-Founder," "Voyage of St. Brendan," "Foray of Con O'Donnell," and the "Pillar Towers of Ireland," quickly carried his fame over the land as well as to Irishmen beyond the sea. Shelley's translations from Calderon attracted him to Spanish, and in 1853 he published six of Calderon's dramas translated in the meters of the original, and further instalments followed in 1861, 1867, 1870, and 1873, earning the praises of Ticknor and Longfellow, and in 1881 a medal from the Royal Academy of Spain. In 1872 appeared "Shelley's Early Life," and in 1879 he wrote the ode for the Moore centenary. He died in Blackrock, near Dublin, April 7, 1882.

McCarthy, Justin, an Irish historian; born in Cork, Ireland, Nov. 22, 1830. He was a Home-Rule member of Parliament after 1879, and after the fall of Parnell, chairman of the Irish Parliamentary party. He spent three years (1868–1870) in the United States, traveling, lecturing, and engaged in literary work, being (among other things) connected editorially with the New York "Independent." He revisited the United States in 1886. Among his chief works are: "A History of Our Own Times" (4 vols. 1879–1880); "History of the Four Georges" (4 vols. 1889); the novels "Lady Judith" (1871); "A Fair Saxon" (1873); "Dear Lady Disdain" (1875); "The Right Honorable" (1886, with Mrs. Campbell-Praed); etc. "Modern Leaders," a collection of biographical sketches, appeared in 1872. His latest work included "The Story of Gladstone's Life" (1897); "Modern England" (1898); "Reminiscences" (1898).

JUSTIN M'CARTHY.

McCarthy, Justin Huntley, an Irish journalist, son of Justin; born in 1869. He was educated at University College, and was a member of Parliament after 1884. He wrote: "Outline of Irish History" (1883); "Serapion, and Other Poems" (1883); "England Under Gladstone" (2d ed. 1885); "Camiola, a Girl with a Fortune" (1885); "History of the French Revolution" (1897); the following plays: "The Candidate"; "The White Carnation"; "His Little Dodge"; "My Friend the Prince"; "If I Were King"; etc.

McCaul, John, a Canadian educator and writer; born in Dublin, Ireland, in 1807. In 1849 and 1853 he was elected president of Toronto University. He published several volumes of articles and treatises on classical subjects, besides editing portions of Horace, Longinus, Lucian, and Thucydides, as college text-books. He also wrote: "Britanno-Roman Inscriptions" (1863); and "Christian Epitaphs of the First Six Centuries." He died April 15, 1887.

Macchiavelli, or **Machiavelli, Nicolo** (mak-i-a-vel'li), a Florentine statesman and historian; born in Florence, Italy, May 3, 1469. Little is known of his youth, and nothing of his education, except that he studied under Marcello Virgilio Adriani. On account of his distinguished talents he was appointed in the first half of 1498, before he had completed his 29th year, chancellor of the second chancery of the signory (*signoria,* supreme authority of the State), and a few months later secretary to the "Ten," from which latter appointment he became widely known as *il Segretario Fiorentino.* He had scarcely entered on the duties of his office when he revealed his extraordinary capacity for politics on the occasion of being sent on a special mission to the Lord of Piombino, a capacity of which he gave further proofs in 23 subsequent embassies to Italian and foreign princes, and 15 commissions to execute special trusts in different parts of the Florentine dominions. He was four times plenipotentiary at the French court (July, 1500, to January, 1501; January, 1504; July, 1510; September, 1511), and he was sent in the same quality to the court of Duke Valentino (Cæsar Borgia) in 1502; to that of Pope Julius II. in August, 1506; and to the Emperor Maximilian, whom he met at Bolzano (Botzen, in the Tyrol) in 1507. On all these and other occasions he distinguished himself not less by his patriotism and fidelity to the republic than by

his diplomatic ability. The republic acknowledged his great services, but rewarded them sparingly, so that he was sometimes obliged to petition the signoria on account of his poverty. Macchiavelli held his offices of chancellor and secretary uninterruptedly for 14½ years; but when the Medici (Giuliano and Giovanni de' Medici), with the aid of Pope Julius II., reëntered Florence in 1512 he was the first object of their anger, and in November, 1512, was deprived of both his offices, and exiled for a year to a part of the Florentine territory. The decree by which he was exiled was afterward mitigated so as to allow him to remain in the city, and only to exclude him from the palace of the signory. His misfortunes were increased in the beginning of the following year, when he was accused of being implicated in the conspiracy of Capponi and Boscoli against the Medici, in consequence of which he was cast into prison and put to the torture with the hope that he might acknowledge his own complicity and betray the names of some of his supposed associates. But he bore the torture with firmness, and his examiners were unable to extort any confession from him. He remained in prison for a short time after, but when Giovanni de' Medici was elevated to the papcy as Leo X., in March, 1513, that pontiff caused him to be released, whereupon he retired to his country seat of San Casciano. Here he lived for several years in retirement and in far from easy circumstances, yet bearing his reverse of fortune with admirable equanimity. He devoted himself now to letters, and it is to this period that we are indebted for perhaps the most important, certainly the most celebrated of his works. It was not till after the death of Giuliano de' Medici (1516) and his successor Lorenzo (1519) that Macchiavelli received any prominent marks of favor from that family; but both the Cardinal Giulio (afterward Clement VII.), who succeeded Lorenzo in the government of Florence, and Leo X. now seemed desirous of making use of his abilities, and it was at the request of the latter that he wrote his "Discorsi sopra riformare lo stato di Firenze." After 1521 he received various commissions from the Florentine government, but they were mostly of secondary consequence, and the rewards which he received for the performance of them were not sufficient to deliver him from the constant state of embarrassment in which he found himself. The last task intrusted to him was the most important which he received after his restoration to public life; it was in 1527, when the army of the emperor, under the command of the Constable de Bourbon, was descending on Italy, and it was unknown whether its destination was Florence or Rome. Macchiavelli was sent to watch its movements, and to induce the Army of the League in case of necessity, to move to the defense of Tuscany. When he saw the invading army bend its march toward Rome he returned to Florence. He died in poverty on June 22, 1527, shortly after his return to his native city. He was buried in the Church of Santa Croce, and a monument to him was erected by Earl Cowper in 1787.

The writings of the immortal Florentine may be arranged under four heads — history, politics, military treatises, and belles lettres. His eight books on the history of Florence, written at the command of Clement VII., begin with the year 1215, and end with Lorenzo de' Medici in the year 1492. They are among the first historical works of modern times that deserve to be placed side by side with the beautiful remains of antiquity The "Life of Castruccio Castracani, Lord of Lucca," in which Macchiavelli illustrates his own views of the qualities of a general and a statesman, is more properly a romance than a biography. Under the head of politics are included his two most important works — "The Prince" ("Il Principe") and the "Discourses on the ten first Books of Livy" ("Discorsi sopra la prima Deca di T. Livio") — his "Legazioni," in which he gives accounts of the various embassies in which he was employed, and his treatises on the affairs of France, Germany, and Italy, the materials for which he gathered on the occasion of those embassies, and which are equally remarkable for the force and conciseness of their style, and for the shrewdness and accuracy of the observations contained in them. The first of these works is by far the best known of all Macchiavelli's writings, on account of the maxims which it inculcates and the disputes that have arisen as to the scope of the work and Macchiavelli's object in writing it. It was written in 1513, just after the return of the Medici, and is dedicated to Lorenzo de' Medici, by whom and by Giuliano de' Medici alone it was originally intended to be perused. The subject of the treatise (which is a short one) is the means by which a prince may acquire and maintain power; and what most strikes every modern reader of the book is the undisguised manner in which the author exhorts a prince to make use of all means, whether good or bad from a moral point of view, for these purposes, provided only that they are fitted to effect his object. The immediate purpose of Macchiavelli in writing the work was placed beyond any doubt by the discovery in 1810 of a letter written by him on Dec. 10, 1513, to a friend of his called Vettori, in which he plainly avows that the work was written in the hope of commending himself thereby to the Medici and being employed by them in public affairs. This letter leaves us in no doubt as to at least

one of the objects which Macchiavelli had in view in writing this treatise, but we cannot suppose that this was his only object. The greater part of the treatise is not only consistent with his object, but does not necessarily imply any other. But the last chapter tends to show that at least one motive which he had in writing "The Prince" was love of country, that though he was peculiarly attached to his own native State, yet his patriotism extended to the whole of Italy, that he hoped by his treatise to induce the Medici to attempt to make Italy a united State, free from the influence of foreigners, and also hoped no doubt himself to become the chief instrument in effecting this work as the adviser of the family to whom he was addressing himself. "The Prince" was first published in 1532 by permission of Pope Clement VII. His great military treatise, "Dell' Arte della Guerra," a work in seven books, was written to show the Italians that they were able to recover their freedom without the assistance of the foreign mercenaries so generally employed in the States of Italy; and he shows himself fully sensible of the great importance of infantry, then little valued. His contributions to belles lettres consist of comedies and novels. His comedies "La Mandragola" and "La Clizia" are the first regular dramas written since the time of the Romans. Voltaire preferred the first to any of the plays of Aristophanes. The fine novel entitled "Belphegor," has been versified by La Fontaine.

McClellan, George Brinton, an American military officer; born in Philadelphia, Pa., Dec. 3, 1826; was graduated at the United States Military Academy in 1846; joined the army as 2d lieutenant of engineers; took an active part in the Mexican War, where he distinguished himself under General Scott in the battles of Contreras, Churubusco, Molino del Rey, and Chapultepec, and was promoted to a captaincy; was one of the three American officers sent to observe the campaigns in the Crimea. At the commencement of the Civil War in 1861 he was appointed Major-General of the Ohio volunteers, but by the advice of General Scott he was tendered, by President Lincoln, the position of Major-General of the army. After a successful campaign in West Virginia he commanded and reorganized the Army of the Potomac; in the spring of 1862 invaded Virginia, and advanced near to Richmond, but was defeated in a series of battles in July, and compelled to retreat and finally to evacuate the peninsula; after the defeat of General Pope in the second battle of Bull Run, in 1862, which was followed by a Confederate invasion of Maryland, he reorganized the army at Washington, marched rapidly N., met the forces of General Lee at Antietam, and compelled him to recross the Potomac; he followed the Confederates into Virginia, but being opposed to the policy of the extreme war party he was superseded by General Burnside. In 1864 he left the army and was the Democratic candidate for the presidency. He went to Europe in 1865, and, returning in 1868, superintended the construction of the Stevens floating battery. In 1870 he was appointed chief engineer of the department of docks for New York city, which office he subsequently resigned. He was elected governor of New Jersey in 1877. He died in Orange, N. J., Oct. 29, 1885.

McClellan, George Brinton, an American lawyer; son of Gen. George B. McClellan; born in Dresden, Saxony, Nov. 23, 1865; was graduated at Princeton in 1886; engaged in journalism in New York; treasurer of the New York and Brooklyn Bridge Commission in 1889–1892; admitted to the bar in 1892; was president of the Board of Aldermen, New York, in 1893–1894; Democratic Representative in Congress in 1895–1904; and was mayor of New York, Jan. 1, 1903-Dec. 31, 1909.

McClelland, Robert, an American lawyer; born in Franklin co., Pa., in 1807; was graduated at Dickinson College, Pa.; subsequently practised law for a year in Pittsburg, Pa.; in 1833 migrated to Michigan and commenced business in Monroe; in 1835 was elected to the State Legislature; from 1843 to 1849 represented the State in Congress; in 1852 was elected governor of Michigan; in 1835 became Secretary of the Interior. He died Aug. 30, 1880.

McClernand, Edward John, an American military officer; born in Jacksonville, Ill., Dec. 29, 1848; was graduated at the United States Military Academy in 1870; was on duty in the West against the Indians till 1879; took part in the actions at Prior Creek; in the rescue of the survivors of Custer's command after the massacres and in the capture of Chief Joseph and the Nez Perces Indians; was appointed lieutenant-colonel and adjutant-general of volunteers, May 9, 1898; was adjutant-general of the 5th Army Corps and of the Army of Santiago de Cuba from May 28 to October, 1898, and the same for the Department of Matanzas and Santa Clara, Cuba, to Aug. 17, 1899. He was then promoted colonel of the 44th Volunteer Infantry and ordered to the Philippine Islands. He routed the insurgents at Sudlon Mountain, Cebu, Jan. 8, 1900, and was commander of the W. coast of that island till April of the same year; was then given

command of the 2d District in the Department of the Visayas, including the islands of Cebu, Bohol, Mactan, Bantayan, and "The Camotes."

McClernand, John Alexander, an American lawyer; born in Breckenridge co., Ky., May 30, 1812; admitted to the bar in 1832; in same year volunteered against the Sac and Fox Indians; was member of the Illinois Legislature in 1837–1842; and of Congress, 1843–1851; reëlected in 1858. At the commencement of the Civil War he joined the Union forces and was made a Brigadier-General of volunteers. He won distinction at the battle of Fort Donelson, and for his services was promoted Major-General. He also took part in the battle of Belmont and led a division at Shiloh. He relieved Sherman in command of the army before Vicksburg in 1863, and captured Arkansas Post in the same year. He led the 13th Army Corps till July, 1863, and resigned in November, 1864. He was circuit judge for the Sangamon, Ill., district in 1870–1873; chairman of the Democratic Convention in St. Louis in 1876; and later member of the Utah Commission under President Cleveland. He died in Springfield, Ill., Sept. 20, 1900.

MacClintock, Sir Francis Leopold, a British naval officer and Arctic explorer; born in Dundalk, Ireland, in 1819. At an early period of his career, he devoted his attention to the problem of the N. W. passage, and succeeded, in the course of several voyages toward the North Pole, in making many and important discoveries, besides ascertaining the fate of Sir John Franklin. He wrote "Narrative of the Discovery of the Fate of Sir John Franklin and His Companions" (1860). He was commander-in-chief of the North American and West Indian Station in 1879–1882; was created a K. C. B. in 1891.

McClintock, John, an American educator and author; born in Philadelphia, Pa., Oct. 27, 1814; was elected president of Drew Theological Seminary in 1867. He was the author with James Strong of the "Cyclopædia of Biblical, Theological, and Ecclesiastical Literature" (12 vols.); a work of many years' labor, and intended to cover the whole field embraced in the title. The last volume was published in 1895. He wrote also "An Analysis of Watson's Theological Institutes" (1850); "Temporal Power of the Pope" (1853); and "Living Words," a volume of sermons published since his death, in Madison, N. J., March 4, 1870.

McCloskey, John, an American Roman Catholic prelate; born in Brooklyn, N. Y., March 20, 1810. In 1834 he was ordained priest; in 1844 was made coadjutor of the diocese of New York; in 1847 was transferred to the see of Albany; in 1864 was made Archbishop of New York; in 1875 was appointed cardinal-priest. The history of his life is the history of the progress of the Roman Catholic Church in New York. He died in New York city, Oct. 10, 1885.

McClure, Sir Robert John le Mesurier, a British Arctic explorer, the discoverer of the Northwest Passage; born in Wexford, Ireland, Jan. 28, 1807; entered the navy in 1824; served in Back's Arctic expedition in 1836; and Ross's Franklin expedition in 1848. As commander of another Franklin expedition (1850–1854) he passed in a sledge from Barrow Strait, where his ship, the "Investigator," lay, to Melville Sound, connecting with the Arctic Ocean to the W. McClure was rescued by another expedition, made K. C. B., and after serving in Chinese waters, an admiral. He died in London, England, Oct. 17, 1873.

MacColl, Evan, a Canadian poet; born in Kenmore, Argyleshire, Scotland, Sept. 21, 1808. After emigrating to Canada (1850), he wrote many poems, and was called the bard of St. Andrew's Society of Kingston. Among his publications are: "My Rowan Tree," best known of his lyrical verses; "Clarsach Nan Beann, or Poems and Songs in Gaelic" (1837); "The Mountain Minstrel, or Poems and Songs in English" (1887); "Poems and Songs — Chiefly Written in Canada" (1883; 2d ed. 1888). He died July 25, 1898.

MacColl, Malcolm, an English clergyman; born in Inverness-shire, March 27, 1838. He became Canon of Ripon in 1884, and Savoy chaplain, 1894. He published: "Mr. Gladstone and Oxford, by Scrutator" (2d ed. 1865); "Science and Prayer" (4th ed. 1866); "The Reformation in England" (2d ed. 1869); "The Ober-Ammergau Passion Play" (7th ed. 1870); "Lawlessness, Sacerdotalism, and Ritualism" (3d ed. 1875); "Christianity in Relation to Science and Morals" (4th ed. 1889); "Life Here and Hereafter" (1895); etc. He died April 5, 1907.

McConnell, John Ludlum, an American writer; born in Jacksonville, Ill., Nov. 11, 1826. His books, descriptive of Western individuality and growth, include: "Talbot and Vernon" (1850); "Graham, or Youth and Manhood" (1850); "The Glens" (1851); and "Western Characters, or Types of Border Life" (1853). He died in Jacksonville, Ill., Jan. 17, 1862.

McConnelsville, a town and county-seat of Morgan co., O.; on the Muskingum river; 27 miles S. E. of Zanesville. It has

wagon works, sash and door works, salt, tobacco, and flour products, weekly papers, and an assessed property valuation of over $800,000. The town contains an artesian salt well which throws up brine and hydrogen gas. The gas is collected in a holder and led by a pipe under a boiler; the flame caused by the ignition of the gas supplies sufficient heat to evaporate all the salt produced by the well. Pop. (1890) 1,771; (1900) 1,825.

McCook, Alexander McDowell, an American military officer; born in Columbiana co., O., April 22, 1831; was graduated from the United States Military Academy in 1853; fought the Indians in New Mexico in 1852–1857; was in command of the 1st Ohio Volunteers at the battle of Bull Run and was brevetted major; was made Brigadier-General of volunteers in September, 1861, and Major-General in 1862. He made a brilliant record in the famous battles of the Civil War, such as Shiloh, Murfreesboro, Chickamauga, and others; was brevetted Brigadier-General, U. S. A., in 1865. He 1880 he became colonel of the 6th Infantry and subsequently was placed in charge of the military school at Fort Leavenworth; was promoted Brigadier-General, U. S. A., in 1890; Major-General in 1894; and was retired April 22, 1895. He represented the United States at the coronation of the Czar of Russia in 1896; and was a member of the commission appointed to investigate the War Department in the war against Spain, 1898–1899. He died June 12, 1903.

McCook, Daniel, an American military officer; born in Canonsburg, Pa., June 20, 1798; received a collegiate education; settled in Carrollton, O. When the Civil War began he was 63 years old, but entered the Union army as a major of volunteers. He received a fatal wound in trying to check a raid of Gen. John Morgan and died near Buffington's Island, O., July 21, 1863. He had 10 sons in the Union service, viz., Alexander McDowell (*q. v.*), Anson George, Charles Morris, Edward Moody, Edwin Stanton, Daniel, John James, Henry Christopher, Robert Latimer, and Roderick Sheldon.

McCook, Henry Christopher, an American clergyman and naturalist; born in New Lisbon, O., July 3, 1837. He was vice-president of the American Entomological Society, and of the Academy of Natural Sciences of Philadelphia; and author of "The Mound-Making Ants of the Alleghanies" (1877); "The Natural History of the Agricultural Ant of Texas" (1880); "Tenants of an Old Farm" (1884); "The Gospel in Nature" (1887); "American Spiders and Their Spinning-Work" (1888); and "Martial Graves of Our Fellow Heroes in Santiago de Cuba."

McCormick, Cyrus Hall, an American inventor; born in Walnut Grove, W. Va., Feb. 15, 1809. The reaping machine invented by him won him many gold medals and distinctions. He established the Presbyterian Theological Seminary of the Northwest in Chicago, 1859. He died in Chicago, Ill., May 13, 1884.

McCormick, Leander James, an American inventor; born in Walnut Grove, W. Va., Feb. 8, 1819; worked with his father in manufacturing reapers during his early life; settled in Chicago, Ill., in 1848; and there formed a partnership with his brother, Cyrus H. McCormick; was director of the manufacturing department till 1879, when the firm was incorporated as the McCormick Harvesting Machine Company; retired from active business in 1889. He made many improvements in the machine that has brought fame to his family. In 1871 he gave to the University of Virginia an observatory and a 24-inch refracting telescope (see McCormick Observatory). He died in Chicago, Ill., Feb. 20, 1900.

McCormick Observatory, the astronomical station of the University of Virginia, near Charlottesville, Va. The funds for the construction of the observatory were principally the gift of Leander J. McCormick, and it was built in 1883–1884. The principal instrument is an equatorial of 26 inches aperture, a companion instrument to the Washington 26-inch, both being the work of Alvan Clark & Sons, of Cambridgeport, Mass. The position of the observatory is lat. 38° 2′ 1.2″, lon. 5 hours 14 minutes 5.2 seconds W. See McCormick, Leander J.

McCosh, James, a Scotch-American theologian; born in Carskeoch, Ayrshire, Scotland, April 1, 1811. In 1851, having joined the Free Church of Scotland, he became Professor of Logic in the college at Belfast, Ireland. In 1868, at the solicitation of the faculty and trustees of Princeton College, N. J., he came to the United States and became president of that institution. Under his guidance and the influence of his name Princeton advanced to a higher place than ever before among the universities of the United States. He wrote: "Method of the Divine Government" (1850); "Intuitions of the Mind" (1860); "The Supernatural in Relation to the Natural" (1862); "Examination of Mill's Philosophy, etc." (1866); "Christianity and Positivism" (1871); "The Development Theory" (1876); "Psychology" (1887); "Religious Aspects of Evolution" (1888);

etc. He resigned the presidency of Princeton in 1888. He died in Princeton, N. J., Nov. 16, 1894.

McCrackan, William Denison, an American writer; born in Munich, Bavaria, Feb. 12, 1864. He was educated in Germany, at St. Paul's School, Concord, N. H., and Trinity College, Hartford, Conn. He wrote: "Rise of the Swiss Republic"; "Swiss Solutions of American Problems"; "Little Idyls of the Big World"; "The Huntington Letters"; etc.

MacCracken, Henry Mitchell, an American educator; born in Oxford, O., Sept. 28, 1840; was graduated at the Miami University in 1857; studied at the Princeton Theological Seminary and in Europe; was pastor of the First Presbyterian Church, Toledo, O., in 1868–1880; chancellor of Western University, Pittsburg, in 1880–1884; accepted the chair of philosophy and the vice-chancellorship of New York University in the latter year. He was chancellor in 1891-1910. His publications include "Tercentenary of Presbyterianism"; "Kant and Lotze"; "A Metropolitan University"; "Leaders of the Church Universal" (3 vols.); "Lives of Church Leaders: or, Heroes of the Cross" (1900); etc.

McCrary, George Washington, an American lawyer; born near Evansville, Ind., Aug. 29, 1835; was taken to that part of Wisconsin Territory which is now the State of Iowa in 1836; was admitted to the bar in 1856; State senator in 1861–1865; member of Congress in 1868–1870 and 1872–1876; introduced the law under which the judiciary of the United States was reorganized; was Secretary of War in 1876–1879; and was judge of the 8th Judicial District in 1879–1884. He then resigned and settled in Kansas City, Mo., where he became general consulting attorney of the Atchison, Topeka, and Santa Fé Railroad Company. He was the author of "American Law of Elections." He died in St. Joseph, Mo., June 23, 1890.

McCreary, James Bennett, an American lawyer; born in Madison co., Ky., July 8, 1838; was graduated at Center College, Danville, Ky., in 1857, and at the Law School of Cumberland University, Tenn., in 1859; joined the Confederate army in 1862 as major of cavalry; was promoted lieutenant-colonel; member of the Kentucky House of Representatives in 1869, 1871, and 1873; governor of Kentucky in 1875–1879, and member of Congress in 1885–1897. He was a delegate to the International Monetary Conference at Brussels, Belgium, in 1891.

MacCrie, Thomas, a Scotch Presbyterian clergyman and historical writer; born in Duns, Scotland, November, 1772. He was Professor of Divinity at Whitburn, 1817–1827. He wrote "Life of John Knox" (1812, several editions); "Life of Andrew Melville" (2 vols. 1819); "History of the Reformation in Italy" (1827); "History of the Reformation in Spain" (1829); the two last becoming standard works. He died in Edinburgh, Aug. 5, 1835.

McCullagh, Joseph Burbridge, an American journalist; born in Dublin, Ireland, in 1842. He went to the United States in 1853, and went to St. Louis in 1855, where he obtained employment on the "Christian Advocate." On the outbreak of the Civil War he enlisted as lieutenant under Gen. John C. Fremont, but later resigned to become a war correspondent. After the war he was editor successively of "The Enquirer," Cincinnati; "The Republican," Chicago; and "The Democrat," St. Louis. This last paper was consolidated with the "Globe" to form the "Globe-Democrat," and McCullagh became editor-in-chief. Under his charge it became the most influential journal of the Southwest, and one of the leading papers of the land. He died in St. Louis, Mo., Dec. 31, 1896.

McCulloch, Benjamin, an American military officer; born in Rutherford co., Tenn., Nov. 11, 1811; settled in Texas prior to its war for independence; took part in the battle at San Jacinto; and served in the Mexican War as a captain of Rangers. In 1857 he was a commissioner to settle difficulties with the Mormons. At the outbreak of the Civil War he became Brigadier-General in the Confederate army and was killed while leading his command at the battle of Pea Ridge, March 7, 1862.

McCulloch, Horatio, a Scotch landscape painter; born in Glasgow, Scotland, in November, 1806. He painted the Highland landscape with unrivaled truth, breadth, and imagination, among his principal pictures being "Highland Loch," "Loch-an-Eilan," "View in Cadzow Forest," "Dream of the Forest," "Misty Corries," "Deer Forest, Isle of Skye," "Loch Achray," "Mist Rising Off the Mountains," "Kilchurn Castle, Loch Awe," and "Bothwell Castle, on the Clyde." He died in Edinburgh, Scotland, June 24, 1867.

McCulloch, Hugh, an American financier; born in Kennebunk, Me., Dec. 7, 1808; received a collegiate education; settled in Fort Wayne, Ind., in 1833, and practised law there till 1835; and in 1856 became president of the newly established Indiana State Bank. In 1863 he was made comp-

troller of the currency, and in 1865 appointed Secretary of the United States Treasury. Owing to the drain on the National finances during the Civil War the Treasury at this time was in a very precarious condition, but in less than six months after Mr. McCulloch's appointment a large sum of the money due 500,000 soldiers and sailors was paid, other expenses met, and the National debt greatly reduced. His theory, that if the short-time obligations of over $1,000,000,000 could be converted into a funded loan, the United States would be placed on a sound financial basis, proved his sagacity, for in less than two years after the adoption of the plan his prophecies were realized. He was Secretary of the Treasury in 1865–1869 and in 1884–1885. He wrote "Men and Measures of Half a Century." He died near Washington, D. C., May 24, 1895. The revenue cutter "McCulloch," which bore a conspicuous part in the battle of Manila Bay, was named after him.

MacCulloch, John, a Scotch geologist; born in Guernsey, Oct. 6, 1773. He studied medicine at Edinburgh and became assistant surgeon to an artillery regiment. In 1811 he was employed by government in geological and mineralogical researches in Scotland; in 1820 became physician to Prince Leopold of Saxe-Coburg, afterward King of the Belgians; and in the later years of his life was Professor of Chemistry and Geology in the East India Company's military school at Addiscombe. His most important works are a "Description of the Western Islands of Scotland" (1819); "A Geological Classification of Rocks, with Descriptive Synopses" (1821); "A System of Geology, with a Theory of the Earth" (1831); "Malaria" (1827); and "The Remittent and Intermittent Diseases" (1828). He died in Penzance, Cornwall, Aug. 21, 1835.

MacCulloch, John Ramsay, a Scotch political economist; born in Whithorn, Wigtownshire, March 1, 1789. He was Professor of Political Economy at London University (now University College), 1828–1832; editor of the "Scotsman" 1818–1820; and a regular contributor to the "Edinburgh Review." Among the very large number of works he wrote or compiled are: "Principles of Political Economy" (1825), his chief work; "Dictionary of Commerce" (1832); "Statistical Account of the British Empire" (1837); etc. He was a disciple of Adam Smith and Ricardo, and edited the works of both, adding a life of the former to his edition of the "Wealth of Nations." He died in London, Nov. 11, 1864.

MacCullough, John Edward, an American tragedian; born in Coleraine, Ireland, Nov. 2, 1837; came to the United States in 1853; and made his first appearance two years later in Philadelphia. He frequently played with Edwin Forrest, who regarded him as the coming American actor, and who bequeathed to him all his manuscript plays. With Lawrence Barrett he managed the Bush Street Theater in San Francisco, Cal., in 1869. He played in England in 1881, but was not successful. He was at the height of his career when, in 1884, both his mind and body gave way and he died in an insane asylum in Philadelphia, Pa., Nov. 8, 1885.

MacCunn, Hamish, a Scotch composer; born in Greenock, Scotland, March 22, 1868. After study under local teachers, in 1883 he won a scholarship at the Royal College of Music, London, England. In 1888 he was appointed a junior Professor of Harmony at the Royal Academy. He was one of the most successful composers of his day. He published: overtures, etc., "Cior Mhor"; "Land of the Mountain and the Flood," "The Dowie Dens of Yarrow"; "Highland Memories"; dramatic cantatas, etc., "Lord Ullin's Daughter"; "The Cameronian's Dream"; "The Lay of the Last Minstrel"; "The Death of Parcy Reed"; operas, "Jennie Deans" and "Diarmid"; songs about 100; part songs about 20; etc. His special gifts were fertility in melody and a remarkable mastery of the orchestra. His works were distinctly Scottish in character and subject.

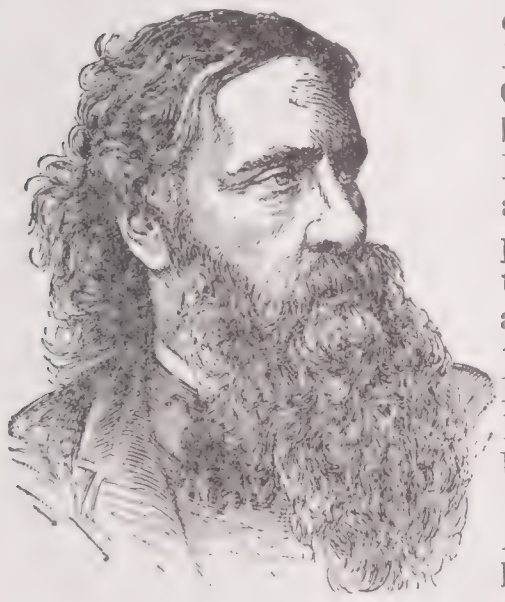
McCurdy, James Frederick, a Canadian Orientalist; born in Chatham, N. B., Feb. 18, 1847; educated at the University of New Brunswick, Princeton Theological Seminary, and the Universities of Göttingen and Leipsic, Germany; Professor of Oriental Languages in University College, Toronto, Ontario (1888). He published: "Aryo-Semitic Speech" (1881); "The Semitic Perfect in Assyrian" in the "Transactions of the Congress of Orientalists" (1883); and various essays on subjects connected with Oriental learning.

Macdonald, Etienne Jacques Joseph Alexandre (mäk-do-näl), **Duc de Tarente,** a Marshal of France; born in Sancerre, Cher, France, Nov. 17, 1765. He served in the French Revolution as colonel, Brigadier-General, and General; was made governor of the Roman States in 1798, and of Naples in 1799; was given the rank of Marshal for his services at Wagram, July 6, 1809. He commanded the left wing in the Russian invasion in 1812; and served in the campaigns of 1813–1814. He died in his château, Courcelles, near Guise, Loire, Sept. 25, 1840.

Macdonald

Macdonald, Flora, a Scotch heroine; born in 1722. After the defeat of the young Pretender, Prince Charles Edward, at Culloden, in April 1746, she risked her own life that she might aid his escape from his pursuers. She had the prince dressed as a woman, and giving him out as her maid-servant, succeeded in conveying him safely to the Isle of Skye, whence, after many wanderings, perils, and hardships, he ultimately escaped to France. Flora was afterward imprisoned for a short time in the Tower of London. She died in Kingsburgh, March 5, 1790.

MacDonald, George, a Scotch novelist and poet; born in Huntley, Aberdeenshire, Scotland, in 1824; educated at King's College and University, Aberdeen, and at Independent College, Highbury, London. He was originally an Independent minister, but became a lay member of the Church of England. He lectured in the United States (1872 – 1873). Among his best known novels are: "David Elginbrod" (1862); "Annals of a Quiet Neighborhood" (1866); "Robert Falconer" (1868); "Wilfrid Cumbermede" (1871); "Weighed and Wanting" (1882); "Lilith" (1895); "Salted with Fire" (1897); etc. He published poems in 1855, 1857, 1864, 1868, and 1882. He died Sept. 18, 1905.



GEORGE MACDONALD.

MacDonald, James Wilson Alexander, an American sculptor; born in Steubenville, O., Aug. 25, 1824. When 16 years old a plaster bust seen by him at Washington, together with his taste for drawing, gave him the desire to become a sculptor. He removed to St. Louis, Mo., in 1844 and there studied art; settled in New York city in 1865. His works include a colossal bronze statue of Edward Bates in Forest Park, St. Louis, Mo.; a colossal head of Washington in Prospect Park, Brooklyn, N. Y.; a statue of Fitz-Greene Halleck in Central Park, New York; equestrian statue of Gen. Nathaniel Lyon; numerous busts; etc. He died Aug. 14, 1908.

Macdonald, Sir John Alexander, a Canadian statesman, the chief organizer of the Dominion; born in Glasgow, Scotland, Jan. 11, 1815. His parents emigrated to Canada when he was five years old and settled in Kingston, where he was educated at the Royal Grammar School. He was called to the bar in 1836, almost immediately made an impression by his vivacious eloquence and self-confidence, and entered political life in 1844 as Conservative member for Kingston in the Legislative Assembly. At that time the two provinces of Upper and Lower Canada were under the legislative union of 1841, and the task of harmonizing the racial and religious differences between the French Roman Catholics of Lower Canada and the Protestant and English-speaking population of Upper Canada was exceedingly difficult. Macdonald at the outset of his political career took an attitude of the broadest toleration for such differences, but was uncompromising in his devotion to British connection and the union of all the British provinces of North America. The rebellion of 1837, during which he was a volunteer, had resulted in responsible government, and opened to him an opportunity for popular leadership according to the practice of British party politics. He had not been long in the Legislative Assembly before his skill in debate and parliamentary tactics compelled attention, and in 1847 he was given a cabinet position in the government of which William Draper was premier. Upon the defeat of this government in 1848, Macdonald went into opposition for six years, during which he distinguished himself by his advocacy of broader and more progressive principles for the Conservative party, aiming so to free it from reactionary Toryism that moderate men of the Liberal party might join it. He was successful, and the character of the change wrought was indicated in the new name, "Liberal-Conservative," which was afterward given to the party when united under his leadership.

In 1854 the Conservatives again obtained power under Sir Allan MacNab. Macdonald became attorney-general, and three years later, premier. The difficulty of conciliating the French of Lower Canada, and the vigorous opposition of George Brown, the Reform leader of Upper Canada (or Canada West), compelled Macdonald to accept office at different times under the nominal leadership of French-Canadian premiers. At the same time several causes tended to force into urgent prominence the question of a federal union of the provinces. Until 1864 there was a succession of brief ministries; but in that year a notable conference was held at Charlottetown, Prince Edward Island, in which the proposed union of Nova Scotia, New Brunswick, and Prince Edward Island was, by Macdonald's initiative and tact, merged in the larger question of the union of all the British American provinces. The conference was adjourned and met at Quebec in the same year; and

the resolutions there passed resulted in the British North America Act of 1867. (See CANADA, CONFEDERATION IN.) Of the new dominion thereby formed Macdonald, who was now knighted, became the first premier, holding office until 1873, when his government was defeated owing to charges of bribery in connection with the contract for building the Canadian Pacific railway. During the ensuing five years of opposition he advocated a policy of protection, and he was returned to power by a large majority in 1878. In 1869 the rights of the Hudson's Bay Company were purchased by the Dominion. In 1870 Manitoba, a province formed out of the newly acquired lands of that company, joined confederation, and was followed by British Columbia in 1872 and Prince Edward Island in 1873. In 1882 a provincial government for the Northwest Territories was organized. In all these measures Macdonald bore the principal part, as well as in the building of the Intercolonial and the Canadian Pacific railways, which, after 1885, connected the provinces from the Atlantic to the Pacific. He was returned to power in three successive general elections after 1878, and was premier at the time of his death. He died at Earnscliffe Hall, near Ottawa, June 6, 1891.

Macdonald, John Sandfield, a Canadian statesman; born in St. Raphaels, Canada, Dec. 12, 1812; was admitted to the bar in 1840, and began practice in Cornwall; became a Conservative member of the Canadian Parliament in 1841, but two years later united with the Independent Reform party; was reëlected in 1848, 1852, and 1854; was solicitor-general in 1849-1851 and premier in 1862-1864; held the same office for the province of Ontario in 1867-1871. He died in Cornwall, Canada, June 1, 1872.

McDonald, Joseph Ewing, an American politician; born in Butler co., Ohio, Aug. 29, 1819. He practiced law in Crawfordsville, Ind., in 1849-51 was a Democratic representative in Congress, and from 1856 to 1860 was attorney-general of Indiana. In 1875-81 he was United States senator. For many years he was one of the most prominent Democrats of the Middle West. He died in Indianapolis, June 21, 1891.

McDonogh, John, an American philanthropist; born in Baltimore, Md., Dec. 29, 1779. He acquired wealth as a merchant in New Orleans, where he settled about 1800; and about 1825 devised a system whereby his slaves received wages for extra labor and were thus enabled to purchase their freedom and emigrate to Liberia. At his death his fortune, amounting after litigation to about $1,400,000, was equally divided between New Orleans and Baltimore, to be applied to public education. He died in McDonoghville, La., Oct. 26, 1850.

McDonough, Thomas, an American naval officer; born in New Castle co., Del., Dec. 23, 1783. In 1814 he commanded a squadron on Lake Champlain, and defeated the British under Commodore George Downie. For this service he was promoted captain and was given a gold medal by Congress. He died at sea, Nov. 16, 1825.

McDougall, Alexander, an American military officer; born on the Island of Islay, Scotland, in 1731; emigrated to America in 1755, settled near New York, and learned the printer's trade. He was colonel of the 1st New York Regiment at the beginning of the Revolution; promoted brigadier-general in August, 1776; was conspicuous for bravery at the battle of White Plains; promoted major-general in 1777; participated in the battle of Germantown; and was later placed in command of the Hudson Highlands; was a member of Congress in 1781; for a short time minister of marine (secretary of the navy); and again in Congress in 1784-1785. He died in New York city, June 8, 1786.

MacDowell, Edward Alexander, an American pianist and composer; born in New York city, Dec. 18, 1861. In 1876-79 he studied at the Paris Conservatory and with Heymann (pianoforte) and Raff (composition) at Frankfort-on-the-Main. In 1881-84 he was head of the piano department of the Darmstadt Conservatory; and in 1884-88 resided at Wiesbaden, devoting himself to composition. He returned to America in 1888 and settled in Boston as a teacher and concert-pianist. From 1896 until his retirement in 1904 he was professor of music in Columbia University. He was also director of the Mendelssohn Glee Club in 1896-98 and president of the American Society of Musicians and Composers in 1897-98. In 1905 ill health compelled him to abandon all work. He was a pianist of distinction and for a time appeared frequently with the Boston Symphony Orchestra and other organizations. But he was better known as one of the most important composers of recent times. Among his works are four symphonic poems for orchestra and two orchestral suites, one of them the "Indian Suite," based on themes from the music of the Sioux; two piano concertos, four sonatas, several groups of pianoforte pieces, and over fifty songs. He died in New York city, Jan. 23, 1908.

McDowell, Irvin, an American military officer; born near Columbus, O., Oct. 15, 1818; was aid-de-camp to General Wool in the Mexican War (1845); commanded the Department of Northeastern Virginia and the defenses of Washington (1861), and the Army of the Potomac at the battle of Bull Run; later commanded the Department of the Pacific (1864); of California (1866); of the East (1868); of

the South (1872). He died in San Francisco, Cal., May 5, 1885.

McDowell, Katharine Sherwood, an American poet; born in Holly Springs, Miss., Feb. 26, 1849. In 1872 she became private secretary to Longfellow. She wrote: "The Radical Club," a poem; "Suwanee River Tales"; "Like Unto Like" (1881); and "Dialect Tales" (1884). She died in Holly Springs, Miss., July 22, 1884.

Macduff, a Scotch hero, thane, or Earl of Fife; commemorated in Shakespeare's play "Macbeth." According to tradition, he was the chief actor in the overthrow of the usurper Macbeth, and in restoring Malcolm Canmore to the throne of Scotland. In consideration of his loyalty he was granted many privileges, among them that of a place of refuge to which he and his descendants could flee in case of committing unpremeditated murder. This sanctuary was in the form of a cross which stood till 1559 in the pass leading to Strathearn. It was destroyed by the Reformers, though the pedestal still remains.

Mace, a currier's mallet with a knobbed face, made by the insertion of pins with egg-shaped heads. It is used in leather dressing to soften and supple the tanned hides and enable them to absorb the oil, etc. It is analogous to the fulling hammer. Also, in old armor, a military implement used for dealing heavy blows, and constructed so as to fracture armor. It was frequently carried by horse-soldiers at the saddle-bow, where it was suspended by a thong which passed through the upper part of the handle; this thong was wound round the wrist to prevent its loss by the force of a blow. It had many forms; a simple iron club, a spiked club, a pointed hammer. In England during the time of the Plantagenets the mace was used in battles and tournaments, and was superseded by the pistol in the time of Elizabeth. The mace is still retained among the Turkish irregular cavalry.

Mace, a spice, the dried aril or covering of the seed of the nutmeg (*Myristica fragrans*), this covering being a fleshy net-like envelope somewhat resembling the husk of a filbert. When fresh it is of a beautiful crimson hue. It is extremely fragrant and aromatic, and is chiefly used in cooking or in pickles.

Mace, Frances Parker Laughton, an American poet; born in Orono, Me., Jan. 15, 1836. She published "Legends, Lyrics, and Sonnets" (1883), and poems entitled "Under Pine and Palm"; her contributions to magazines include: "Israfil," "Easter Morning," and "The Kingdom of a Child." "Only Waiting," a poem, attained great popularity. She died in Los Gatos, Cal., in August, 1899.

Macé, Jean (mä-sā′), a French educator and writer; born in Paris, France, April 22, 1815. He served in the French army, 1842–1845; in 1866 founded a league of instruction in the Belgian manner; was decorated with the Legion of Honor, Feb. 4, 1880; elected senator, Dec. 8, 1883. His best known work is "Contes du Petit-Château" (1862), called in the English translation "Home Fairy Tales." He wrote also: "History of a Mouthful of Bread" (1861); "Servants of the Stomach" (1866); "France Before the Franks" (1881); etc. He died Dec. 13, 1894.

JEAN MACÉ.

Macedo, Joaquim Manoel de (mashā′dō), a Brazilian poet; born in San João d'Itaborahi, June 24, 1820; was Professor of National History in the College of Rio Janeiro. He wrote very successful novels, dramas, and comedies. As a lyric poet he was greatly esteemed. His works include: "Moreninha," a novel (1844; 5th ed., revised, 1877); "O Moço Loura," a novel of the early stages of the Portuguese conquest (1845); "A Nebulosa," a poem (1857); "Cotie," a drama; "Fantasma Branco," a comedy (1856); and "Corógraphia do Brasil" (1873).

Macedo, José Agostinho de, a Portuguese writer; born in Beja, Sept. 11, 1761. Among his works are: "Gama" (1811), an epic; "A Meditaçao" (Meditation: 1813), a poem, his chief work; "Man, or the Limits of Reason" (1815), a philosophical treatise; a number of sarcastic critiques; etc. He died in Pedroucos in 1831.

Macedonia, in ancient geography, a territory lying to the N. of Greece, which first became powerful under its king, Philip, the father of Alexander the Great, and conqueror of Greece. Alexander the Great added immensely to the empire of Macedonia, and made what had only been a petty province mistress of half the world. After his death the empire was divided; dominion was lost over Greece; and the result of the battles of Cynoscephalæ (197 B. C.) and Pydna (168 B. C.) was to reduce the ancient kingdom to a Roman province. Macedonia now forms a part of Turkey in

Europe, and is inhabited by Wallachians, Turks, Greeks, and Albanians. In the Turko-Grecian War in 1897 Thessalonica, the principal port in Macedonia, was made the chief base of supplies for the Turkish army, and a large number of the Turkish troops were stationed at Alossona.

Macedonian, pertaining to, or in any way connected with the teaching of Macedonius; as, the Macedonian heresy. The Macedonians in Church history were a sect which came into existence toward the end of the Arian controversy, taking its name from Macedonius, who became Patriarch of Constantinople in 341. He taught that the Holy Ghost was "subordinate to the Father and to the Son, unlike to them in substance, and a creature." Macedonius, who was a semi-Arian, was deposed by the Arians in 360; and his special tenets were condemned at the Council of Constantinople in 381, where 36 bishops were found to support them. In that council the clause defining the divinity of the Holy Ghost was added to the Nicene Creed. The Macedonians were called also the Pneumatomachi.

Maceo, Antonio (mä-thā'ō), a Cuban patriot; born in Santiago de Cuba in 1843. In the 10-years' rebellion, 1868–1878, he was on the military staff of General Gomez, the Cuban leader. He owned a large plantation in Santiago de Cuba and his family resided there. In 1878 he traveled in Central America, endeavoring to raise an army to invade Cuba and throw off the Spanish domination. In 1886 he urged the Haitian government to assist in the proposed revolt of Cuba, but was obliged to flee from Haiti. In 1890 he was formally banished from Cuban soil by the Spanish government, but at the outbreak of the war of 1895–1898 he returned to Cuba and took command of 7,000 insurgents in his native province, and was thereafter engaged in various battles and skirmishes with the Spanish armies. Early in December, 1896, while attempting to penetrate the Spanish lines with a skirmishing troop, he was killed. He was accounted a brave, intelligent, and sagacious commander. In the course of the Cuban troubles he is said to have been wounded 28 times. A report circulated in the United States that he had been killed under a flag of truce aroused intense excitement, but this was soon shown to be unfounded.

Maceo, José, a Cuban patriot; brother of Antonio Maceo; born in Santiago de Cuba in 1846. He was one of the leading spirits in the insurrection of 1868–1878, and was taken prisoner and sent to Spain. He attempted to escape to Gibraltar, but was captured and sent to the fortress of La Mola at Mahon, in the Balearic Islands; thence he made his escape to Algiers; when the rebellion again broke out in Cuba he returned there, arriving March 31, 1895. In a brief time he raised a large force, with which he defeated the Spaniards at Jobito in May, and again in September at Sao del Indio. He was killed at La Lama del Gato, July 5, 1896.

Macer, one of a number of officers attending the Supreme Courts in Scotland, appointed by the crown. Their duty is to keep silence in the court, and execute the orders of the courts if addressed to them. They hold their office for life and are paid by salary.

Macerata (mä-chā-rä'tä), a walled town of Central Italy, picturesquely perched on an eminence (1,207 feet), 44 miles S. of Ancona; has a cathedral, a beautiful town hall of the 13th century, and manufactures of glass and pottery; the university (1290) in 1898 had 11 teachers and 310 students and auditors. Pop. (1899) 25,-191.

Macfarlane, Charles, a Scotch historian; traveled extensively in the East, and for many years resided in Italy. He wrote: "Our Indian Empire" (1844); "Pictorial History of Scotland" (8 vols. 1849, with G. L. Craik); "Turkey and Its Destiny" (1850); "History of British India" (1852); etc. He died in 1858.

Macfarren, Sir George Alexander, an English composer; born in London, England, March 2, 1813. He was educated at the Royal Academy of Music; became a member of the Board of the Academy, and ultimately chairman and principal; was elected Professor of Music, Cambridge University (1875); and was knighted by the queen in 1883. His chief operas are "The Devil's Opera" (1838); "Don Quixote" (1846); "Robin Hood" (1860). He also essayed the cantata in "Lenore" (1852), and "The Lady of the Lake" (1870); while his oratorios are "St. John the Baptist" (1873); "The Resurrection" (1876); "Joseph" (1877); and "King David" (1883). He also wrote several musical treatises. He died in London, England, Oct. 31, 1887.

McGaffey, Ernest, an American writer of verse; born in Ohio in August, 1861. He was connected with the Chicago press. He published "Poems of Gun and Rod" (1893); "Poems" (1895); "Poems of the Town" (1900); "Sonnets to a Wife" (1901); "Outdoors" (1901).

MacGahan, Barbara, a Russo-American journalist, wife of J. A. MacGahan; born (Yelagena) on her father's estate near Tula, Russia, in April, 1850. She was graduated at the Tula Female Seminary in 1866; was correspondent of numerous important journals in the United States, Russia, etc. Her first novel was written in Russian under the pseudonym "Vlad Kashirin"; she wrote in English one called

"Xenia Repnina." Her articles in American and European periodicals made her widely known. She died Feb. 28, 1904.

MacGahan, Januarius Aloysius, an American war correspondent; born near New Lexington, O., June 12, 1844. He was war correspondent of the New York "Herald" during the Franco-Prussian War (1870–1871); accompanied the Russian expedition against Khiva in 1873, and the Arctic expedition on the "Pandora" in 1875. He wrote: "Campaigning on the Oxus, and the Fall of Khiva" (1874); "Under the Northern Lights" (1876); "Turkish Atrocities in Bulgaria" (1876), which appeared originally during the same year as a famous series of war letters in the London "Daily News." He is regarded by the Bulgarians as the author of their independence. He died in Constantinople, June 9, 1878.

McGee, Thomas D'Arcy, a Canadian journalist; born in Carlingford, Ireland, April 13, 1825; became prominent in the Young Ireland party, and had to make his escape to the United States, where he soon made a name as a journalist. His views then underwent a change; he became an ardent royalist; went to Canada, and entered Parliament in 1857. In 1864 he became president of the executive council, and till near his death took a prominent part in the measures of the day. Obnoxious to the Fenians, he was assassinated by a member of that body in Ottawa, Canada, April 7, 1868.

McGiffen, Philo Norton, an American-Chinese naval officer; born in Pennsylvania, in 1863; was graduated at the United States Naval Academy in 1882; was sent to the China Station; resigned from the United States navy on the outbreak of war between France and China, and entered the service of the latter. He was placed in charge of the principal Chinese naval academy, and became a trusted companion of Admiral Ting, Li Hung Chang, and other Chinese officials. When the war broke out between Japan and China he was given command of the "Chen Yuen," the sister ship of the Chinese flagship. He was the first man of American or European blood who ever commanded a modern warship in battle; and his heroic conduct in the terrible fight on the Yalu, on Sept. 17, 1894, deserves a conspicuous place in history. Though fearfully wounded he followed the example of another American naval hero of a former generation — he never gave up the ship. He was so near the first gun when it exploded that his clothing was set on fire, his eyebrows and hair burned, his eyes injured, and though his ears were stuffed as tightly as possible with cotton, the drums of both ears were permanently injured by the explosion. He was unconscious for a time, but as soon as he regained his senses was on his feet giving orders. He received 40 wounds, many of them caused by splinters of wood; with his own hands he extracted a large splinter from his hip, and holding his eyelids open with his finger, he navigated his ship, which had been struck 400 times, safely to its dock, skillfully evading capture. The "Chen Yuen" was the only one of the Chinese vessels that came out of the fight with credit. In that dreadful battle McGiffen's nerves, limbs, and senses were shattered. He soon afterward returned to New York city, and while undergoing treatment in a hospital shot himself fatally, Feb. 11, 1897.

McGiffert, Arthur Cushman, an American theologian; born in Sanquoit, N. Y., March 4, 1861; was graduated at Western Reserve College in 1882 and at the Union Theological Seminary in 1885; studied abroad till 1888; was instructor in Church history at Lane Theological Seminary in 1888–1890; professor of that branch in 1890–1893; then accepted the chair of Church history at the Union Theological Seminary. Charges of heresy having been preferred against him, on which, however, he was never brought to trial, though he had positively refused to change his views, he withdrew from the Presbyterian Church in March, 1900. He was the author of "Dialogue Between a Christian and a Jew" (1888); "A History of Christianity in the Apostolic Age" (1897); etc.

McGill, Alexander Taggart, an American theologian; born in Canonsburg, Pa., Feb. 24, 1807; studied law in the office of Gen. George McCullough, in Milledgeville, Ga.; surveyed the boundary line between Georgia and Alabama through the Cherokee Indian lands; then prepared himself for the Church. In 1848 he was elected moderator of the General Assembly, and was then the youngest moderator in the Presbyterian Church. In 1853 he was elected professor in the Columbia (S. C.) Theological Seminary, and in 1854 was appointed Professor of Homiletical and Pastoral Theology at the Theological Seminary, Princeton, N. J. He died in Princeton, N. J., Jan. 13, 1889.

McGill, James, a Canadian philanthropist; born in Glasgow, Scotland, Oct. 6, 1744. He emigrated to Canada before the American Revolution, engaged for some time in the Northwest fur trade, and, subsequently settling in **Montreal,** became a successful merchant there. He was for many years a member of the Lower Canada Assembly, and subsequently a member of the legislative and executive councils. He was noted for philanthropy. He bequeathed to the college in Montreal that bears his name property valued even at that time at

$120,000. He died in Montreal, Canada, Dec. 19, 1813.

MacGillivray, William, a Scotch naturalist; born in Old Aberdeen, Jan. 25, 1796. He was Professor of Natural History in Marischal College, Aberdeen, 1841–1852. His principal work was a "History of British Birds" (5 vols. 1837–1852). He wrote also "Lives of Eminent Zoölogists" (1834), etc. He died in Aberdeen, Sept. 4, 1852.

Macgillycuddy Reeks, a group of rugged mountains in Ireland, in County Kerry, rising from the W. shores of the Lakes of Killarney, and covering an area of 28 square miles. Carran-Tual, the loftiest peak, not only of the Reeks, but in all Ireland, is 3,414 feet in height. Caper, the next in altitude, reaches 3,200 feet, and there are several others which exceed 2,500 feet.

McGill University, an educational institution in Montreal, Canada, founded by John McGill in 1811. By his will he left the estate of Burnside, near Montreal, consisting of 47 acres of land, and the Manor House, and £10,000 to the "Royal Institution for the Advancement of Learning," incorporated, to establish a university in Lower Canada. The McGill bequest, which was estimated at the time to be worth $120,000, was conditional on one of the colleges of the university being known in perpetuity as McGill College. The university has since been enriched by many generous benefactors, and notably by Lord Strathcona and Mount Royal, and Sir William C. Macdonald. The Royal Victoria College for Women erected and endowed by Lord Strathcona and Mount Royal, is a residential college for the higher education of women, and is only one of many liberal gifts to the university by the donor. Among Sir William Macdonald's contributions are the Macdonald Engineering Building, the Macdonald Chemistry and Mining Building, and the Macdonald Physics Building, all thoroughly equipped and endowed. Sir William also endowed the Law Faculty with $200,000. The Peter Redpath Museum and the University Library are the gifts of Peter Redpath. The supreme authority of the university is vested in the crown and exercised by the Governor-General of Canada as visitor. There are five faculties, Arts, Applied Science, Law, Medicine, and Comparative Medicine and Veterinary Science. In its religious character McGill University is Protestant, but not denominational. There are, however, five applied theological colleges with buildings adjoining the university grounds. In the university year 1901–1902 there were 1,222 students enrolled. HENRY DALBY.

McGlynn, Edward, an American Roman Catholic clergyman; born in New York city, Sept. 27, 1837. For 28 years he was pastor of St. Stephen's Church in New York city, and greatly endeared himself to his flock. In the mayoralty campaign of 1886 he took sides with Henry George, and worked for him with tongue and pen. For this he was condemned by his ecclesiastical superiors, and, on being summoned to Rome by the Propaganda, he refused to submit, whereupon he was deposed from his pastorate by Archbishop Corrigan, in January, 1887, and, still refusing to go to Rome, was excommunicated by the Pope. He afterward made submission and was readmitted to the Church. He died in Newburg, N. Y., Jan. 7, 1900. See SINGLE TAX.

McGraw, John, an American merchant; born in Dryden, N. Y., May 22, 1815; was a poor boy, but became very successful in the lumber business in Wisconsin, Iowa, and Michigan; was a member of the first board of trustees of Cornell University, and gave $150,000 to erect the McGraw building for the museum and library of the university. He died in Ithaca, N. Y., May 4, 1877. His daughter, JENNIE, married Prof. Daniel Willard Fiske, of Cornell, and bequeathed $1,000,000 to the university. Professor Fiske contested his wife's will on the ground that the act of the Legislature incorporating the university limited the funds it could hold and that his wife's gift of $1,000,000 would carry the funds beyond the legal limit. The case excited much interest in legal and educational circles and was decided in favor of the contestant, who subsequently made the university a handsome gift of money.

MacGregor, John, an English traveler; born in Gravesend, England, Jan. 24, 1825; was called to the bar in 1851; was captain of the Royal Canoe Club (1866); and wrote: "The Rob Roy on the Baltic" (new ed. 1872–1879); "The Voyage Alone in the Rob Roy" (4th ed. 1880); "The Rob Roy on the Jordan" (new ed. 1880); "A Thousand Miles in the Rob Roy" (13th ed. 1884); etc. He died in Boscombe, near Bournemouth, England, July 16, 1892.

Mácha, Karel Hynek (mä′kä), a Bohemian poet; born in Prague, Nov. 15, 1810. His chief work was a lyrico-epic poem, "Máj" (May, 1836), containing a strain of Byronic pessimism. He wrote also short lyrics and stories, including "Cikáni" (The Gipsies: 1857). His merit was recognized only after his death. His complete works were published in 1862, a German translation appearing in the same year. He died in Litomerice, Nov. 7, 1836.

Machairodus (-kī′-), saber-toothed tiger, a genus of *Felidæ*, having the upper

canines extraordinarily developed, trenchant, and saber-shaped, with serrated margins. In it the organization reaches the highest power of destruction. Range in space through India, the continent of Europe, Great Britain, and North and South America. Range in time from the Miocene to the close of the Upper Miocene period.

Machalath (ma'ka-), or **Mahalath,** a word that occurs in the title of Psalms liii. and lxxxviii.; the former is inscribed to the "chief musician upon Mahalath," the latter to the "chief musician upon Mahalath Leannoth." Mahalath is by some authors traced (like Machol) to a root meaning pierced or bored; hence it is thought these Psalms were accompanied by flutes. It is generally thought that the term leannoth refers to antiphonal singing. Other writers consider the titles of these and several other Psalms to be a reference to well-known tunes to which they were to be sung.

McHenry, Fort, a fortification at the entrance of Baltimore harbor, which was unsuccessfully bombarded by the British fleet in 1814. It was at this time that "The Star-Spangled Banner" was written by Francis Scott Key, an American citizen, who was detained on board a British vessel and witnessed the bombardment. See KEY, FRANCIS S.

McHenry, James, an American novelist; born in Larne, County Antrim, Ireland, Dec. 20, 1785. He came to the United States in 1817, and settled in Philadelphia in 1824. Included in his many publications are: "The Pleasures of Friendship," a poem (1822); "The Usurper: An Historical Tragedy" (a poetical work); also "O'Halloran, or the Insurgent: A Romance of the Irish Rebellion," reprinted at Glasgow; "The Wilderness of Braddock's Times: A Tale of the West" (2 vols. 1823); and "The Betrothed of Wyoming" (2d ed. 1830). He died in Larne, Ireland, July 21, 1845.

Machete (mä-chā'tā), a cutlass-like tool or weapon, half knife, half cleaver, used either as a tool or a weapon in Cuba and other countries of tropical America.

Machina, Deus ex, a phrase used to describe the intervention of a god in the classical drama and epic poetry; in modern literature the unexpected introduction of some important personage, or the occurrence of some improbable event to enable a dramatist or novelist to escape from an awkward situation. The allusion is to the *machina,* a machine by which gods and heroes were represented passing through or floating in the air. Nineteenth century experience has failed to improve on the rule for the introduction of supernatural beings which Horace laid down 2,000 years ago.

Machine Gun, a piece of ordnance of small caliber which can deliver a number of projectiles, either simultaneously or in rapid succession. An early form was the *orgue de bombardes* or *ribaudequin,* in which there were a number of barrels fixed on a carriage. In the Arms Museum in Berlin, there are various examples of machine guns, some dating back to the beginning of the 17th century. One of these contains 64 barrels. Shortly after 1861 the "Requa battery" was constructed, by which 31 barrels could be fired simultaneously. A specimen of a similar machine gun has been in the Rotunda, Woolwich, England, since 1830. The French used the "mitrailleuse" in 1870-71 against the Germans, this being the first machine gun employed successfully in actual warfare. It had 37 rifle barrels, which were loaded simultaneously by a metal frame containing cartridges. One well-known form of machine gun is the Gatling. A Gatling gun has 10 barrels, which are arranged in a circle and revolve, and 10 locks, which not only revolve with the barrels, but have a backward and forward motion of their own, effected by a cam actuated by the turning of a crank handle. The forward motion loads, closes the breech, and fires; the backward motion extracts and expels the fired cartridge. From these 10 barrels 1,632 rounds have been fired in 84 seconds. The Gardner and Nordenfeldt machine guns have two or more barrels fixed horizontally. The loading, firing, and extracting mechanism is moved forward and backward by a crank, worked by the hand. The cartridges for these semi-automatic guns lie in columns one above the other in vertical feeders, and drop one by one into the loading mechanism, which pushes them forward into the barrel. Machine guns can fire cartridges and bullets identical with those for small arms. Indeed, it was not until the metallic cartridges were perfected for small arms that machine guns became entirely practicable and effective.

In the South African war the Boers used Maxim guns throwing 1¼ pound shells, with bursting charge and percussion fuse, at the rate of 60 per minute, and afterward the British followed their example. The "pom-poms," as the Maxims are familiarly called, entrenched somewhat upon the sphere of the field gun in their tactical employment. In the Maxim gun the cartridges are carried on a web bandolier, and the automatic feed mechanism draws out the cartridges one by one, putting them in a line with the barrel ready for insertion. This automatic action secures a continuous fire as long as the cartridges are supplied.

This is also the case with another machine gun, the Colt gun. In the Maxim, Colt and Hotchkiss guns all the operations of opening and closing the breech, supplying the car-

tridges, loading, cocking the lock, firing, and ejecting the empty cartridge, are done automatically—(1) in the Maxim by utilizing the force of recoil; (2) in the Colt by tapping off a portion of the powder gas and allowing it to act by an intermediate lever on the breech mechanism; (3) in the Hotchkiss by means of the powder gas, which operates the breech mechanism through a piston in a cylinder beneath the barrel.

In all machine guns the extracting mechanism must be so adjusted that no motion begins to extract the cartridge in the barrel till all the powder is ignited. In the Maxim gun the barrel and lock recoil together about one inch before extraction commences, when the lock separates from the barrel, leaving a space to be filled, first by the empty cartridge, and then by the fresh one. The recoiling lock frame has a crank fitted with a projecting arm and a fusee, to which a chain is attached. A fusee or spiral spring is fixed at its fore end to the non-recoiling breech casing, its rear end being connected with the recoiling crank and fusee. The explosion causes the barrel and lock to move backward through one inch, then the barrel stops, and springs press it forward. During the recoil the arm of the crank, striking a fixed resistance piece, is rotated; thus the greatest portion of the energy of recoil is transferred to the crank. The spiral fusee spring is not only extended one inch, but the rotation of the crank winding the chain on the fusee causes a further extension. When the force of recoil is expended, the stored-up energy of the fusee spring carries the lock forward, the unwinding of the fusee giving it an accelerating motion, in order to catch up the barrel, and the fresh cartridge is forced into the barrel and fired. Round the barrel is a casing containing water to keep it cool. About 450 rounds a minute can be fired with the Maxim or Colt.

The barrel of the Colt gun is fixed. At the muzzle a small hole is bored radially; when the bullet passes this hole, the gas can rush through and act on a piston actuating a lever, which puts in motion the whole breech mechanism. When the energy imparted by the gas is exhausted, the mechanism comes back into its original place by utilizing the stored energy of springs. The mere enumeration of the component parts in the accompanying plate gives a general idea of the action. There is no water jacket; the barrel, since it does not recoil, can be made fairly heavy and therefore thick, and thus it does not get so hot. It may be safely predicted that inventors will succeed in applying automatic mechanism to guns of a larger caliber, and so eventually the distinction between machine guns and quick firers will cease. But any considerable increase in the caliber of machine guns would, in the field, lead to difficulties of checking recoil—at present forming an obstacle to the use of quick firers in the field.

Comparing a machine gun with a field gun, the .303-inch Maxim practically fires less than 400 bullets per minute at a maximum range of 2,500 yards—the 15-pounder shrapnel, containing 212 bullets, can be fired at a maximum range of 6,000 yards, at a rate of six rounds a minute, or 1,272 bullets per minute. Even with the "pom-pom" 1½-pounder it is practically useless to attempt a time shrapnel, as the weight of the time fuse itself as made at present is more than three-quarters of a pound. Besides shrapnel, the 15-pounder can fire common shell filled with a fair amount of high explosive; hence the field gun is more adapted for general purposes. Shrapnel keeps down the enemy's fire during the infantry attack, which task a long-range gun, out of reach of rifle fire, can better perform than short-range machine guns, whose specialty is the raining of a torrent of bullets on a spot where the enemy may be thick. Machine guns will thus have only a special employment. There is an undue tendency to seek in the failures of war the germs of future success. The successes of mounted infantry and heavy guns, both of long-reaching action, were the prominent facts of the South African War. Machine guns were very largely used by both Russians and Japanese in the siege of Port Arthur. For an account of other firearms see GUN; REVOLVER; RIFLE.

E. L. ZALINSKI.

Machol (-kōl′), or **Mahhol** (-hol′) an Old Testament word generally rendered in the English version by "dances" or "dancing;" by some authorities traced to a root meaning "pierced" or "bored," and therefore considered to have been a flute.

Mack von Leiberich, Karl, Baron, an Austrian military officer; born in Nennslingen, Franconia, Aug. 24, 1752. He entered the military service of Austria in 1770, and after fighting in the Turkish War and against the French Republican armies, was in 1797 created Field-Marshal. Having, after the peace of Campo Formio, been appointed by the King of Naples to the command of his troops, he took the field against the French and occupied Rome; but he was unable to retain his hold of the city. A riot in the city of Naples, caused by his having concluded an armistice with the French, compelled him to seek safety in the enemy's camp. He was thereupon carried prisoner to Paris, but escaped in 1800. Five years later the Emperor put him at the head of 80,000 men, and sent him to check the French advance along the line of the Iller. But the enemy outmaneuvered

him, and shut him up in Ulm, and on Oct. 17 Mack capitulated with his army. He was tried by court-martial and condemned to death, but the sentence was commuted by the emperor to expulsion from the army and 20 years' imprisonment. In 1808 Mack was liberated, and in 1819 fully pardoned. He died in St. Pölten, Austria, Oct. 22, 182z.

Mackay, Charles, a Scotch journalist; born in Perth, March 27, 1814; was editor of the "Illustrated London News," 1852-1869, lectured in the United States in 1857-1858, and was special correspondent of the London "Times" in New York during the Civil War. He wrote: "The Salamandrine, or Love and Immortality" (1842); "Voices from the Crowd" (1846); "Voices from the Mountains" (1847); "History of the Mormons" (1851); etc. He died in London, Dec. 24, 1889.

Mackay, John William, an American capitalist; born in Dublin, Ireland, Nov. 28, 1831. After a miner's life in California, in 1860, he went to Nevada. In 1872 he was one of the discoverers of the Bonanza mines, of which he owned two-fifths. Their production has been enormous. In 1884, in partnership with James Gordon Bennett, he laid two cables across the Atlantic. He died in London, July 20, 1902.

McKean, Thomas, an American philanthropist; born in Philadelphia, Pa., Nov. 23, 1842; was graduated at the University of Pennsylvania in 1862 and began a successful career in business, becoming an officer in many railroad and financial corporations. He accumulated a large fortune and was a liberal benefactor of educational and charitable enterprises. His various gifts to the University of Pennsylvania alone aggregated $300,000. He died in Philadelphia, Pa., March 16, 1898.

McKeesport, a city in Allegheny co., Pa., at the confluence of the Monongahela and Youghiogheny rivers, and on the Pittsburg and Lake Erie and the Baltimore and Ohio railroads; 15 miles S. of Pittsburg. It is in the center of the great bituminous coal and natural gas region of the State; contains a hospital, business college, public library, electric light and street railroad plants, daily and weekly papers, National banks, and about 30 churches; and has tubing and wrought iron pipe works, manufactories of sheet iron, glass, lumber, and bicycles, a large trade in coal and lumber, and an assessed property valuation of over $15,500,000. Pop. (1890) 20,741; (1900) 34,227; (1906, Fed. est.) 43,438; (1910) 42,694.

McKenna, Joseph, an American jurist; born in Philadelphia, Pa., Aug. 10, 1843; removed to Benicia, Cal., with his parents and received an academic education; studied law and was admitted to the bar in 1865; served two terms as district attorney for Solano county; a member of the California legislature in 1875-1876; United States circuit judge in 1893-1897; Attorney-General of the United States from March, 1897, to January, 1898; and then was appointed an associate justice of the United States Supreme Court.

Mackenzie, a district of the Northwest Territories (*q. v.*), Dominion of Canada, bounded on the N. by the Arctic Ocean; on the S. by the provinces of British Columbia, Alberta, Saskatchewan, and the district of Keewatin; on the E. by Keewatin; and on the W. by the Yukon Territory. It is the largest political division of Canada, having a total area of 562,182 square miles, of which 29,548 square miles are under water. Its physical features partake of the general character of the interior continental plain, being a continuation northward of the latter, but more broken and hilly, and better watered, especially having a greater number of lakes than the southern portion of the plain. The district is well forested in the valley of the Mackenzie river and on the mountain slopes of the west. The chief varieties of trees are the spruce, pine, tamarack, birch, and aspen poplar. The larger portion of the east is a sterile waste. The two largest lakes are Great Bear and Great Slave; among the smaller are Doobaunt, Aylmer, Golden, Mackay, Gras, Point, Rum, La Martre, and Willow. The leading rivers are the Mackenzie, Coppermine, and Great Fish or Back. The industrial and commercial value of the district is comparatively small, the chief industry being the fur trade of the Hudson's Bay Company. The climate is unfavorable to agriculture. The summers are short and warm, while the long, very cold winters prevent the growing of cereals and root crops except in a few small areas in the S. Coal, salt, and other minerals are found. In 1905 the Dominion Parliament formed the provinces of Alberta and Saskatchewan out of the four provisional districts of Alberta, Athabasca, Assiniboia, and Saskatchewan, and this necessitated a readjustment of the Northwest Territories lines, which now include Mackenzie, Franklin, and Ungava districts, and other territories not included in any province or within the boundaries of the Yukon Territory. Pop. (1901) 5,216, chiefly Eskimo Indians.

Mackenzie, Sir Alexander, a Canadian explorer; born in Inverness, Scotland, in 1755. In the employment of the Northwest Fur Company he explored the great river named after him from the W. end of Great Slave Lake to the Arctic Ocean (1789). He made another expedition to the W. coast (1792), and was the first white man to cross the Rocky Mountains and reach the Pacific coast. He returned to Great Britain in 1801, and was knighted.

He died in Mulnain, near Dunkeld, Scotland, March 11, 1820.

Mackenzie, Alexander, a Canadian statesman; born in Logierait, Perthshire, Scotland, Jan. 28, 1822; removed to Canada in 1842, and worked for some time as a mason, subsequently becoming a builder and contractor; in 1852 became editor of a Reform newspaper; represented Lambton in Parliament 1861–1867, and in the Dominion Parliament till 1882; was then elected for East York, and was reëlected in 1887; from 1867 led the Reform opposition in Parliament, and in 1873–1880 was leader of the Liberal party in Canada. In 1873 he succeeded Macdonald as premier, and remained at the head of the government till 1878. Mr. Mackenzie thrice declined the honor of knighthood. He published the "Life and Speeches of Hon. George Brown" (1882). He died in Toronto, Canada, April 17, 1892.

Mackenzie, Sir Alexander Campbell, a Scotch composer; born in Edinburgh, Scotland, in 1847. He studied music in Germany and at the Royal Academy, London; 1865–1879 was engaged in Edinburgh as teacher, violinist, conductor, and composer; afterward resided in Italy, devoting his energy mainly to composition; in 1886 had the degree of Mus. Doc. from St. Andrews University; in February, 1887, was appointed principal of the Royal Academy of Music in London; was knighted in 1895. His works embrace almost every form of music, including the operas "Colomba" (1883); and "The Troubadour"; the oratorios "The Rose of Sharon" (1884, regarded as his best work), and "The Lord of Life" (1891); "Cotter's Saturday Night"; "Scottish Rhapsodies"; "La Belle Dame Sans Merci"; several important cantatas; various orchestral works, a concerto and a pibroch for violin; chamber music, songs, pianoforte and organ pieces, etc. He was also eminent as a conductor.

Mackenzie, Alexander Slidell, an American naval officer; born in New York, April 6, 1803. He was a brother of John Slidell, the Confederate commissioner—"Mackenzie" being assumed later. He published "A Year in Spain, by a Young American" (2 vols. 1829–1831; enlarged ed., 3 vols. 1836), which attained great popularity in England and the United States. Washington Irving commended it highly. He also wrote: "Popular Essays on Naval Subjects" (2 vols. 1833); "The American in England" (2 vols. 1835). He died in Tarrytown, N. Y., Sept. 13, 1848.

Mackenzie, Sir George, a Scotch lawyer; born in Dundee, Scotland, in 1636; became king's advocate in 1677, in which capacity his persistent severity toward the covenanters acquired for him the title of "the bloody Mackenzie." The revolution terminated his political career. Besides his "Vindication of the Government of Charles II.," he wrote "Institutions of the Law of Scotland" (1684); "Laws and Customs in Matters Criminal" (1674); and in his "Memoirs" he gives an interesting account of Scotland before the revolution. Sir George Mackenzie was founder of the Advocates' Library in Edinburgh (1682). He died in London, England, in 1691.

Mackenzie

Mackenzie, Henry, a Scotch author; born in Edinburgh, Scotland, in August, 1745. In 1771 he published the work by which he is best known, "The Man of Feeling"; in 1773 "The Man of the World"; and in 1777 "Julia de Roubigné." These novels were very popular in their day. In 1779–1780 he edited "The Mirror," and from 1785 to 1787 he conducted "The Lounger," both being the kind of periodical made familiar by Addison's "Spectator." Besides several dramatic pieces he wrote the "Lives" of Dr. Blacklock, John Home, Lord Abercromby, and William Tytler. In 1804 he was appointed comptroller of the taxes for Scotland. He died in Edinburgh, Scotland, Jan. 14, 1831.

Mackenzie, Sir Morell, a Scotch physician; born in Leytonstone, July 7, 1837; was educated at London Medical College, Paris and Vienna; obtained the Jackson prize for diseases of the larynx; became physician to the London Hospital, and lecturer on diseases of the throat. In 1887–1888 he was associated with the specialists of Berlin and Vienna in the treatment of the larynx disease of the Emperor Frederick (at first, while he was Crown Prince) of Germany. He was the author of a treatise on "Diseases of the Throat and Nose," etc. He died in London, Feb. 3, 1892.

Mackenzie, Robert Shelton, an American writer; born in Drews Court, County Limerick, Ireland, June 22, 1809. He went to the United States in 1852. He wrote: "Lays of Palestine" (1828); "Titian: A Venetian Art-Novel"; "Life of Guizot" (1846); "Life of Charles Dickens" (1870); and "Sir Walter Scott: The Story of his Life" (1871). He also edited the "Noctes Ambrosianæ" (5 vols. 1854). He died in Philadelphia, Pa., Nov. 30, 1880.

Mackenzie, William Lyon, a Canadian journalist; born in Dundee, Scotland, March 12, 1795; emigrated to Canada in 1820; and in 1824 established the "Colonial Advocate," first at Queenstown, then at Toronto. There his denunciations of the officials resulted in the partial destruction of his printing office in 1826. In 1828 he was elected to the provincial Parliament for York, but was expelled for libel on the Assembly, and was successively expelled and reëlected till finally the government refused to issue the writ. In 1832 he went

to London with a petition of grievances from the Reformers of Canada, and while there secured the dismissal from office of the Attorney-General and Solicitor-General of Upper Canada. In 1834 he was elected the first mayor of Toronto, and in 1836 he started the "Constitution," in which he attacked Sir Francis Head, the lieutenant-governor, for interference with the elections. In 1837 he published a virtual declaration of independence in his paper, headed a band of armed insurgents, and demanded of the lieutenant-governor a settlement of all provincial difficulties by a convention. This demand not having been granted, Mackenzie determined to arrest the lieutenant-governor and capture the military stores in Toronto; but being met by a superior force at Montgomery's Hill, 4 miles from the city, the insurgents were put to flight after a brief skirmish in which several were killed. Mackenzie and others effected their escape and took possession of Navy Island in the Niagara river, where he established a provisional government. He was soon, however, compelled to break up his camp, and was afterward sentenced by the United States authorities to 12 months' imprisonment in Rochester, N. Y. On the proclamation of amnesty in 1849 he returned to Canada, and was a member of Parliament from 1850 till 1858. Reforms more radical than those he contended for have since been granted. He died in Toronto, Aug. 28, 1861.

McKinley, William, an American statesman, 24th President of the United States; born in Niles, O., Jan. 29, 1843. He was educated at the public schools, and at the Poland, O., Academy. In May, 1861, he volunteered for the army, and entered the 23d Ohio Infantry as a private. He served four years, rising by merit and faithfulness to the captaincy of his company, and to the rank of major when mustered out in 1865. He at once began the study of law; in 1867 was admitted to the bar, and commenced practice at Canton, O., where he afterward had his residence. In 1869 he was elected prosecuting attorney for Stark county, where his success attracted local attention. Entering politics, he was elected to Congress in 1876, and was reëlected for six successive terms. In 1882 his election was contested, and he was unseated, but triumphantly returned at the next election. His reputation in Congress rests chiefly on a tariff bill that bears his name. It was drawn by him as chairman of the Ways and Means Committee, and passed by the 51st Congress. This bill and his able advocacy of it before the House distinguished him as the leader of the Republican party, on the tariff question. The Republican party went before the country in 1892 almost solely on the issue raised

by the McKinley tariff, but a reaction against it had set in, and Mr. Cleveland was elected. Meanwhile McKinley failed of reëlection in his district, though largely reducing the adverse plurality created by a redistricting that changed the limits of the district. In 1891 he was elected governor of Ohio by a large plurality over former Governor James E. Campbell, a very popular Democrat, and reëlected in 1893 in the reactionary tidal wave of politics following a contrary tariff policy, that carried the Republican party back to power in Congress, having a plurality of over 80,000. By this time his name was frequently mentioned as a future candidate for the presidency. In 1895 a systematic canvass in McKinley's behalf was instituted by his supporters which was continued till the election of 1896. These sagacious and well-timed efforts, with the general acceptability of McKinley in the Republican party

WILLIAM McKINLEY.

ranks, made it certain long before the convention met that he would be the candidate. Meanwhile the issue of protection, for which he had always stood, had been largely relegated to a place of subordinate importance, and the question of the free coinage of silver had arisen to engross almost completely the public mind. On this question McKinley's utterances had been either unfavorable to the sentiments voiced by the convention, or somewhat uncertain. Led by Thomas C. Platt, of New York, and Henry C. Lodge, of Massachusetts, the convention made an unequivocal declaration against free coinage without international agreement. This platform McKinley adopted, and the campaign was fought on this issue. He was elected by a plurality of 603,514, and an electoral majority of 95, after a campaign of more intense interest than was displayed in any election since the Civil War.

President McKinley's first term is memorable chiefly for the occurrence of the American-Spanish War and its unexpected

results (see CUBA). That his policy during 1896–1900 was acceptable was shown by his unanimous renomination and reëlection in 1900 by a plurality of 849,000 and an electoral majority of 137. His second term began most auspiciously, but he was not destined to see much of it. On Sept. 5, 1901, he visited the Pan-American Exposition in Buffalo, N. Y., that day having been set apart in his honor and called the "President's Day." On the afternoon of the following day, while holding a public reception in the Temple of Music, he was shot twice by Leon F. Czolgosz, an anarchist, who was at once arrested. The wounded President was first taken to the Emergency Hospital on the exposition grounds for immediate treatment, and then removed to the residence of John N. Milburn, the president of the exposition. Hopes of his recovery were entertained for several days, but on Sept. 13 he began to sink rapidly and died at 2.15 A. M., Sept. 14. His remains were removed to Washington on Sept. 16, laid in state in the Capitol on the 17th, and taken to his home city, Canton, O., where they were interred on the 18th amid universal mourning. The assassin was placed on trial in Buffalo, N. Y., on Sept. 23, and found guilty of murder in the first degree on Sept. 24, in a trial lasting less than nine hours and covering a period of two days. On Sept. 28 he was sentenced to death, and on Oct. 29 the sentence was carried out.

McKinley Act, a tariff bill reported to Congress May 21, 1890, by the Ways and Means Committee of the House of Representatives, of which William McKinley was chairman. It became a law in October, 1890, and was repealed in 1894. It raised the duties on wool, woolen manufactures, on tin-plate, barley, and some other agricultural products, and remitted the duty on raw sugar. The reciprocity feature was an important part of the bill, this providing for the remission of duty on certain products from those countries which should remove duties on American imported products.

Mackintosh, Sir James, a Scotch philosopher; born in Aldourie, Invernessshire, Scotland, Oct. 24, 1765. He was recorder of Bombay, India, 1804–1806; judge of admiralty, 1806–1811; member of Parliament, 1813; Professor of Law and Politics at Haileybury College, 1818–1824; Commissioner of Indian Affairs, 1830. He wrote: "Dissertation on the Progress of Ethical Philosophy" (1830), in the "Encyclopædia Britannica"; "History of England" (1830); "Life of Sir Thomas Moore"; etc. Much of his philosophical writing is to be found in "Modern British Essayists." ("Works," 3 vols. 1836.) He died in London, England, May 30, 1832.

Mackenzie River, in North America, a stream having its origin, as the Athabasca, in a Rocky Mountain lake in British Columbia, flowing over 600 miles to Lake Athabasca, and 240 as the Slave river to Great Slave Lake, where it assumes the name of Mackenzie river, conveying the waters of the Great Slave Lake to the Arctic Ocean at Mackenzie Bay, after a final course of 1,045 miles, making a total river-system of nearly 2,000 miles. It drains an area of little less than 600,000 square miles. The mouth of the river is closed from October to June by ice. The Mackenzie district itself is desolate and unfit for colonization; but its great tributaries, the Laird and the Peace and Athabasca rivers, drain an immense fertile country, with abundance of petroleum (the fields have more than once been reported to be the largest in the world), and some coal and lignite. The Mackenzie received its name from Sir Alexander Mackenzie, by whom it was discovered and first navigated in 1789. Sir John Franklin descended it in 1825. (See ATHABASCA RIVER under ATHABASCA.

Mackerel, *Scomber scomber* (Linn.), *S. scombrus* (Cuv.), the common European mackerel. Snout pointing, under jaw projecting, gill covers large and smooth, pectoral and ventral fins in advance of the dorsal; five finlets above and below the tail, vertically over each other; tail crescent shaped. Above the lateral line the color is a fine green, varied with rich blue, and marked with broad, dark, descending lines, straight in the males, undulating in the females; under parts silvery with golden tints. The home of the common mackerel may be broadly described as the North Atlantic Ocean; it is common in the North Sea, and all round the British and Irish coasts. It is an extremely valuable food fish, and the mackerel fishery is only second in importance to the herring and cod fisheries.

Mackey, Albert Gallatin, an American writer on Freemasonry; born in Charleston, S. C., March 12, 1807. His works are authorities. They include: "A Lexicon of Freemasonry" (1845); "The Mystic Tie" (1849); "Book of the Chapter" (1858); "A Manual of the Lodge" (1862); "A Text-Book of Masonic Jurisprudence" (1869); and an "Encyclopædia of Freemasonry" (1874). He died in Fort Monroe, Va., June 20, 1881.

McKibbin, Chambers, an American military officer; born in Pittsburg, Pa., Nov. 2, 1841; joined the army as a private Sept. 22, 1862, and two days afterward was made 2d lieutenant of the 14th Infantry. He won distinction during the engagement of North Anna River, Va., and was promoted 1st lieutenant June 10, 1864. In July, 1898, he was commissioned a Briga-

dier-General of volunteers; participated in the battle of Santiago de Cuba; and for gallantry was promoted Brigadier-General, U. S. A., and made military governor of that city. On June 6, 1899, he was placed in command of the Department of Texas.

Macklin, Charles, an English actor and dramatist; born in Ireland, May 1, 1690 or 1699. He was the son of an Irish gentleman named McLaughlin, who commanded a troop of horse for King James at the Boyne two months later, and lost his estates in consequence. After a wild, unsettled youth, in which he was by turns potboy, college servant, and stroller, he played for a number of years in Bristol and Bath, till his brogue was worn down, and in 1733 was engaged for small parts at Drury Lane, London. He steadily rose in the public favor, till in 1741 he appeared in his great character, Shylock: Pope said of it, "This is the Jew that Shakespeare drew." From this time he was accounted one of the best actors, appearing with nearly equal success in tragedy or comedy, in passion or buffoonery, for nearly half a century. His last performance was at Covent Garden in May, 1789, when he broke down; but he survived, with an annuity of $1,000 for eight years longer. In 1735 he killed a brother actor in a quarrel over a wig, and was tried for murder; and frequently afterward he was engaged in disputes and actions at law. He wrote a tragedy, and several farces and comedies; of these "Love à-la-Mode" (1759) and "The Man of the World" (1781) have been printed. He died in London, England, July 11, 1797.

Maclaren, Ian. See WATSON, JOHN.

Maclaurin, Colin, a Scotch mathematician; born in Kilmodan, Argyllshire, Scotland, in February, 1698. He was graduated at Glasgow in 1713, and four years later obtained the professorship of mathematics in Marischal College, Aberdeen. In 1719 he visited London and was admitted to the Royal Society. Here he published his "Geometria Organica" (1719), an elaborate treatise on the description of curves. He afterward visited France as tutor to Lord Polwarth's son, and while there wrote a dissertation on the percussion of bodies, which gained the prize of the Academy of Sciences in 1724; while 16 years later he divided with Euler and Bernouilli its prize for an essay on the flux and reflux of the sea. The following year he was appointed, on the recommendation of Newton, assistant to James Gregory, Professor of Mathematics in the University of Edinburgh, and soon after succeeded him in the chair. Maclaurin's writings gave a strong impetus to the study of mathematical science in Scotland. His "Treatise on Fluxions" (1742), written in defense of Newton's discoveries against the attack of Berkeley, was the first work in which the principles of fluxions were logically arranged, and formed a contribution of the greatest importance to the theory of the tides and the figure of the earth. The "Treatise on Algebra" (1748) was left incomplete, as was also the "Account of Sir Isaac Newton's Philosophical Discoveries" (1748), containing explanations of all Newton's discoveries, the optical ones excepted. Many papers appeared in the "Philosophical Transactions." In the labor of preparing trenches and barricades to defend Edinburgh against Prince Charlie's army he took too active a share for his health, and died of dropsy, June 14, 1746.

McLaws, Lafayette, an American military officer; born in Augusta, Ga., Jan. 15, 1821; was graduated at the United States Military Academy in 1842; served in the Mexican War till the surrender of Vera Cruz; and was promoted captain Aug. 24, 1851. At the beginning of the Civil War he was commissioned a Brigadier-General in the Confederate army; and was promoted Major-General May 23, 1862, in recognition of his services at an engagement near Lee's Mill, at the battle of Williamsburg, and in the retreat of the army to Richmond. He also distinguished himself at the battles of Antietam, Savage's Station, Malvern Hill, Gettysburg, etc. During the march of Sherman to the sea he commanded the defenses of Savannah and had charge of the Military District of Georgia. He was made collector of internal revenue at Savannah in 1875 and postmaster there in 1876. He died in Savannah, Ga., July 24, 1897.

McClay, Edgar Stanton, an American author; born in Foochow, China, April 18, 1863; was graduated at Syracuse University in 1885; was a reporter on the Brooklyn "Times" in 1886–1890; served on the editorial staffs of the New York "Tribune" and New York "Sun" in 1893–1896. In the latter year he was appointed lighthouse keeper at Old Field Point. On Sept. 7, 1901, he was appointed a "skilled laborer" at the New York navy yard. He wrote a "History of the United States Navy." In the third volume of that work, where a description of the battle between the fleets of the United States and Spain at Santiago is given, the author referred to Rear-Admiral Schley as a "caitiff, poltroon, and coward." After the publication of this volume Admiral Schley called for a court of inquiry into his conduct, which was granted. After the court made its report the Secretary of the Navy requested the resignation of Maclay in December, 1901. The latter, on refusing to comply with this request, was

summarily dismissed by order of President Roosevelt. Maclay also wrote "Reminiscences of the Old Navy" (1898) and "The History of American Privateers" (1899).

Macle (mak'el), in heraldry, the same as mascle (*q. v.*). In mineralogy, a variety of andalusite, occurring in long, tapering crystals in clay-slate. They have the axes and angles of a different color from the rest of the crystals, owing to a regular arrangement of impurities in the interior. In transverse section they exhibit a cross or a tesselation.

McLellan, Isaac, an American poet; born in Portland, Me., May 21, 1806; was educated at Bowdoin College; practiced law for several years in Boston, Mass.; in 1851 removed to New York; his last years were spent in Greenport, L. I. He was a friend of Longfellow, Hawthorne, Daniel Webster, and the poet Willis. His love for outdoor sports was so intense, and his poems on these themes were so numerous, as to win for him the title of "the poet-sportsman." His early poems, "The Death of Napoleon" and "New England's Dead," attracted much attention. He was also the author of "The Fall of the Indian" (1830); "Mount Auburn" (1843); and "Poems of the Rod and Gun" (1886). He died in Greenport, L. I., Aug. 20, 1899.

McLennan, John Ferguson, a Scotch sociologist; born in Inverness, Scotland, Oct. 14, 1827. He was graduated at King's College, Aberdeen, in 1849, and then proceeded to Trinity College, Cambridge, which he left in 1855 to join the Scotch bar in 1857. He wrote: "Primitive Marriage" (1865), in which he emphasizes the importance of the matriarchal theory of marriage among savage peoples (the book, after being enlarged and the argument strengthened by new evidence, was issued under the new title of "Studies in Ancient History" in 1876); the papers in the "Fortnightly Review" (1869-1870) on totemism; a further defense of his views as against the patriarchal theory of Sir Henry Maine, "The Patriarchal Theory," finished and edited by his brother Donald in 1885; "Life of Thomas Drummond" (1867) and papers on "The Levirate and Polyandry" (1877). He died in Hayes Common, Kent, England, June 16, 1881.

McLeod, Archibald Angus (mäk-loud'), an American railroad official and financier; born in Compton county, Quebec, Canada, in 1848. When a boy he came to the United States and was employed by the Northern Pacific railway. In 1885 he was made manager of the Elmira, Cortland, and Northern line, and from 1885 to 1890 was successively acting general manager, vice-president, and general manager of the Reading system. His consolidation of the Lehigh Valley, Jersey Central, and Reading railroads formed a great coal-controlling power, but it resulted in the Reading passing into receivers' hands. He built a large terminal in Philadelphia and planned one for New York city. He died in New York city, April 19, 1902.

Macleod, Fiona. See SHARP, WILLIAM.

Macleod, Norman, a Scotch clergyman; born in Campbelltown, Argyllshire, Scotland, June 3, 1812. He was a founder of the Evangelical Alliance in 1847; in 1852 became minister of the Barony parish, Glasgow; was appointed chaplain to the Queen for Scotland in 1857; edited "Good Words" (1860-1872), making it an educational and literary power. Among his works are: "The Earnest Student" (1854), a biography; "Parish Papers" (1862); "Wee Davie" (new ed., 1865); "The Starling" (1867, new eds. 1870-1877-1880), a Scotch story; "Peeps at the Far East" (1871); "Character Sketches" (1872). He died in Glasgow, Scotland, June 16, 1872.

McLeod, Xavier Donald, an American poet; born in New York, Nov. 17, 1821. An Episcopal clergyman, he became a Roman Catholic in 1852, and later a priest. He wrote: "Pynnshurst" (1852); "Life of Sir Walter Scott" (1852); "The Blood-Stone" (1853); "Château Lescure"; "Life of Mary Queen of Scots" (1857). He was killed near Cincinnati, Ohio, July 20, 1865.

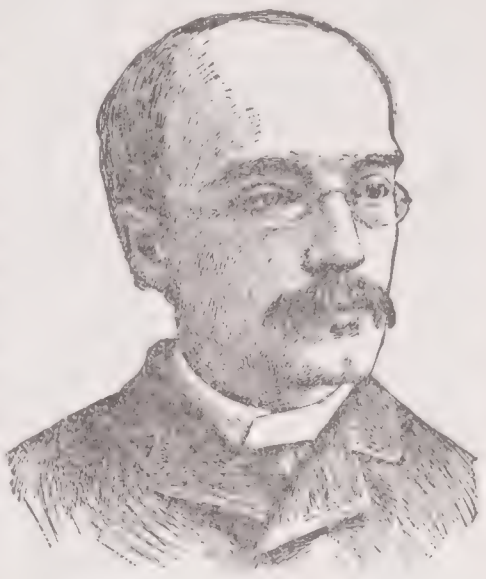
Maclise, Daniel, a British painter; born in Cork, Ireland, Feb. 2, 1806. He was the son of a Highland soldier named McLeish. He entered the school of the Royal Academy, London, in 1828, soon exhibited at the Academy, and in 1833 made himself famous by his "All-Hallow Eve." His later pictures are many of them familiar by engraving—such as "The Banquet Scene in Macbeth" and "Scene from Twelfth Night" (1840), "Play Scene in Hamlet" (1842), and his design of "Shakespeare's Seven Ages" (1848), "The Gross of Green Spectacles" (1850), "Caxton's Printing-office" (1851). The frescoes — each 45 feet long and 12 feet high — in the Royal Gallery of the House of Lords, depicting "The Meeting of Wellington and Blücher on the Evening of the Battle of Waterloo" and "The Death of Nelson at Trafalgar," were considered the finest mural paintings hitherto executed in Britain. Other easel works were "Othello," "Desdemona," and "Ophelia" (1867), "The Sleep of Duncan" and "Madeline after Prayer" (1868), "King Cophetua and the Beggar Maid" (1869), "The Earls of Desmond and Ormond" (1870). The sketches by him of his contemporaries, published in "Fraser's Magazine" during 1830-1838, were republished in 1874 and 1883. He died in London, England, April 25, 1870.

Macmahon, Marie Edme Patrice Maurice de (mäk-mä-ôn*g*), **Duke of Magenta,** a Marshal of France, descended from an Irish Jacobite family; born in Sully, near Autun, France, Nov. 28, 1808. Entering the army, he saw much active service in Algeria, especially distinguishing himself at the storming of Constantine (1837), commanded the division that stormed the Malakoff of Sebastopol in 1855, and took a conspicuous part in the war against the Kabyles in Algeria (1857-1858) and in the Italian campaign of 1859, winning a Marshal's baton and the dignity of Duke of Magenta for the decisive part he took in the battle of that name. He was nominated governor-general of Algeria in 1864. In the Franco-German War of 1870-1871 he had command of the first army corps, but was defeated at Wörth, and wounded and captured at Sedan. On the close of the war he was made commander of the army of Versailles, with which he suppressed the Commune. In 1873 he was elected president of the republic for a period of seven years, with some hope that the restoration through him of the Bourbons might be secured. He resigned on Jan. 30, 1879. He afterward lived in retirement, and died in Paris, Oct. 17, 1893.

MacManus, Seumas (James), an Irish novelist, short-story writer, and poet; born at Mount Charles, Donegal, in 1868. He worked on his father's farm while getting his education, and at eighteen became a teacher. The old stories of the peasants had a great charm for him, and he stored a vast number in his memory which he afterward used in his writings, his special forte being his humorous descriptions of Irish peasant life. He married in 1901 "Ethna Carbery" (Anna Johnston), who died in 1902, a poet of great genius and promise. He contributed prose and verse to many newspapers and magazines from quite an early age. He visited America in 1899 and again in 1903, lecturing and giving readings. "Sheulers from the Heathy Hills," his first book, was published in 1893, and "The Ladin' Road to Donegal" in 1895. He has also written: "Through the Turf Smoke," "The Bewitched Fiddle," "For Chimney Corners," "Donegal Fairy Tales," "A Lad of the O'Frials," and "The Wager."

McMaster, Guy Humphrey, an American poet; born in Clyde, N. Y., Jan. 31, 1829. At 19 he wrote "Carmen Bellicosum," better known as "The Old Continentals," published in the "Knickerbocker Magazine," and very popular. Aside from the above, his best-known poems are: "A Dream of Thanksgiving Eve" (1864); "The Professor's Guest Chamber" (1880); "The Commanders" (1887). He died in Bath, Steuben co., N. Y., Sept. 13, 1887.

McMaster, John Bach, an American historian; born in Brooklyn, N. Y., June 29, 1852. He was a civil engineer, 1873-1877; instructor in civil engineering in Princeton College, 1877-1883; professor of American history in the University of Pennsylvania after 1883. He wrote "Benjamin Franklin as a Man of Letters" (1887); "History of the People of the United States" (5 vols. 1883-1900); "With the Fathers" (1896); "A School History of the United States" (1897); "Primary School History of the United States"; etc.



JOHN BACH M'MASTER.

Macmillanites, the followers of the Rev. John Macmillan, of Balmaghie, in Kirkcudbrightshire, Scotland, who in the latter part of the 17th century aided in laying the foundation of the Reformed Presbyterian or Cameronian Church.

Macomb, Alexander, an American military officer; born in Detroit, Mich., April 3, 1782; joined the army in 1799; was lieutenant-colonel of engineers and adjutant-general in 1812; later was transferred to the artillery and won distinction on the Niagara frontier; promoted brigadier-general in January, 1814; and placed in command of the Lake Champlain region in the summer of that year. On Sept. 11 he won a brilliant victory at Plattsburg, for which he was promoted major-general and received a gold medal and a vote of thanks from Congress. In 1835 he was appointed general-in-chief of the United States armies and held that post till his death in Washington, D. C., June 25, 1841. His body was interred with military honors in the Congressional Cemetery in Washington, where a beautiful monument marks his grave. He was the author of "Martial Law and Courts-Martial."

Macon, a city and county-seat of Bibb co., Ga., on the Ocmulgee river, at the head of navigation, and on the Central of Georgia, the Southern, and other railroads; 88 miles S. of Atlanta. It is in the heart of the cotton belt, and is the manufacturing and jobbing center of an extensive district. The river affords great water power. It contains Mercer University, St. Stanislaus College, Wesleyan Female College, Mount de Soles Academy, Gresham

High School, Ballard Normal School for Colored Pupils, and the Georgia Academy for the Blind. There are electric light and street railroad plants, waterworks, National and State banks, daily and weekly newspapers, a hospital, public library, a United States Government Building, and interesting Indian mounds. It has large cotton and knitting mills, foundries, agricultural works, lumber and planing mills, and an assessed property valuation of nearly $15,000,000. Pop. (1890) 22,746; (1900) 23,272; (1910) 40,665.

Macon, a city and county-seat of Macon co., Mo.; on the Burlington Route and the Wabash railroads; 20 miles N. of Moberly. It has the County Insane Asylum, St. James' Military Academy, waterworks, gas, and electric light plants, State and National banks, and several weekly newspapers; carriage and wagon factories, flour mills, and foundry; and an assessed property valuation of nearly $3,500,000. Pop. (1890) 3,371; (1900) 4,068.

Macon (Matisco of Cæsar), the capital of the French department of Saône-et-Loire, on the right bank of the Saône, 41 miles N. of Lyons; a dull, modernized place, it has a 12-arch bridge, with a view of Mont Blanc; a fragment of an old cathedral, demolished at the Revolution; the fine Romanesque church of St. Pierre (rebuilt 1866); and a statue of Lamartine, who was born here; carries on an extensive trade in wines known as Mâcon, like but lighter than Burgundy, as well as in corn, cattle, etc., and has manufactures of watches, brass, faience, etc. Pop. (1901) commune, 15,810.

Macon, Nathaniel, an American statesman; born in Warren co., N. C., Dec. 17, 1757. He was educated at Princeton College; in 1777 left college; served for some time as a private in a company of volunteers; and at the expiration of this first service enlisted again as a volunteer and served as a common soldier under the command of his brother, Col. John Macon, till the provisional treaty of peace in 1782, refusing any pay or military distinction. While yet in the army, in 1780, he was elected a member of the Senate of North Carolina; and when the Constitution of the United States was submitted to the vote of the people of that State, he firmly opposed it, as conferring too much power on the new government, as making it in effect independent of the State and so of the people, and tending to corruption. He retained till the end of his life this dislike of the Constitution, and his unlimited confidence in the capacity of the people for self-government; his favorite saying being that "if left alone they would always do what was right." He was elected a member of the United States House of Representatives in 1791, and continued in that office by successive reëlections till 1815. In 1816 he was elected to the Senate, where he served till 1828, when he resigned his seat, having been then a member of Congress for 37 successive years, the longest term of service that has fallen to the lot of any legislator in the United States. Though he was in no sense an orator, few men in Congress were listened to with more respectful attention. Mr. Jefferson called him "the last of the Romans"; and Mr. Randolph pronounced him "the wisest man he ever knew." He died on his plantation, in the same county where he was born, June 29, 1837.

McPherson, Edward, an American journalist; born in Gettysburg, Pa., July 31, 1830; was graduated at the University of Pennsylvania (1848); studied law, but abandoned it for journalism; was a member of Congress (1858 and 1860); deputy commissioner of internal revenue (1863); clerk of the United States House of Representatives (1863–1873, 1881–1883, and 1889–1891); permanent president of the National Republican Convention (1876); editor of the Philadelphia "Press" (1877–1880); received the degree of LL. D. from the University of Pennsylvania (1877). Among his publications are: "Political History of the United States during the Great Rebellion" (1865); "The Political History of the United States during Reconstruction" (1870); and a "Hand-Book of Politics" (1872). He died in Gettysburg, Pa., Dec. 14, 1895.

Macpherson, James, the translator of Ossianic poems; born in Ruthven, Inverness-shire, Scotland, Oct. 27, 1736. Having, in 1760, produced "Fragments of Ancient Poetry, Translated from the Gaelic or Erse Language," they were so well received, that a subscription was formed to enable the author to collect additional specimens of national poetry. The result of his researches was "Fingal, an Ancient Epic Poem," in six books, together with several other poems (professedly translated from originals), by Ossian, the son of Fingal, a Gaelic prince of the 3d century, and his contemporaries. Dr. Johnson treated him as an impostor, and a violent controversy ensued concerning their authenticity. From the evidence of the contending parties, it may be concluded, that Macpherson's prose epics were founded on traditional narratives current among the Highlanders; but the date of the oldest of their lays is comparatively modern; and it is now impossible to ascertain the precise extent of his obligations to the Gaelic bards of former ages. In 1764 he accompanied Governor Johnstone of Florida, as secretary. After his return he translated the "Iliad" into Ossianic prose; wrote a "History of Great Britain from the Restoration to the Accession of the House of Hanover"; and also employed his pen in vindicating the measures of government during the Ameri-

can war. He was afterward appointed agent to the nabob of Arcot, became a member of Parliament, and died Feb. 17, 1796.

McPherson, James Birdseye, an American military officer; born in Sandusky, O., Nov. 14, 1828; was graduated at the United States Military Academy in 1853; entered service in the Civil War, and was chief engineer on the staff of General Grant in 1862; took command of the 17th Army Corps in 1863; in the same year defeated a portion of Gen. J. E. Johnston's army at Raymond and again at Jackson; was distinguished for brilliant services at Champion Hill and at Vicksburg, and was Commander of the Army of the Tennessee when he was killed at Atlanta, Ga., July 11, 1864.

Macquarie (ma-kwor'ē), a tributary of the Darling, a river and a port of Tasmania, a port in New South Wales, and a small island in the South Pacific; named from Gen. Lachlan Macquarie, governor of New South Wales 1809–1821.

Macquoid, Mrs. Katharine Sarah, an English novelist; born in London, England, Jan. 26, 1824. Among her numerous works are: "A Bad Beginning" (last ed. 1884); "Hester Kirton" (new ed. 1870); "Patty" (new ed. 1873); "At the Red Glove" (1885); "Puff" (1888); "In the Sweet Spring Time" (1880); "Her Sailor Love" (1883); "A Little Vagabond" (1886); "Drifting Apart" (1891); "His Last Card" (1895); "A Ward of the King" (1898); etc. Among several books of travel are: "Through Normandy" (1877), and "Through Brittany" (1877).

Macrauchenia (-kē'-), a genus of South American fossil herbivorous animals, forming a connecting link between the palæotherium and the camel family; in form they nearly resemble the llama, but were as large as a hippopotamus.

Macready, William Charles (-rē'di), an English tragedian; born in London, England, March 3, 1793. His father, the lessee and manager of several provincial theaters, sent him to Rugby and Oxford to be educated, but his circumstances became embarrassed, and the youth had to join his father's company at Birmingham in 1810. Afterward he played in the provinces with considerable success, and appeared at Covent Garden in 1816. In 1826 he made his first visit to America, and in 1828 played in Paris, with great success in both countries. He undertook the management of Covent Garden in 1837, and Drury Lane in 1842, but though he did much to reform the stage and cultivate the public taste for Shakespearean drama in both theaters (he himself taking the leading parts in Shakespeare's plays), his pecuniary losses required him to retire from managership. He revisited the United States in 1849; returned to England; gave a series of farewell performances, and finally retired from the stage in 1851. He died in Cheltenham, England, April 27, 1873. His "Reminiscences" appeared in 1875.

Macrocosm. See Microcosm.

Macrocystis (-sis'tis), a genus of *Fucaceæ*, family or tribe *Laminaridæ*. *M. pyrifera* is a giant seaweed, with a stem 700 feet long, no thicker than the finger. The branches are as slender as packthreads; the leaves long and narrow, each has at its base a vesicle filled with air, enabling the plant to float. It is met with in the ocean in the S. temperate and S. polar zones.

Macropodidæ, or **Macropidæ,** in zoölogy, a family of Marsupials, section Phytophaga, or in Owens' classification Diprododontia. There are six incisors in the upper jaw, and two in the lower; the canines in the upper jaw are small and wanting in the lower one; the molars are five on each side above and below. The anterior feet, which are small, have five toes, each armed with a claw; the hinder ones, which are very large, powerful, and well adapted for leaping, have but four, the inner one, or great toe, being absent. Found in Australia, Tasmania, and New Guinea. Genera: *Macropus* (kangaroo), *Dendrolagus* (tree-kangaroo), *Hypsiprymnus* (kangaroo-rat), etc. Also, the first family of Milne-Edwards' Oxyrhynchi. They have very long feet, and are called in consequence sea spiders and spider crabs. They live in the deep sea. Called also Leptopodidæ (*q. v.*). Latreille has termed them Macropodia. Huge Macropi are found in the post-Tertiary of Australia with representatives of the other genera. They were found in ossiferous breccias in the Wellington valley, about 210 miles W. of Sydney, on the river Bell, one of the principal sources of the Macquarie, and on the Macquarie itself. Kangaroos seem to have been limited to Australia before the human period began. The name of the Rhætic genus *Hypsiprymnopsis* of Prof. Boyd-Dawkins suggests a relation to *Hypsiprymnus*, but Professor Owen considers it to be a Microlestes.

Macropus (mak'-), the generic name of the kangaroos, applied to them in allusion to their elongated hind feet. See Kangaroo and Marsupialia.

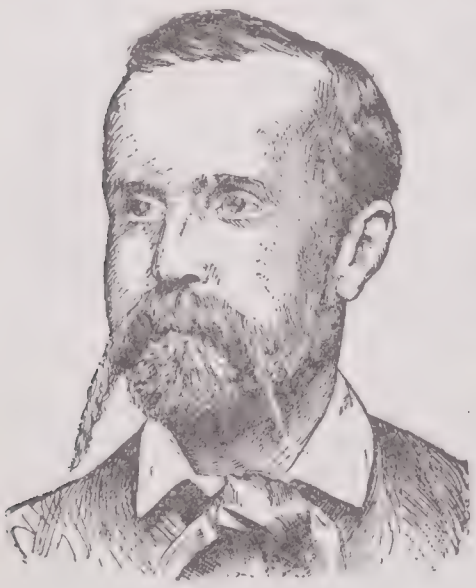
Macrura, or **Macroura** (-krör'ä), long-tailed Crustaceans; lobsters, a sub-order of *Decapoda*, having the abdomen greatly developed, cylindrical, the segments short, flattened, and expanded laterally; the whole terminated by a broad swimming tail. The antennæ are usually large. The feet are terminated by nipping claws. The young, on being hatched, are not very different in form from their parents. They abound in both salt and fresh water. The sub-order contains the families *Crangonidæ, Astacidæ,*

Thalassinidæ, and *Palinuridæ*. They came into existence in Palæozoic times.

Mactra, a genus of bivalve mollusks, with somewhat triangular equal-valved shells. They are active animals, plowing their way through the sand either on the shore or at slight depths, and are able like cockles to take considerable leaps. Two common North American species, *M. solidissima* and *M. ovalis*, known as hen-clams, surf-clams, etc., are sometimes eaten, while some small British species — *e. g.*, *M. subtruncata* — are said to be gathered for feeding pigs.

MacWhirter, John, a Scotch painter; born near Edinburgh, Scotland, in 1839; was educated at Peebles, and the School of Design, Edinburgh; became an A. R. S. A. in 1864, an A. R. A in 1879, an H. R. S. A. in 1880, an R. A. in 1894. His early studies of wild flowers at home and abroad were selected by Ruskin as examples for his Oxford class. He excelled in depicting Highland scenery, but he traveled much, and one of his most admired works is a view of "Constantinople and the Golden Horn" (1889). Favorites among his numerous pictures are: "The Vanguard"; "The Lady of the Woods" (1876); "Lord of the Glen" (1877); "The Three Graces" (1878); "Out in the Cold"; "The Sleep that is Among the Lonely Hills" (1896); "Crabbed Age and Youth"; "A Monarch"; etc. Died Jan. 28, 1911.

Madách, Emerich (mä'dätsh), a Hungarian poet; born in Alsó-Sztregova, Jan. 21, 1823. He studied law, and was a notary in his native county. His principal works are: "Moses" (1861); and "The Tragedy of Man" (1861), a philosophical dramatic poem treating of the development of mankind since the Fall, produced on the stage in 1883. He wrote also lyrics and dramatic fragments of minor importance. He died in Balassa-Gyarmath, Oct. 5, 1864.



EMERICH MADÁCH.

Madagascar, a large island in the Indian Ocean, 230 miles from the E. coast of Africa, from which it is separated by Mozambique Channel; length, 975 miles; average breadth, 250 miles; area, about 228,500 square miles; population, about 3,500,000. Madagascar may be described as an elevated region, with an average height of 3,000 to 5,000 feet, overlooked by mountains rising in some cases to nearly 9,000 feet. The coast exhibits a number of indentations, mostly small, but few good harbors, being in great part rock, though in some places low and sandy. On some parts of the coast are numerous lagoons. The rivers are numerous, yet few of them offer even to a moderate extent the advantages of internal navigation. The climate is oppressively hot on the coast, but temperate on the highlands of the interior. The island is only unhealthy for Europeans and Americans in the neighborhood of lagoons or marshes. The rainy season continues from December to April. The most striking feature in the vegetation is a belt of dense forest, with an average breadth of 15 to 20 miles, passing round the whole island. It is found at all levels from 6,000 feet to the water's edge, and the trees include palms, ebony, mahogany, fig, cocoanut, and the ravinala or traveler's tree (*Urania speciosa*), which when pierced yields a refreshing juice. The vegetable products grown for food include rice, manioc or cassava, sweet potatoes, ground nuts, and yams. Ginger, pepper, and indigo grow wild in the woods; cotton, sugar cane, coffee, tobacco, and hemp are cultivated. Coal is found in the N. W., rice, cattle, hides, gum, india-rubber, wax, cotton, sugar, vanilla, lard, and coffee are exported to Mauritius, Réunion, and Europe. Humped cattle are found in immense herds, and form a large part of the wealth of the inhabitants, as do also sheep, goats, swine, and horses. The most characteristic of the mammals are the lemurs. The birds are numerous; snakes are rare; crocodiles, lizards, chameleons abound. The inhabitants, called Malagasy, belong to the Malayo-Polynesian stock and speak a Malayan language. They appear to form a single race, though they are divided into numerous tribes, each having a distinctive name and customs. The Hovas are the ruling tribe, they having extended their sway over nearly the whole island, while the other chief tribes are the Betsimasarka, the Betsileo, and the Sakalava. In the coast districts the houses of the better class are built of framed timber with lofty roofs; the dwellings of the lower classes are constructed of bamboo or rushes, or even of clay. The Malagasy show much aptitude as silversmiths, gunsmiths, carpenters, and with rude looms make handsome cloths. The religion of the great bulk of the people is a kind of fetichism or worship of charms. Many of their superstitious customs have been abolished and Christianity adopted, chiefly by the Hovas. Capital, Antananarivo, a striking and well-built town; pop. about 70,000, on a lofty hill about 200 miles inland; principal port, Tamatave, on the E. coast; pop. 5,000 to

7,000; chief port on the N. W. coast is Majunga; pop. about 6,000.

The Hovas are the predominant tribe in the island, and long held the other Malagasy tribes in a condition of practical slavery.

Prior to 1895 the government was an absolute monarchy under Queen Ranavalona III. A French Resident, however, with a military escort, resided at the court and controlled foreign relations, so that the country was virtually a French protectorate. Much friction prevailed in 1893–1894, between the government and the French authorities, and finally France decided to make her protectorate of the island effective. An expedition easily overcame the resistance of the Hova troops, and after some changes in the formation of the administration the island was made a French colony, and General Gallieni was appointed resident-general and commander-in-chief in September, 1896. His vigorous and determined policy made a great improvement in the condition of the country, especially in the direction of opening up trade routes between the capital and the coast. The queen was exiled to Réunion in March, 1897.

Madame Cottin. See COTTIN, SOPHIE RISTEAU.

Mad Apple, a name sometimes given to the apple of Sodom (*Solanum Sodomeum*), sometimes to the fruit of the egg-plant, and sometimes to the large galls known as Mecca or Bussorah galls, which are also called apples of Sodom.

Madden, Sir Frederick, an English antiquary; born in Portsmouth, England, Feb. 16, 1801. He was employed in the British Museum first as assistant-keeper, from 1837 as keeper, in the department of MSS.; was knighted in 1832, and gazetted as one of the gentlemen of the privy chamber; in 1866 he retired from office in the British Museum. He edited many works of literary or historical interest, including "Havelok the Dane" (1833), "William and the Werwolf" (1832), the early English versions of the "Gesta Romanorum" (Deeds of the Romans, 1838), "The Wycliffite Version of the Holy Scriptures" (1850), Layamon's "Brut" (1847), and the "History of the Angles" of Matthew Paris, for the Rolls series (1858). His original writings are found in the pages of the "Archæologia" and "Collectanea Topographica." He died in London, England, March 8, 1873.

Madden, Richard Robert, an English physician and miscellaneous writer; born in Ireland, in 1798. He was prominent in the English anti-slavery cause. He wrote: "Travels in Turkey" (2d ed. 1833); "The Mussulman," a tale; "The Infirmities of Genius" (1833); "Life of Savonarola" (2d ed. 1854); "Life and Correspondence of the Countess of Blessington" (2d ed. 1855); "The United Irishmen, their Lives and Times" (4 vols. 1857–1860), his great work. He died in 1886.

Madder, in botany, the genus *Rubia,* and specially *R. tinctorum.* It is a trailing or climbing annual, supporting itself by its leaves and prickles. It is supplied chiefly from Holland, France, Italy, and Turkey. The roots, which are ready the third year, are kiln-dried, and then threshed, to clear them from earth and dust. They are then dried a second time, and afterward pounded and stamped in a mill. Indian madder, called also madder of Bengal, is *R. cordifolia;* madder of Chile, *R. augustissima* or *Relboum.*

In chemistry, the root of *R. tinctorum;* is extensively used in dyeing for the production of a variety of colors, namely, red, pink, purple, black, and chocolate. Other species of *Rubia* are also used. It would appear that madder contains a colorific principle — rubian — which, under the influence of a peculiar ferment, termed erythrozym, breaks up into alizarin, purpurin, etc. Several of the coloring matters of madder appear to exist in the fresh root, but it is only when it has been kept for some time that the alizarin and purpurin are developed in quantity. The colors produced from madder are very stable, the well-known Turkey-red being one of them; and the tints and shades obtainable, according to the mordant used, are very numerous. Alizarin, or madder red, discovered by Robiquet, may be extracted with solvents, or obtained by sublimation in the form of beautiful reddish needle (see ALIZARIN). Madder also contains certain yellow coloring matters, but they are useless, if not injurious, in the process of dyeing. In pharmacy, madder is a tonic, a diuretic, and an emmenagogue. Brown madder, a rich red-brown pigment, prepared from the roots of *R. tinctorum.*

Madeira (mä-dā′ē-rä), a Portuguese island in the North Atlantic, 360 miles from the coast of Africa, 530 miles from Lisbon, 1,215 from Plymouth; length, 30 miles; breadth, 13 miles; area, 505 square miles; pop. (1900) 151,125. The island is traversed by a central mountain ridge, the highest point of which reaches 6,000 feet; from this great spurs descend to the coast, forming lofty precipices; and in the bays formed between these volcanic cliffs are situated the villages of Madeira. Adjacent to Madeira is Porto Santo, a small island, and the Desertas, which, with Madeira itself, compose the group of the Madeiras. The staple products of Madeira are wine and sugar. The mean annual temperature is 65°, the two hottest months being August and September, and the three coldest January, February, and March. The climate is

equable and the island is considered an excellent sanatorium for chest diseases. Capital and chief center of trade, FUNCHAL (*q. v.*); pop. (1900) 20,844. The Madeiras were known to the Romans, and were rediscovered and colonized by the Portuguese in 1431.

Madeira, the great affluent of the Amazon, having its origin in the confluence of the Mamoré and Guaporé, at about lat. 12° S., the Beni joining 110 miles lower down, and then flowing N. E. to the Amazon, its drainage basin embracing about 425,000 square miles. From its mouth to its first falls the distance is 578 miles; above this point navigation is broken by a series of 19 falls, rapids, and cataracts for a distance of 230 miles, and it has been proposed to construct a railway to pass these, and so provide an outlet by the Amazon for the products of Bolivia.

Madelparoowa (-rö'wä), a kind of boat used in Ceylon for fishing close to the shore, or on lakes in the interior of the island; it is sometimes covered with a bamboo roof.

Madhava (mä'da-va), an appellation of the Hindu god VISHNU (*q. v.*).

Madhava Achárya (ä-chär'ya), a Hindu writer of the 14th century, famed for his numerous and important works relating to the Vedic, philosophical, legal, and grammatical writings of the ancient Hindus.

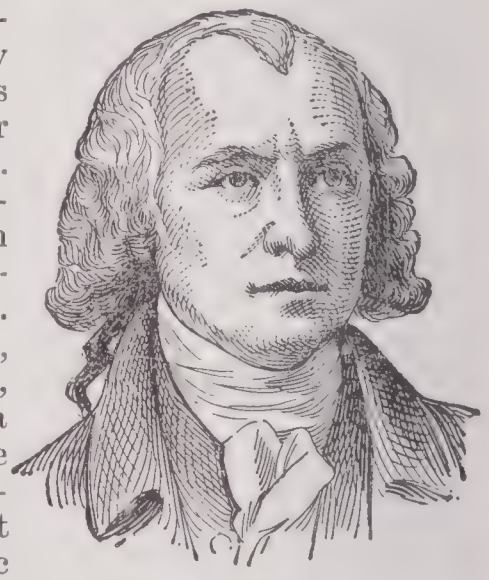
Madia Oil (mā'-), oil expressed without heat from *M. sativa.* It is transparent, yellow, and without odor; it may be used for salads or for oil cake for cattle.

Madison, a city and county-seat of Jefferson co., Ind.; on the Ohio river, and on the Pittsburg, Cincinnati, Chicago, and St. Louis railroad; 45 miles N. of Louisville, Ky. The city has steamboat connection with various places on the Kentucky, Ohio, and Mississippi rivers; contains a public library, electric street railroads, gas and electric lights, National banks, and several daily and weekly newspapers; and has many manufactories, ship lumber yards, shipyards, and cotton and woolen mills. The assessed property valuation is nearly $4,000,000. Pop. (1890) 8,936; (1900) 7,835; (1910) 6,934.

Madison, a city, county-seat of Dane co., and capital of the State of Wisconsin; on the Chicago, Milwaukee and St. Paul, the Chicago and Northwestern, and the Illinois Central railroads; 75 miles W. of Milwaukee. It is situated in the Four Lake country, being built on a strip of land between Lakes Mendota and Monona. It contains the capital, county court house, county jail, University of Wisconsin, State Institution for the Insane, United States Government Building, Soldiers' Orphans Home, and several libraries. It has electric street railroads, gas and electric lights, waterworks, National and State banks, and daily and weekly newspapers. The city is a well-known summer resort, its air being recommended as beneficial for lung diseases. It has a large trade in agricultural productions, manufactories of bicycles, machinery, farming implements, carriages, wagons, etc., and an assessed property valuation of nearly $7,000,000. Pop. (1890) 13,426; (1900) 18,164; (1910) 25,531.

Madison River, a stream of Montana rising in the Rocky Mountains at an elevation of 8,300 feet above the sea-level, running nearly N. through Madison county, passing through several deep cañons interspersed with picturesque valleys, and uniting with the Jefferson Fork of the Missouri at the Three Forks, on the W. border of Gallatin county; length about 230 miles.

Madison, James, an American statesman, 4th President of the United States; born in Port Conway, Va., March 16, 1751. He was the eldest of a family of seven children. His early education was mostly under private tutors. In 1769 he entered Princeton College, graduating in 1771. He studied law, and afterward, with some idea of entering the ministry, theology. He first attracted public attention through his efforts, in company with Jefferson and George Mason, to secure the religious rights of the dissenting sects in Virginia, as against the taxation and persecution to which they were subjected by the Anglican party. In 1776 he was elected to the convention that framed the Virginia constitution; in 1777 he was defeated for the Virginia Assembly, but appointed a member of the Executive Council; in 1780 entered the Continental Congress, where he served three years; and in 1784 was elected to the Virginia Legislature, where he advocated the abolition of the feudal system of entail and primogeniture, and the removal of the remaining hindrances to perfect religious freedom. In 1785 he urged a meeting of the States by delegates to perfect a common government, and was a member of the Constitutional Convention of



JAMES MADISON.

1787, and one of the chief framers of the Constitution of the United States. He advocated the adoption of it in some of the ablest papers of "The Federalist." He gradually parted political company with the Federal party and refused a seat in the cabinet and the mission to France in consequence of his inclination to adopt the principles of the Republican party. During Adams's administration he remained mostly in retirement. In 1794 he married a brilliant society woman, Mrs. Todd, who afterward proved socially helpful to him in public life. He opposed the Alien and Sedition Laws that were repealed somewhat through his influence. His writings produced to some extent the reaction against the Federalists that resulted in Jefferson's election, who at once (1801) made him Secretary of State, in which office he conducted the diplomatic affairs of government so ably as to make him Jefferson's successor. He was elected to the presidency in 1808. The principal events of his administrations concern the War of 1812 with Great Britain and the treaty by which it was concluded. He filled the office for two terms, retiring in 1817 to his estate. He served in his old age as rector of the University of Virginia, and as a member of the convention called to reform the Virginia constitution. He died in Montpelier, Va., June 28, 1836.

Mad Mullah, an Abyssinian insurgent.

Madoc (mad'ok), son of Owen Gwynnedd, a Welsh prince, believed by his countrymen to have discovered America about 300 years before Columbus. Compelled, it is said, by civil strife, to abandon his native land, he sailed W. in 1170 with a small fleet, and, after a voyage of several weeks, reached a country whose productions and inhabitants were quite unlike those of Europe. Here he lived for a long time; then, returning to Wales, he gave an account of the new land that he had discovered, equipped another fleet, set sail again, and was never more heard of. There is considerable reason for suspecting the genuineness of this Welsh tradition; and even if true, the Northmen have a prior claim to the discovery of America, for it is beyond doubt that Greenland and the New England States were visited by them at a much earlier period. Southey has chosen the story of Madoc as the subject of one of his so-called epics.

Madonna, a word originally used in Italy, like *madame* in France, as a title of honor and dignity, but now exclusively applied to the Virgin Mary, as in other languages she is called "Our Lady." It is also applied to a number of celebrated pictures, in which the Virgin forms the sole or principal object, as the Madonnas of Raphael.

Madoqua (mad'ō-kwa), *Antilope saltiana* or *Neotragus saltianus,* a diminutive antelope about the size of a hare, common in Abyssinia. Legs short and slender; the males alone bear horns, which are short and conical. The foreparts are rufous, but gray is the prevailing hue.

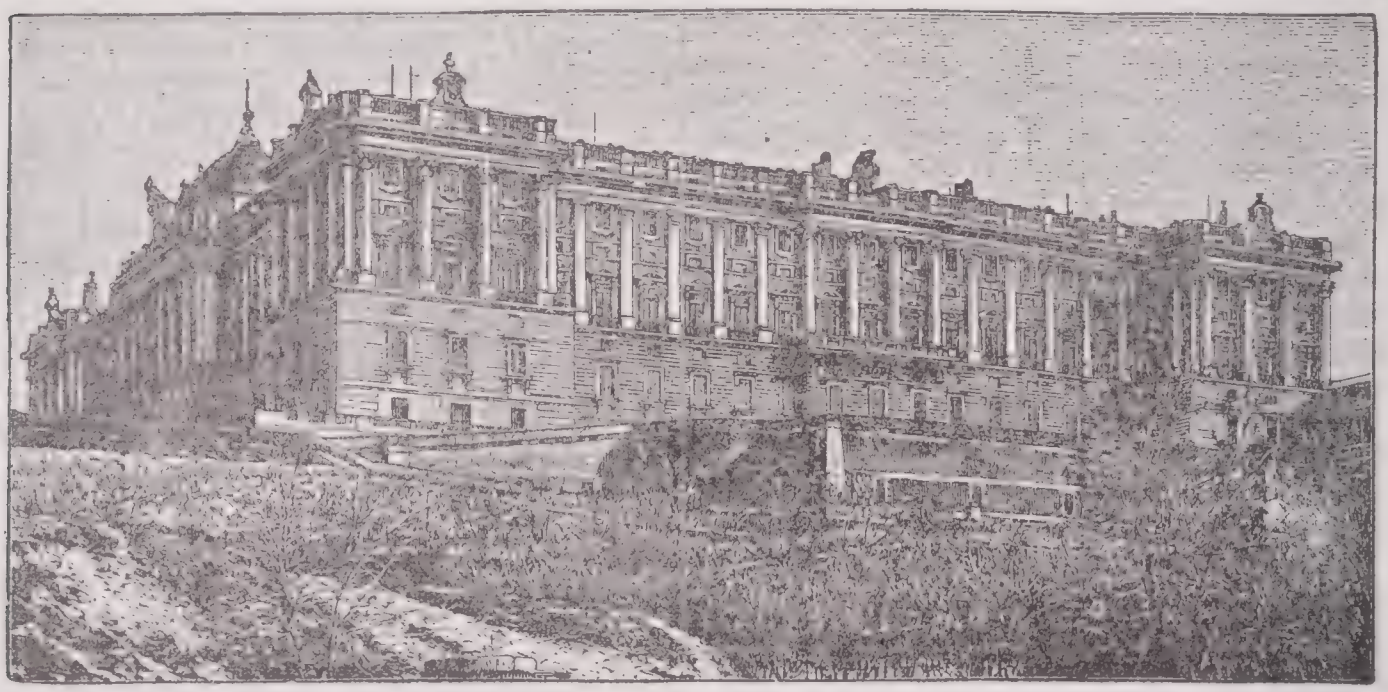
Madras (ma-dras'), **Presidency of,** with its dependencies and the State of Mysore, the entire S. of the peninsula of India, surrounded on every side except the N. by the sea, bounded on the N. by Orissa, the Central Provinces, the territory of Hyderabad and Mysore; length, 950 miles, breadth 450 miles; area, 141,189 square miles; pop. (1901) 38,209,436. It comprises 22 British districts, 3 agencies under special administration, and 5 native states, viz., Travancore, Cochin, Pudukota, Banganapalli, and Sandúr. The three chief rivers, Godavari, Krishna, and Kaveri, rise in the Western Ghâts and enter the Bay of Bengal. The climate is varied; in the Nilgiri Hills it is temperate, on the Malabar coast the monsoon brings an excessive rainfall, while in the central table-land the rainfall is low, and the heat almost unendurable. The soil is sandy along the coast, but there are many fertile districts; while iron, copper, lead, and coal are found in considerable quantities. There are extensive forests in the presidency, yielding teak, ebony, and other valuable timber trees. The principal vegetable products are rice, wheat, barley, maize, and other grains; sugar-cane, areca, yam, plantain, tamarind, jack-fruit, mango, melons, cocoanuts, ginger, turmeric, pepper, tobacco, oil seeds, coffee and cotton. The wild animals are the elephant, tiger, chetah, jackal, wild hog, etc. The Madras administrative authority is vested in a governor, with a council of three members appointed by the king, of whom one is the commander-in-chief. For legislative purposes the council is increased by nominations of the governor. In each of the 22 districts there is a collector and a sessions judge. The chief educational institution is the Madras University, an examining body granting degrees in arts, law, medicine, and engineering; matriculated students (1898) 1,515. The imports amount to about $45,000,000, and the exports to $65,000,000 annually. The chief languages spoken are the Dravidian, namely, Tamil, Telugu (which are spoken by the great majority of the inhabitants), Canarese, and Malayalam, while Hindustani is the language spoken by the Mohammedans.

Capital, Madras, situated on the E., or Coromandel coast of India, 885 miles S. W. of Calcutta, and 790 miles S. E. by rail of Bombay; has Fort St. George (1639), Government House (the governor's residence); churches and chapels of all de-

nominations (St. Mary's opened in 1680); the cathedral of St. George's; Presidency College; the central institution of the Free Church of Scotland's Mission; the Doveton Protestant College; the Medical and Civil Engineering Colleges; a flourishing school of art, established by Dr. A. Hunter in 1850, and now receiving official support (it has passed nearly 5,000 students); a central museum, annually visited by 120,000 persons; the government model farm in the immediate neighborhood, at Sydapet; public statues to Lord Cornwallis, Sir T. Munro, and General Neill. The city is supplied with water from the Red Hill Reservoir, and sanitation is carefully enforced. Though situated on an open, surf-beaten coast of the Indian Ocean, the city possesses an important maritime trade, equal to more than one-third that of the entire presidency. Ships anchor in the roads, a mile from the shore, in from seven to nine fathoms of water, and have always to put to sea in heavy weather. Communication is maintained by massoola boats and catamarans. A harbor, consisting of two piers of rubble and concrete, each 500 yards long, incloses a space of 170 acres, with enough water for the largest ships. This, however, affords no protection in case of cyclones, which are of frequent occurrence. The site of Madras was acquired in 1639 from the Hindu Rajah of Chandgherry, by Mr. Francis Day, the chief of the company's trading settlement at Armagon. Pop. (1901) 509,346.

Madreporaria, white stony corals or madrepores, a sub-order of *Zoantharia,* class *Anthozoa.* If the animal be simple it resembles a sea anemone, having one or more ranges of tentacles, with an internal disk opening in a small mouth. The body may be cup-like, flat, bell-shaped, tubular, or compressed like a fan. Externally, the body is covered with a disk, underneath which are various septa. A columella may or may not exist on the axis. The interstices and walls of the cells are always porous. Some corals are simple and separate, others are compound, budding from the parent. They exist on the floor of the sea at all depths, from water level down to 3,000 fathoms. The sub-order is very numerous, both in genera and individuals. The reef-building corals, among others, belong to it. It is divided into three groups: (1) *M. aporosa,* (2) *M. perforata,* and (3) *M. rugosa.*

Madrid (mä-*thrēth'*), the capital of Spain and of the province of Madrid, a part of New Castile, situated near the heart of the country, on the left bank of the Manzanares, a sub-affluent of the Tagus, and on a hilly, sandy plateau, 2,200 feet above the sea, treeless save in the vicinity of the city, and stretching away in the N. to the snow-capped Sierra de Guadarrama. One of the handsomest of European cities, it has a very modern aspect, and is partly surrounded by a brick wall 20 feet high, and pierced by 16 gates, the most notable being the Puerta de Alcalá (1759), a triumphal arch 72 feet high at the foot of the Calle de Alcalá, a magnificent street that traverses the city from N. E. to S. W. The city is girt with fine promenades and stately suburban villas embowered in beautiful gardens. On the E. side is the famous Prado, the evening resort of the people, with parterres, trees, and marble fountains. Outside the Puerta de Alcalá, in the Plaza de Torres, stood the circus for bull-fights erected by Philip V. to ac-



MADRID: ROYAL PALACE.

commodate 12,400 persons, which was taken down in 1874, when a new one was begun a little farther N.

Madrid has 72 public squares, of which the chief are the Puerta del Sol, the center of pleasure and business, the Plaza Mayor, 398 by 306 feet, the scene of the *auto-da-fé*, surrounded by colonnades, the Plaza Oriente in front of the royal palace, containing an equestrian statue in bronze of Philip III. and 44 other statues of kings and queens, and the Plaza de las Cortes, with a fine bronze statue of Cervantes. The great building in Madrid is the Real Palacio, on the W. side, between the city and the river. It is a square, 470 feet on each side, and 100 feet high, built (1737–1750), of granite and white marble, occupying an area of 220,900 square feet, inclosing a court 240 feet square, and containing a library of 100,000 volumes, an armory of 2,533 specimens, and a numismatic collection of 150,000 pieces. Madrid has also about 60 churches, several decorated by old masters, 44 monasteries, used since 1836 for secular purposes, 24 nunneries, 24 hospitals (one with 1,526 beds), 14 barracks, 100 elementary schools, several colleges or higher schools, a university, a medical school, a conservatory of music, eight theaters, four public libraries (the National with 230,000 volumes), eight museums, a botanical garden, an observatory, an academy modeled on that of Paris, etc. The royal museum in the Prado contains a gallery of 1,833 pictures, one of the richest collections in the world, with 65 by Velasquez, 58 by Ribera, 46 by Murillo, 10 by Raphael, 62 by Rubens, 43 by Titian, and 22 by Van Dyck. The Escurial is 26 miles N. W. of the city.

The industries of Madrid are slight, the chief manufactures being chocolate, beer, shoes, boots, plated ware, coaches, gloves, and fans. The commerce, however, is important, as Madrid is the entrepôt for all the interior provinces. Retail business is mainly in the hands of foreigners, mostly French, but most of the wholesale trade is carried on by native houses. The climate is described in a Spanish proverb as "three months of winter and nine months of hell." The temperature, which ranges from 18° to 105° F., is subject to frequent and sudden changes. Between the sunny and shady sides of a street the difference of temperature is sometimes as great as 20°. The prevailing winds are the parching *Solano* from the S. E. and the icy N. wind from the Guadarrama. Madrid, or Majerit, is first mentioned in history in the year 932, when it was taken by Ramiro II. of Leon. A strong outpost of the Arabs, it was captured by Alfonso VI. of Castile in 1083. Philip II. made it his capital in 1560, when it was still surrounded by extensive forests. From this time it grew rapidly into a fine city and became the center of the history of the Spanish people. Pop. (1900) 539,835.

Madrigal, in poetry, a little amorous poem sometimes also called a pastoral poem, containing some delicate and tender though simple thought, and consisting of not less than three or four stanzas or strophes. Madrigals were first composed in Italy, those of Tasso being accounted among the finest specimens of Italian poetry. In the 16th and 17th centuries especially the writing of madrigals flourished in England, the chief writers being Suckling, Carew, Lodge, and Withers. In music, an important species of vocal polyphonic composition which reached its highest development between the middle of the 16th and the middle of the 17th centuries. Madrigals are of various kinds: (1) Simple melodies accompanied by other parts not containing counterpoint or imitation; (2) elaborate compositions full of contrapuntal devices, sometimes consisting of two or more movements. Strictly speaking, madrigals are an unaccompanied class of pieces; a few, however, have been written with instrumental accompaniments. Madrigals are always sung by several voices to each part. The number of parts in which they were written varies from 3 to 10; but the favorite number of parts during the classical period above named was five or six.

Madstone, a stone which when applied to a wound caused by the bite of a mad dog is said to prevent hydrophobia. The most famous one in the United States is owned by the descendants of a family named Fred, in Virginia. This stone was brought over from Scotland in 1776. It is said to be the one spoken of by Sir Walter Scott in "The Talisman" and has been religiously preserved as one of the most valuable relics of the age. It is about two inches long by one inch broad, and about half an inch thick, and is of a chocolate color. When applied to the wound it adheres till all the poison is absorbed, when it drops off. It is then soaked in warm milk or water for a time, and when removed the liquid is found to be full of a greenish-yellow scum. It is said that of the 130 cases in which it has been applied for the bite of a mad dog. none ever suffered from hydrophobia.

The belief in a madstone was common hundreds of years ago in the East, and travelers in India in 1677 and 1685 make mention of it. Tradition said it grew on the head of certain snakes, but some think it was made by the priests. George T. Kunz, a New York expert in gems, identifies the madstone, or snakestone, of the East, with the stone known as tabersheer, which is a variety of opal found in the joints of the bamboo in Hindustan and

Burma. This stone is formed of juice which by evaporation becomes mucilaginous, then a solid substance, and when placed in the mouth will adhere to the palate or cause water to boil. Sir David Brewster says it is found in the joints of diseased corn-stalks and is formed by sap depositing silica; also that it is used in the treatment of fevers, colds and biliousness.

Madura (mä-dö′rä), a maritime district of India, in the S. of the presidency of Madras, bounded on the E. by the Gulf of Manaar, which separates Hindustan from Ceylon; area 8,401 square miles; pop. (1891) 2,608,404. Chief town is Madura, the third largest in the presidency; pop. (1901) 105,984. For nearly 2,300 years Madura was the political and religious capital of the extreme S. part of India. Its Pandyan kings are mentioned by the ancient Greek geographers. In the 17th century the Nayak rulers, chiefly Tirumala (1623–1659), built here a magnificent pagoda to Sundareswara (Siva), with a hall having 1,000 (997) pillars, a fine palace, now ruined, a summer palace for the god, and a great tank. The Jesuits have been active in Madura since the time of Tirumala.

Madura, an island of the Dutch East Indies, separated by a narrow strait from the N. E. of Java; area 1,764 square miles. It is mostly barren, but possesses numerous forests and salt marshes. Along with about 80 smaller islands, lying mostly to the E., it forms a Dutch residency; area, 2,040 square miles. The people, of Malay descent, resemble the Javanese, but are stronger, more enduring, and more enterprising; they make the best native soldiers in the colonial army. Pop. (1893) 1,554,889.

Madvig, Johan Nikolai, a Danish philologist; born in Svaneke, Bornholm, Aug. 7, 1804. He entered the University of Copenhagen, 1820, where he took his doctor's degree, 1826, and was appointed Professor of the Latin Language and Literature, 1829. His earliest works, "Emendations of Cicero on Laws, etc." (1826) and "On Asconius Pedianus" (1826), attracted much attention, and from this time he produced a series of critical works which have had great influence on scholarship, particularly in the direction of textual criticism. From 1848 to 1851 he was minister of religion and education. He entered the Landsthing in 1853, and in 1855 the Rigsraad, of which he was president till 1863. His political writings had a marked effect. He died in Copenhagen, Dec. 13, 1886.

Mæander (mē-an′dur), a river in Asia Minor, 200 miles long, which flows W. S. W. from Mount Aulocrene, in Phrygia, to the Ægean Sea, near Miletus. The proverbial windings of the Mæander made its name a synonym for a tortuous course.

Mæcenas, Caius Cilnius (mē-sē′nas), a man whose name is imperishably associated with the Augustan literature of Rome, was descended from the ancient kings of Etruria, and flourished in the 1st century B. C. He was the companion of Augustus in nearly all his campaigns, and his most trustworthy counsellor in political matters. For the three years 18–15 B. C., he was invested with the government of Italy, and he was always sent to Rome on any emergency, either with the Senate or the people, in case he was absent with Augustus. His great glory, however, was the happy influence that he exercised over the emperor as a patron of learning, and his own munificence and taste in the same direction. Vergil, Horace, and Propertius are best known to us as the guests of his hospitable mansion on the Esquiline Hill; but many others enjoyed his protection and friendship. Some poetical fragments of his remain to this day. Mæcenas was a constant valetudinarian; died in 8 B.C. Having no children, he bequeathed his property to Augustus.

MÆCENAS.

Maeder, Mrs. Clara Fisher. See FISHER, CLARA.

Maelar (mā′lär), **Lake of,** a lake of Sweden, running inland from the Baltic; length about 81 miles; average breadth, 13 miles; area, 525 square miles; contains upward of 1,200 islands. Its E. end is closed by Stockholm, where its waters are poured into the Baltic, the difference of level being about six feet. It is surrounded by the districts of Stockholm, Nykioping, Upsal, and Westeras.

Maelström (mēl′struhm) ("grinding stream"), or **Moskenström** a famous whirlpool, or more correctly current, between Moskenäs and Mosken, two of the Lofoden Isles. The strait is habitually navigated by vessels at high and low tide, though in one place the water is always rough and churned into angry foam. When the wind blows directly against the current it becomes extremely dangerous, especially with spring tides or during a N. W. wind. The stories of ships, whales, etc., being swallowed up in the vortex are simply fables; at the same time, a ship once fairly under the influence of the current would probably founder or be dashed upon the rocks, and whales have often been found stranded on the Flagstadt coast from the same cause. The current takes 12 hours to make a circular revolution. Edgar Allen Poe's imaginative description of the horrors of being sucked down by the Maelström is well

known. A like dangerous current is the Saltström, at the entrance of the Salten Fjord, where a vast mass of water is poured through a narrow opening at a terrific rate. Yet steamboats pass through the Saltström, though only at high or low tide.

Mænades (mē′na-dēz), the mad priestess of Bacchus.

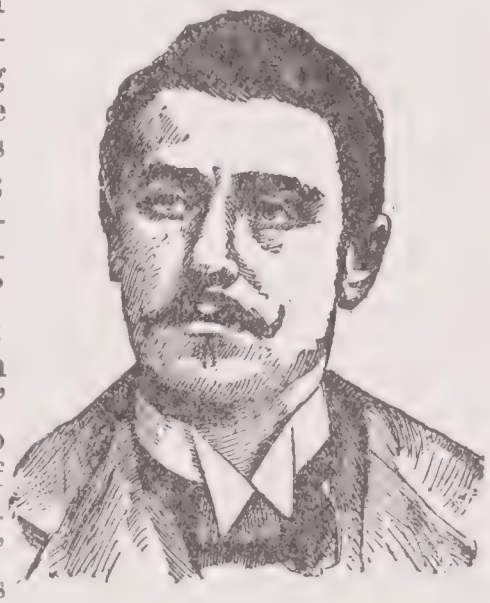
Maerlant, Jakob van (mär′länt), a Flemish poet; born probably in Maerlant, on the island of Voorne, about 1235. He founded the didactic school of poetry in the Netherlands, and has been called "the father of Dutch poets." His chief work was "Mirror of History," begun in 1283 but left unfinished. A statue has been erected to him at Damme. He died in Damme, near Bruges, in 1291.

Maestoso (mä-es-tō′sō), a direction in music that the passage to which it is appended is to be played with dignity, grandeur, and strength.

Maestricht (mäs′tri*ht*), the capital of the Dutch province of Limburg, 19 miles N. N. E. of Liège, situated on the left bank of the Meuse, a stone bridge (1683) connecting it with the suburb of Wijk; formerly an important fortress, it is still a garrison town, but the fortifications were dismantled in 1871–1878; the town hall, with spire and carillon (1662), contains many paintings and a library; and in the three-towered church of St. Servatius (12th–14th century), the cathedral once, is a "Descent from the Cross," by Van Dyck. But Maestricht's great sight is the subterranean quarries of the Pietersberg, formerly called Mons Hunnorum (Mount of the Huns, 330 feet). Their labyrinthine passages, 12 feet wide and 20 to 50 feet high, number 16,000, and extend over an area of 13 by 6 miles. They are supposed to have been worked first by the Romans, and, among other fossils, have yielded two heads of the huge MOSASAURUS (*q. v.*). The manufactures include glass, earthenware, and carpets; and the trade is considerable. Maestricht, called by the Romans Trajectum ad Mosam to distinguish it from Trajectum ad Rhenum (Utrecht), was six times besieged between 1579 and 1814, and in 1830 was the only town that withstood the insurgent Belgians. Pop. (1906) 36,257.

Maestricht Beds, in geology, a series of calcareous beds 100 feet thick, on the banks of the Meuse at Maestricht, about the age of the Faxoe beds — *i. e.*, the highest part of the Upper Cretaceous Rocks. Like the chalk immediately below, the Maestricht calcareous rock contains *Belemnitella mucronata, Pecten quadricostatus*, etc., also the genera *Braculites, Hamites*, etc., which are only Mesozoic. On the other hand, it has the univalve mollusks *Voluta* and *Fasciolaria*, genera not commencing elsewhere till the Tertiary. It is a connecting link between the Secondary and the Tertiary Rocks, but in all essential respects belongs to the former. In the Maestricht beds of St. Peter's Mount was found the huge reptile MOSASAURUS (*q. v.*)

Maeterlinck, Maurice, (mä′tur-link), a Belgian poet; born in Ghent, Flanders, in 1862. He was the foremost representative of the school calling itself "Young Belgium." Among his works are the dramas "The Blind"; 'The Intruder''; "Princess Maleine" (5th ed. 1891); "The Seven Princesses" (1891); also the volume of verse "Hot-House Blooms," and the essays "The Treasure of the Humble."



MAURICE MAETERLINCK.

Maffei (mäf-fā′ē), **Francesco Scipione, Marchese di,** an Italian playwright and antiquary; born in Verona, Italy, June 1, 1675. He studied in the Jesuit College at Parma. He spent the years 1703–1704 in military service, under his brother, Alessandro, who greatly distinguished himself in the Spanish war of succession, and who finally rose to the rank of a Field-Marshal; but Francesco's love of literature prevailed over the desire of military renown, and he devoted himself to literary pursuits. His tragedy of "Merope" (1714) was received with great approbation, and went through 70 editions in Maffei's lifetime. His comedy of "The Ceremony" (1728) was also successful. "Verona Illustrated" (1731–1732; new ed. 1827) is a work of much brilliancy and learning. After four years in France (1732–1736) he visited England, Holland, and Germany, then settled in his birthplace, where he died Feb. 11, 1755.

Mafia (mä-fē′ä), **The,** a Sicilian secret society akin to the CAMORRA (*q. v.*) in Naples. The Mafia, under one designation or another, runs back to the Middle Ages. It punished crimes against itself by death. A man who had injured one of the Mafiosi had his hand cut off; if he had overheard the secrets of the association he had his ears cut off, or the skin of his forehead flayed and turned down over his eyes — but these were only tokens; he was killed first, and mutilation was the intimation to his friends. Under the Bourbons its simplest

form was brigandage and sequestration of the person, to be held to ransom, default of which implied death. Members of the Mafia in the cities kept watch on the movements of people of wealth, and sent messengers to their colleagues outside to give information of them, so that they might be taken with the least trouble. When Sicily was annexed to Italy outlawry was increased by the addition of the partisans of the Bourbons, who pretended to be in insurrection. The disorders were suppressed by the bersaglieri, who scoured the country and tried by drum-head court-martial all the men they caught with arms, or who were accused of brigandage, and shot the condemned on the spot.

After the reëstablishment of civil rule in the island there was a revival of the Mafia. Minor crimes are still somewhat protected by the organization, but the policy of the government has been one of steady legal pressure and change of venue to the Continent for the trial of the criminals, and this is gradually paralyzing the Mafia. This policy resulted in the emigration of large numbers of the Mafiosi to the S. States of the United States. In New Orleans the order became especially strong, and was responsible for many secret assassinations. In 1890 the chief of police, Captain Hennessy, determined to stamp out the Mafia, but was himself shot down in cold blood by emissaries of the society. The assassins were arrested and tried, but the jury disagreed, partly from fear of the vengeance of the Mafias. Thereupon the law-abiding citizens rose in a body, broke open the jail, and shot a number of the culprits there confined. As a consequence, some of them being Italian citizens, the government of Italy made demand on the United States for reparation, and the Italian minister at Washington was temporarily recalled.

Magalhaens, Domingo José Gonçalve de (mä-gäl-yä'ens), a Brazilian poet; born in Rio Janeiro in 1811. From 1845 to 1867 he was Brazilian minister to Dresden, Naples, Turin, and Vienna. As a lyric poet he ranks high among his countrymen. His works include: "Poesias" (1832); and "Antonio José" and "Olgiato," two dramas which had great popularity in various translations. He died in 1882.

Magariños Cervantes Alejandro (mägä-rēn'yos ther-vän'tes), a Uruguayan miscellaneous writer; born in Montevideo in 1826. He wrote: "Historical Studies on the River La Plata"; "Church and State"; several volumes of poems; etc.

Magazine Rifle, a rifle that contains within itself, presumably in or near the butt, a magazine or reservoir holding a limited number of cartridges, combined with a mechanical action which, by trigger pressure only — or at all events with the aid of one other motion — performs all the functions of loading; so that, the magazine being filled beforehand, the firer can repeat his shots almost as quickly as he can take aim and fire.

Magdala (mäg-dä'lä), a hill-fortress and small town of ABYSSINIA (*q. v.*), 300 miles S. of Annesley Bay, on the Red Sea, perched on a plateau 9,110 feet above sea-level. It was the place of captivity of the British prisoners for whose rescue an expedition was sent out under Sir Robert Napier (Lord Napier of Magdala); and on April 13, 1868, the town was burned and its defenses destroyed.

Magdalena (mäg-dä-lā'nä), the principal river of Colombia, rising in the Central Cordillera, lat. about 2° N., and only 8 miles from the source of the Cauca. These streams flow N. on either side of the Cordillera, uniting about 130 miles from the sea. The Magdalena, which ends in a large delta, is closed to sea-going vessels by a bar with dangerous shifting sands; merchandise is conveyed by a railway (18 miles) from Barranquilla to Puerto Colombia, the shipping port, where a pier has been built. The river is navigable to Honda, 500 miles, where the rapids begin; above these it has been navigated by a German steamer to Nieva since 1875, and a railway (20 miles) alongside the rapids connects the upper and lower sections. The Magdalena's drainage area is calculated at 92,900 square miles.

Magdalen, or **Magdalene, Mary,** that is, Mary of Magdăla, a woman mentioned in the New Testament as having had seven devils cast out of her, as watching the crucifixion, and as having come early to the sepulcher on the resurrection morning. She was erroneously identified as the "woman who was a sinner" (Luke vii: 37), and hence the term Magdalen came to be equivalent to a penitent fallen woman.

Magdeburg, a German city, the capital of Prussian Saxony; situated on the Elbe river (which here forms several branches); 76 miles W. S. W. of Berlin. The old town is situated on the left or W. bank of the W. branch (Strom Elbe) of the Elbe; and on the same side of the river are the suburbs of Neustadt (new town) to the N., Buckau to the S. E., and Sudenburg to the S. W. of the old town. Of these suburbs only Buckau and the older part of the new town extend to the river bank. The other main branch of the river, known as the Old Elbe, is situated E. of the Elbe proper, which it leaves nearly opposite Buckau and rejoins a little below the older part of the Neustadt. Between these two branches is an island on which, besides a park and extensive meadows, etc., is the suburb of

Werder, divided into a W. and an E. portion, known respectively as Little and Great Werder, by a narrow channel, called the Zoll-Elbe, which terminates in the harbor called the Winter-Hafen. Immediately S. of Little Werder is the citadel. The suburb of Friedrichstadt lies on the right bank of the Old Elbe, facing Great Werder. The old town communicates with Friedrichstadt by a continuous roadway which is carried by means of bridges across the island and Elbe. The river is also bridged by the railways to Berlin. Besides the harbor basin already mentioned there is the Handel-Sicherheits-Hafen to the W. of the Elbe proper, and opening into the united stream in the N.

Magdeburg ranks as a fortress of the first class, and is one of the strongest places in Europe. Its defensive works have been reconstructed since 1866, but the citadel is still of defensive value. The houses are for the most part large and handsome, but in the older parts are very much crowded together, and a great number of the streets are narrow. The principal are the Breite Weg, with many old buildings, running N. and S. through the old town, and the Kaiser Strasse, with many fine buildings, running parallel to it on the W., and joining it on the S., in the Hasselbach Platz. The chief squares are the New Market or Domplatz; the Old Market, which is decorated with an equestrian statue of the Emperor Otho, erected in 1290, and since renewed; and the Kaiser Wilhelm Platz, with an equestrian statue of William I. (1897). The buildings most deserving of notice are the Dom, or cathedral, one of the noblest Gothic structures of Northern Germany, erected in 1208–1363 and repaired in recent times at immense expense, flanked by two towers, and remarkable within for the height of its ceiling, the beauty of its chancel and baptistery, and a number of interesting monuments; the Roman Catholic Marienkirche, older even than the cathedral, and restored in 1890–1891; St. Sebastian's Church; the town house in the Old Market; the former royal palace, now temporarily used as a museum; the government buildings, like the last, in the Domplatz; the new town buildings with the town library of 30,000 volumes; the Dom gymnasium, also with a valuable library; the royal educational seminary; real gymnasia; several other educational institutions, among them some technical schools; the old town theater, and some newer ones; several hospitals and benevolent institutions; etc.

As the capital of the province Magdeburg is the seat of a number of courts and public offices. The manufactures comprise ships, machinery, castings, armor plates, chemicals, spirits, pottery, sugar, cottons, ribbons, leather, beer, soap, cigars, etc. The iron and machine works are mostly in Buckau. The trade, which derives great facilities from the position of the town on the Elbe, the canal connecting it with the Havel, and the railroads to Leipsic, Halle, Berlin, and Hamburg, is of great importance. The principal articles are sugar (for which Magdeburg is the chief center in Germany), hardware, corn, wood, coal, wine, cotton, chicory, colonial produce. There are electric and steam railroads. Magdeburg is a place of great antiquity, and is mentioned in records in the 8th century, It early distinguished itself in the Reformation and long exerted a powerful influence in its favor. In 1631, after a siege in which it valiantly defended itself, it was taken by storm and given up to indiscriminate massacre by the brutal Tilly. Above 20,000 people were murdered and the greater part of the town was laid in ashes. Pop. (1910) 279,664.

Magellan (ma-jel'an), the incorrect but generally received name of **Magalhaens, Ferdinand** (mä-gäl-yä'ens), a celebrated Portuguese navigator; born in Saboroso, Portugal, about 1480. In 1520 he discovered and passed the straits which have since been called by his name and was the first to circumnavigate the world. His services not being valued by his own country, he offered them to Charles V. of Spain, who intrusted him with a fleet destined to attempt a W. passage to the Moluccas; hence his discovery. He was slain in a skirmish with the natives on Mactan, one of the Philippine Islands, April 27, 1521.

FERDINAND MAGELLAN.

Magellan, Strait of, a sea-passage separating South America on the S. from Tierra del Fuego; length 375 miles, breadth

from 12 to 17 miles. It was discovered by Magellan in 1520, and first thoroughly explored by King and Fitzroy in the "Adventure" and "Beagle" (1826–1836). The wider E. half is bordered by level, gently-rolling grassy plains. The narrower W. half is shut in by steep, wooded mountains; the current runs strong through it, and the W. winds are a great hindrance to sailing vessels. There are several fine harbors along this part of the strait.

Magendie, François (mä-zho*ng*-dē'), a French physiologist and physician; born in Bordeaux, France, Oct. 15, 1783. He studied at Paris, became successively prosecutor in anatomy (1804), physician to the Hôtel-Dieu, member of the Academy of Sciences (1819), and Professor of Anatomy in the College de France (1831). He made important additions to the knowledge of nerve-physiology, the veins, and the physiology of food, and wrote numerous works, including the "Elements of Physiology." He was likewise the founder, and for 10 years the editor, of the "Journal of Experimental Physiology," in which are recorded many of the experiments on living animals which gained for him, too deservedly, the character of an unscrupulous vivisector. He died in Paris, France, Oct. 7, 1855.

Magenta (mä-jen'tä), an Italian town, 18 miles W. of Milan. Here, on June 4, 1859, 55,000 French and Sardinians defeated 75,000 Austrians, the latter losing 10,000 (besides 7,000 prisoners), and the allies only 4,000. For this victory Macmahon received his dukedom. For the coal-tar color, see Dyeing.

Magenta, Duc de. See Macmahon.

Maggiore (mäd-jō're), **Lago,** one of the largest lakes in Italy, the Lacus Verbanus of the Romans, situated for the most part in Italy, but also partly in the Swiss canton of Ticino; length 39 miles, breadth from ½ mile to 5½ miles; 646 feet above sea-level, with a maximum depth of 1,158 feet. The river Ticino flows through it. In a S. W. expansion of the lake are the Borromean Islands (*q. v.*). On the N. and W. it is surrounded by granitic mountains, 7,000 feet high, on the S. and E. by vineyard-covered hills.

Maggot. See Grub.

Magi (mā'ji), a sect of priests among the ancient Medes and Persians. They formed one of the six tribes into which the Medes were originally divided, and on the downfall of the Median empire they continued to retain a great degree of power and authority with the conquerors, being the recognized ministers of the national religion. The great apostle of their religion was Zoroaster. They were so celebrated for their enchantments, that they have given name to the art of magic or enchantment. They were also learned as astrologers, and their name was applied to anyone celebrated for wisdom; hence, the wise men of the East who came to see Jesus are simply called magi. See Gueber.

Magic, the art or pretended art of putting in action the power of spirits; the science or art of producing preternatural effects by the medium of supernatural means, or the aid of departed spirits, or the occult powers of nature. A belief in magic is to be reckoned among the earliest growths of human thought. It is everywhere present, in a greater or less degree, in an inverse ratio to the progress of civilization. Outlying races and castes and sects, once dominant, but which have now lost their supremacy, are credited with the possession of supernatural powers by those who have succeeded to the lost position. Thus gipsies and clairvoyants reap a rich harvest from the credulity of many unlearned, superstitious people. It is noteworthy that in Ireland miraculous power is attributed to suspended — or, as they are euphemistically called "blessed" — priests, rather than to the ordinary clergy. The practice of magic had its origin in the belief in an objective connection between two things — a man and a rude drawing or image of him, or two events — as between the birth of a child and the rising or setting of a particular star, when, in truth, the connection could only be subjective.

Black magic: Magic proper, or that division of it which in former times fell into the hands of unofficial persons, or was practised with malefic intentions. Celestial magic: A supposed supernatural power which gave to spirits a kind of dominion over the planets, and to the planets an influence over man. Natural magic: The art of applying natural causes to produce effects apparently supernatural. Superstitious or goetic magic: The invocation of devils or demons involving the supposition of some tacit or express agreement between them and human beings. White magic: (a) Magic practised for the benefit of others. (b) The art of performing tricks and exhibiting illusions by aid of apparatus, excluding feats of dexterity in which there is no deception, together with the performance of such automaton figures as are actuated in a secret and mysterious manner.

Magic Circle, a circle invented by Franklin, founded on the same principles and possessing similar properties with the magic square of squares.

Magic Lantern, an instrument by which the images of objects, usually, but not al-

ways, transparent, and paintings or diagrams drawn on glass are exhibited, considerably magnified, on a wall or screen. Its invention has been attributed to Roger Bacon about 1261, but it was first generally made known by Baptista Porta in his "Natural Magick," and by Kircher, 1669–1670, who described it in his "Great Art of Light and Shade." The instrument consists of a case or box to confine all scattered rays from some powerful light which occupies the center, and which may be aided by a reflector. On one side of the box powerful lenses condense the diverging rays on the painting or other object, which slides in a sort of stage. Another object glass, or focussing lens, usually achromatic, throws the image of the highly illuminated object on the screen, the focus being adjusted by sliding this lens nearer to or farther from the object, usually by a rack and pinion. The magnitude of the image depends on the relative distances of the object from the lens, and of the lens from the screen. Powerful lanterns give a brilliant picture 20 feet in diameter of a slide three inches in diameter.

Magic Square, a square figure formed by a series of numbers in mathematical proportion, so disposed in parallel and equal rows that the sum of the numbers in each row or line, taken perpendicularly, horizontally, or diagonally, are equal.

Magill, Mary Tucker, an American writer; born in Jefferson co., Va., Aug. 21, 1832. After the Civil War she conducted Angerona College for Girls, at Winchester, Va. Besides magazine sketches she wrote: "The Holcombes" (1868); "Women; or, Chronicles of the Late War" (1870); "School History of Virginia" (1877); and "Pantomimes; or, Wordless Poems" (1882). She died near Richmond, Va., April 29, 1899.

Magilp, or **Magilph,** in painting, a vehicle for colors, consisting of linseed which has been long exposed to the oxidizing influence of the air mixed with a certain proportion of mastic varnish.

Magilus (maj'-), in zoölogy, a genus of siphonostomatous gasteropods, family *Buccinidæ*. It contains but one species, *M. antiquus,* parasitic in live corals in the Red Sea, and on the coast of Java and the Mauritius. When young the shell of *Magilus* is spiral and thus, as the animal eats its way horizontally through the living mass of coral, it becomes prolonged into an irregular tube, filled with solid shell matter, the animal residing at the extremity. The tube is sometimes 15 inches long and very heavy. The animal has a concentric lamellar operculum, with its nucleus near the outer edge.

Maginn, William, an Irish author; born in Cork, Ireland, July 10, 1793. He was educated at Trinity College, Dublin, and established himself as a literary man in London. He was for long a regular contributor to "Blackwood's Magazine," and was successively editor of the "Standard," of "Frazer's Magazine," etc. Notwithstanding his splendid scholarship and talent for popular writing, his irregular habits brought him to bankruptcy and a debtor's prison. He is best known as the author of "The City of Demons" and "Bob Burke's Duel with Ensign Brady." His "Homeric Ballads," "Shakespeare Papers," etc., were collected and published after his death in Walton-on-Thames, Surrey, England, Aug. 21, 1842.

WILLIAM MAGINN.

Magna Charta (kar'tä), or **Magna Carta,** originally the Great Charter of the liberties of England and subsequently of the whole civilized world (*Magna Charta Libertatum*), signed and sealed by King John at the demand of his barons, at Runnymede, on June 19, 1215. It was several times confirmed by his successors. Its most important articles were:

1. Relating to the Church: That the Church should possess all its privileges inviolate, especially freedom of election to benefices.
2. Relating to the Barons: That reliefs be limited to a fixed sum, according to the rank of the tenant: That aids be demanded only in the three cases — knighthood of the eldest son, marriage of the eldest daughter, and the ransom of the king's person; in every other case neither aid nor scutage to be imposed but with the consent of the council: That guardians in chivalry may not waste the estate, nor marry the heir during minority; nor to their disparagement, nor compel widows to marry: That the forest law be mitigated; and that whatever privileges the king grants his vassals, they in like manner shall grant to theirs.
3. Relating to Traders: That London and other towns retain their ancient privileges: That there be one weight and measure throughout the realm: and that freedom of commerce be granted to foreign merchants.
4. Relating to Freemen Generally: That right or justice be not sold, or refused, or delayed: That no freeman be imprisoned, or lose his freehold, or free customs, or be outlawed, or otherwise punished, but by the judgment of his peers or by the law of the land: That no person be fined to his utter ruin, but only according to his offense and means of payment, and that no man be deprived of his instruments of labor: That all men may travel out of the kingdom and return when they please: That a man may make what will he pleases, and, dying without one, the law shall

make one for him; and that the Court of Common Pleas shall no longer follow the king's person, but be held in some certain place and be open to all.

It will be seen from the following extract that Magna Charta no longer exists in the letter:

"Just before the weary Commons adjourned, they read a third time, and passed a bill repealing a number of obsolete statutes, among which was "Magna Charta." It was obvious that the spirit of the Great Charter had long since been embodied in a number of Acts of Parliament and legal decisions ranging between the time of King John and that of Queen Victoria." — London "Daily Telegraph."

Magna Græcia (grē'shiä), or **Major Græcia,** in ancient history, the name applied by Greek writers to their colonies formed on the S. shores of Italy, Cumæ having by general consent the precedence in point of antiquity, though the date of its foundation 1050 B. C. is not to be relied on. There is much uncertainty as to the precise dates of the various settlements; but the greater number of them were probably made between 735 B. C. and 685 B. C. Sybaris, 720 B. C., and Crotona, 710 B. C., the two most powerful cities, were founded by the Achæans. Tarentum, a Spartan colony, was established about 708 B. C.; Metapontum by the Achæans, 700–680 B. C.; and Locris by the Locrians, about 700 B. C.

Magnesia (-nē'shiä), in mineralogy, the same as periclase. Used as a drug, if administered in small doses, magnesia acts as an antacid; if in quantity beyond what is necessary to neutralize acids in the stomach, it passes undigested into the intestines, and may form concretions. The salts of magnesia are purgatives. It is given as a lithontriptic, from its power of dissolving uric acid, and in gouty diseases.

Magnesian Limestone, a limestone composed of carbonate of lime and carbonate of magnesia, the proportion of the latter sometimes being nearly 50 per cent. It effervesces much more slowly with acids than common limestone (carbonate of lime). It is sometimes earthy, sometimes hard and compact. One variety of it is DOLOMITE (*q. v.*). This Rutley makes a synonym of magnesian limestone. The typical kind of magnesian limestone, generally associated with marl slate, is from the Middle Permian. Its characteristic fossils are *Schizodus schlotheimi, Mytilus septifer,* etc. It was originally formed in large measure of the remains of marine animals.

Magnesium (-nē'shium) (Latinized from Magnesia, a city in Asia Minor), in chemistry, a diatomic metallic element; symbol, Mg; at. wt. 24.4; sp. gr. 1.743. Fuses and volatilizes at a red heat. Magnesic sulphate (Epsom salts) was known in the middle of the 17th century, but the metal was first isolated by Davy. The compounds of magnesium are widely distributed in nature, occurring as magnesite, $MgO''CO$; ophite or serpentine, MgO''_3Si_2O; talc, $MgO''_4Si_5O_6$; dolomite, kainite, epsomite, etc. It may be obtained by the electrolysis of fused magnesium chloride, or by reducing magnesium chloride with metallic sodium. It is a brilliant metal, almost as white as silver, and preserves its luster in dry air. It is more brittle than silver at ordinary temperature; but at a higher temperature it becomes malleable and may be pressed into the form of wire or ribbon. Magnesium ribbon may be ignited at the flame of a candle, and burns with a dazzling bluish-white light rich in chemically active rays, a property which has led to its use in photography. When burned in an atmosphere of carbonic acid gas it decomposes the gas, forming magnesic oxide, and throwing down the carbon in powder. Magnesium dissolves in dilute acids, with violent evolution of hydrogen, but it does not decompose water even at 100°.

Magnetic Perturbation. See PERTURBATION.

Magnetism, the science which treats of the phenomena exhibited by magnets — phenomena due to one of those forces which, like electricity and heat, are known only by their effects. The phenomena of magnetism were first observed in the loadstone or magnet (so named from magnesia in Asia Minor). The loadstone is a kind of iron ore (magnetic iron ore), and is found in many parts of the world, especially in the Scandinavian peninsula and in Siberia. It has the power of attracting small pieces of iron and steel, and when suspended in such a way as to be able to move freely, always points to what are called the magnetic poles of the earth, that is nearly N. and S. A piece of loadstone forms a natural magnet, and has the further remarkable power of giving all its own properties to hard iron or steel when these bodies are rubbed by it. A bar or mass of iron or steel to which the peculiar properties of a natural magnet have been imparted by friction from other magnets or by electric induction is called an artificial magnet. When freely suspended, all magnets, natural and artificial, rest with their lengths in a N. and S. direction, and this property is utilized in the well-known compass. They attract iron and other magnetic substances with a force increasing from the middle of the magnet to its extremities, which are called its poles. The magnetism at the two poles is different, that pole which points to the N. is distinguished as the north or north-seeking or austral pole, or by the sign plus (+); that which points to the S. as the south or south-seeking or boreal pole, or by the sign minus (—). The poles of the same denomination repel each other, while those of different names have mutual attraction, thus resembling the two elec-

tricities, positive and negative. The intensity of this attraction and repulsion varies inversely as the square of the distance, a law which also governs electrified bodies.

Magnetism pervades the earth as electricity does the atmosphere. It assumes a totally different form in different substances; the metals iron, nickel, and cobalt being strongly attracted by the magnet; others such as bismuth, copper, silver, gold, etc., being as strongly repelled (see DIAMAGNETIC). The space in the neighborhood of a magnet is called the magnetic field; a piece of soft iron brought into this space becomes magnetic, but it loses its magnetism as rapidly on removal from the field (see INDUCTION, MAGNETIC). Steel has coercive force, in virtue of which it requires time for magnetization, and retains its magnetism on removal from the field. Hard steel may be made magnetic by rubbing it several times in the same direction with a powerful magnet, and hence it is easy to multiply magnets. The most powerful permanent magnets are produced by rubbing bars of steel on electro-magnets (see ELECTRO-MAGNETISM), or by moving them backward along the axis of a coil of wire in which an electric current is passing. A bar is magnetized to saturation when its magnetism is as great as it can retain without future sensible loss. When a magnet is broken into a number of pieces each piece is found to be magnetic, and its N. pole is found to have been directed toward the N. pole of the unbroken magnet. When these pieces are put together again, poles placed in contact nullify each other, and the original magnet is reproduced.

Terrestrial magnetism, which pervades the whole earth, is extremely complicated. It becomes manifest by its influence on the magnetic needle, varying with the time and place over the earth. One pole of the needle points toward the N., the other toward the S. There are, however, only two lines on the surface of the earth on which it points directly N. and S., and where the magnetic and geographical meridians appear to coincide. Elsewhere the needle deviates more or less from the true N. This is termed the declination of the needle, and varies from place to place, and in the course of time at the same place (see ISOGONIC). When a needle is balanced on a horizontal axis, so that it can turn in a vertical plane, the extremity attracted by the nearer magnetic pole of the earth points more or less downward (see DIPPING NEEDLE). The angle thus made is called the dip or inclination, and the lines marking equal inclinations on a map are called isoclinal lines. They intersect the isogonal lines, and the dip increases toward the perpendicular as the magnetic poles are neared. These magnetic poles do not coincide with the geographical poles, the N. being 70° 5′ N., and 96° 43′ W. The S. is probably at 73½° S. and 14½° E. There are two foci of maximum force in the Northern Hemisphere and two in the Southern. In the Northern Hemisphere the stronger focus is assumed to be in 52° and 90° W., and the weaker in 70° N. and 115° E. In the Southern Hemisphere the stronger focus is assumed to be in 65° S. and 140° E., and the weaker probably in 50° S. and 130° E. The earth's magnetism is subject to vast unaccountable commotions or storms of immense extent, which occur at irregular intervals and are of short duration. They are often connected with manifestations of electrical phenomena, such as the aurora borealis, or thunder storms. These disturbances are made manifest by irregular motions of the magnetic needle. The various phenomena connected with terrestrial magnetism are now automatically recorded and systematized in the interests of meteorology. The magnetic equator or line of no dip crosses the terrestrial equator in several places, extending alternately on each side, but never deviating more than 12° from it.

Magneto-Electricity, the science which treats of the production of electricity by means of a magnet. It was discovered in 1831 by Faraday, who succeeded in generating an electric spark by suddenly separating a coiled keeper from a permanent magnet. He subsequently discovered that an electric current existed in a copper disk rotated between the poles and a magnet. This is not to be confounded with electro-magnetism, discovered by Oersted, which investigates the action of an electric current on a magnet, the process being the converse one to that in the former case.

Magnetometer, an instrument for measuring any of the magnetic elements, as the dip, inclination, and intensity. A magnetized needle, isolated from all disturbing influences and suspended by untwisted silk, is used to detect the declination, and the delicate mode of adjustment permits any variation in this element to be observed. For observing the dip or inclination, the magnetized needle is balanced by knife edges on agate planes.

Magnificat, the song of the Virgin Mary, which, in the Vulgate, begins with "Magnificat." See BREVIARY.

Magnin, Charles (mā-nya*ng*′), a French critic and poet; born in Paris, France, Nov. 4, 1793. He was one of the directors of the National Library in 1832. Besides poetry, he wrote: "Racine" (1826), a successful comedy; "The Origins of the Modern Stage" (1838); "Historical and Literary Talks and Meditations" (1843); "History of Puppet Shows" (1852); etc. He died in Paris, France, Oct. 8, 1862.

Magnitude, in astronomy, a term applied to the apparent size of stars viewed from the earth. There are six magnitudes. In geometry, the term was originally applied to signify the space occupied by a body. As thus used, it applied only to those portions of space which possessed the three attributes of extension — length, breadth, and thickness, or height. By extension of meaning it has come to signify anything that can be increased, diminished, and measured. Thus, a line or a surface, an angle or a number, are magnitudes. Time and weight are magnitudes; and, in general, anything of which greater or less can be predicated is a magnitude. In physics, the same as EXTENSION (*q. v.*). Apparent magnitude of an object, in optics, the angle which any object subtends at the eye of an observer.

Magnolia [named after Pierre Magnol (1638–1715), Professor of Medicine at Montpellier, and author of several botanical works], the typical genus of the tribe *Magnolicæ* and the order *Magnoliaceæ*. Sepals three, deciduous; petals, six to nine; stamens and pistils many; carpels compacted in spikes or cones; seeds baccate, somewhat cordate, pendulous, with a long white umbilical thread. The species are trees or shrubs, with alternate leaves and large, terminal, odoriferous flowers. They are found in North America and Asia. *M. grandiflora*, the great-flowered magnolia, or laurel bay, is a fine evergreen tree, 70 feet high in America, and from 20 to 30 in foreign gardens. The species have large, beautiful, fragrant flowers. Those of *M. conspicua* are snow-white, and those of *M. pumila* brownish-green. De Candolle says that those of *M. tripetala* produce sickness and headache. Barton reports that *M. glauca*, the dwarf sassafras, or beaver tree, produces paroxysms of fever. The bark is intensely bitter, but has in it no tannin or gallic acid; it has the properties of cinchona. Its "cones" are employed as a remedy in cases of chronic rheumatism. Those of *M. yulan* are similarly used in China. The "cones" of *M. frazeri*, called also *M. auriculata*, and *M. acuminata*, called, in the United States, cucumber trees, are infused in brandy or whisky, and given in intermittent fevers and rheumatic affections. *M. excelsa* furnishes a valuable timber of fine texture, first greenish, then yellow.

Magnus (mäg'nös), or **Magni** (mäg'nē), **Olaus,** a Swedish historian; born in Linköping in 1490. He became secretary to his elder brother Johannes, Archbishop of Upsala. At the Reformation both brothers went abroad, and ultimately settled in Rome. On the death of Johannes, Olaus became titular archbishop. Both brothers wrote on Swedish history; the famous work of Olaus is his "History of the Northern Nations" (1555). He died in 1558.

Magog. See GOG AND MAGOG.

Magoon, Elias Lyman, an American clergyman; born in Lebanon, N. H., Oct. 20, 1810. Among his published works are: "Eloquence of the Colonial Times" (1847); "Proverbs for the People" (1848); "Republican Christianity" (1849); and "Westward Empire" (1856). He died in Philadelphia, Pa., Nov. 25, 1886.

Magootee (-gö'-), an instrument used by the Pambatees or snake-charmers of the East Indies. It is composed of a hollow calabash, to one end of which is fitted a mouthpiece similar to that of the clarinet. To the other extremity is adapted a tube perforated with several holes, which are successively stopped by the fingers, like those of the flute, while the player blows into the mouthpiece. In the middle of the instrument is a small mirror, on which the serpents fix their eyes while dancing. Sometimes bright beads are attached, which serve the same purpose as the mirror.

Magpie, a well-known bird of the family *Corvidæ*. It is the *Corvus pica* of Linnæus, *Pica caudata, melanoleuca,* or *rustica* of later ornithologists. It is an extremely beautiful bird, the pure white of its scapulars and inner web of the flight feathers contrasting vividly with the deep glossy black of the body and wings, while the long tail is lustrous with green, bronze, and purple reflections. It builds an almost impregnable nest, with a dome of firmly-interwoven sticks, and lays from six to nine bluish-green eggs, blotched with ash-color. In military parlance, a shot striking the target in the division next to the outermost in a target divided into four sections; so called because signalled by the marker with a black and white disk.

Magruder, John Bankhead, an American military officer; born in Winchester co., Va., Aug. 15, 1810. He was graduated at the United States Military Academy; served in the Mexican War; at the outbreak of the Civil War entered the Confederate army; took part in the battle of Malvern Hill, July 1, 1862, being in command as Major-General; was appointed commander of the Department of Texas, Oct. 16, 1862; afterward served under the Emperor Maximilian, of Mexico; and died in Houston, Tex., Feb. 19, 1871.

Magruder, Julia, an American prose-writer; born in Charlottesville, Va., Sept. 14, 1854. She wrote: "Across the Chasm," anonymous (1885); "At Anchor" (1887); "A Magnificent Plebeian" (1887); "Princess Sonya"; "Violet"; "Dead Selves"; "A Realized Ideal"; "A Heaven-Kissing Hill"; "A Beautiful Alien"; etc. She died June 9, 1907.

Maguey, the *Agave Americana,* from which PULQUE (*q. v.*) pita flax, etc., are made.

Mahabharata (ma-hä-bhä'ra-ta), one of the two great epic poems of India, the other being the Ramayana. Its leading theme is the contest, perhaps, in the main, historic, between the Kurus and the Pandus, two dynasties of ancient India, both descended from Bharat, King of Hustinapoor. Dhritarashtra, the father of Duryodhana and the Kurus, was the legitimate heir to the throne, but being blind, he was supplanted by his cousin Yudhistiras, the eldest of the five Pandu princes. Ultimately, by the aid of Krishna, the usurping Pandus were firmly established in the sovereignty of Northern India. With this main theme are interwoven episodes, moral reflections, and digressions of all kinds, constituting about three-fourths of the present poem. The discourse between Krishna and Urjoon on the eve of a battle constitutes the BHAGAVATGITA (*q. v.*). The roots of some portions of modern Hinduism are in the Mahabharata. The worship of Krishna, as one with Vishnu and the universe, has its origin here.

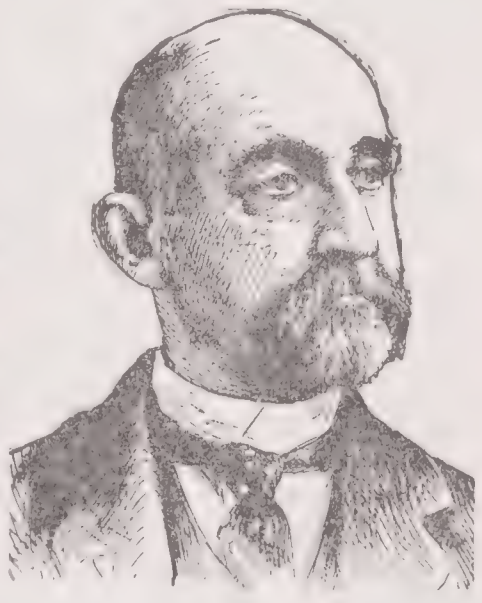
Mahadeva (mä-hä-dā'va), in Hindu mythology, a deity who shares the attributes of Siva in the latter Indian Trimûrti, or Trinity. These attributes vary greatly, Mahadeva being regarded as a generator as well as a destroyer.

Mahaffy, John Pentland, an Irish educator; born in Switzerland in 1839. He was educated in Germany and at Trinity College, Dublin, being graduated in 1859, and winning a fellowship in 1864. He was made Professor of Ancient History there in 1869; was Donnellan lecturer 1873–1874; received several degrees, and was member of a number of learned societies. He was noted for a wide range of scholarship, and was a frequent contributor to periodicals and published books on many subjects. Among these are "Lectures on Primitive Civilization" (1868); "Prolegomena to Ancient History" (1871), treating of Egyptian antiquities; "Greek Social Life from Homer to Menander" (1874); "Rambles and Studies in Greece" (1876); "History of Greek Classical Literature" (1880); "Story of Alexander's Empire" (1890); "Greek Pictures" (1890); "Empire of the Ptolemies" (1896) etc.

JOHN P. MAHAFFY.

Mahaleb (ma-hā'leb), a species of cherry (*Cerăsus Mahaleb*), whose fruit affords a violet dye and a fermented liquor like kirsch-wasser. It is found in the middle and S. of Europe. Its flowers and leaves are used by perfumers, and its wood by cabinet makers.

Mahan, Alfred Thayer (ma-han'), an American naval officer and writer; born in West Point, N. Y., Sept. 27, 1840; was graduated at the United States Naval Academy in 1859; served in the Civil War; was president of the Naval War College, Newport, in 1886–1889 and 1890–1893; visited Europe in command of the "Chicago" in 1893, receiving many honors, among them degrees from both Oxford and Cambridge. He was retired at his own request Nov. 17, 1896. During the war with Spain he was a member of the Naval Board of Strategy; and in 1899 was appointed by President McKinley as one of the American delegates to the Universal Peace Conference at The Hague. His chief work "Influence of Sea Power upon History" (1890), with its continuation, "Influence of Sea Power upon the French Revolution and Empire" (1892), gave him a world-wide reputation. He published also: "The Gulf and Inland Waters" (1883); "Life of Admiral Farragut" (1892); "The Interest of America in Sea Power, Present and Future" (1897), a compilation of his magazine articles; "Life of Nelson" (1897); "Lessons of the Spanish War" (1899); "The Problem of Asia" (1900); "The South African War" (1900); "Types of Naval Officers Drawn from the History of the British Navy" (1901); etc.



ALFRED T. MAHAN.

Mahan, Asa, an American clergyman and educator; born in Vernon, N. Y., Nov. 9, 1800. He was president of Oberlin College, 1838–1850; of Cleveland University, 1850–1856; of Adrian College, Mich., 1860–1871. Among his works were: "System of Intellectual Philosophy" (1845); "Science

of Logic" (1857); "History of Philosophy" (1883). He published "Scripture Doctrine of Christian Perfection" (1839) in support of perfectionist views. He died in Eastbourne, England, April 4, 1889.

Mahánadí (mä-hä-nud'i) ("the great river"), a river of India, rising in the Central Provinces, in lat. 20° 10′ N., lon. 82° E. After an E. course of 520 miles, 300 miles of which are navigable, having divided into several branches at or near the town of Cuttack, which forms the head of its delta, it flows E. and S. E. through the district of that name, and falls by several mouths into the Bay of Bengal. The catchment basin of the Mahánadí is less than 44,000 square miles, yet its maximum discharge in time of flood equals that of the Ganges — 1,800,000 cubic feet per second — and exceeds that of the Mississippi. An elaborate system of canals has been constructed to take advantage of this abundance.

Mahanoy City, a borough in Schuylkill co., Pa., on Mahanoy Creek and on the Lehigh Valley and the Philadelphia and Reading railroads; 13 miles N. E. of Pottsville. It contains a public library, electric lights, National banks, daily and weekly newspapers, and churches of all the leading denominations. It is located in a rich anthracite coal region, from which it gains much of its prosperity. It has about 20 colleries, several potteries, iron foundries, etc., and an assessed property valuation of over $2,000,000. Pop. (1890) 11,286; (1900) 13,504; (1910) 15,936.

Maharajah (literally, a great king), a title applied in courtesy to every Indian rajah, or to any person of high rank or deemed holy.

Maharajpore (mä-hä-räj-por'), a village in Gwalior State, Central India, 15 miles N. W. of Gwalior fort, scene of the defeat of Scindia's forces by the British under Sir Hugh Gough, Dec. 29, 1843.

Mahatma (-hat'-), a word meaning "the great-souled one," and applied among the Brahmans to one who has attained the highest possible point of spiritual enlightenment. It is used as a term of respect.

Mahávansha (ma-hä-va*ng*'sha), two celebrated works written in Páli, and relating to the history of Lanká, or Ceylon, from its earliest period down to the reign of Mahásena, who died A. D. 302. The first 38 chapters were published in 1837 by G. Turnour; and there is an edition of the whole in Páli and Singhalese (Colombo, 1877–1883).

Mahávíra (ma-hä-vē'ra) (literally "the great hero"), the 24th or last Jina, or deified saint, of the JAINS (*q. v.*). His legendary history is given in the "Kalpa-Sútra" and the "Mahávîra-Charitra," two works held in great authority by the Jains.

Mahdi, Mahdee (mä'dē), or **Muhdee** (ma'dē), in Mohammedan theology, the surname of a second Mohammed, the last or 12th Imaum (head, chief, or leader). According to the Shiahs (Mohammedan Scripturalists) of Persia, he is now alive in the unseen world, and will appear with Elias the Prophet at the second coming of Jesus Christ. The generality of the Soonnees (Mohammedan Traditionalists) concur in the belief that the advent of the Mahdi is still future, while an Indian sect caller Gyr Mahdis consider him to have already appeared in the person of Syud Mohammed, of Jounpoor. On the 27th night of the month Ramazan they recite the words "God is almighty, Mohammed is the prophet, and the Koran and Mahdi are just and true"; adding, "Imaum Mahdi has come and gone: whoever disbelieves this is an infidel." They are Soonnee Pathans, but there is a feud, sometimes leading to bloodshed, between them and the ordinary Soonnees. Petitions are sometimes written to the Imaum Mahdi on Friday, the Mohammedan Sunday, and committed to any river in the confident expectation that they will reach their destination.

Mohammed Ali, governor of Egypt (the murderer of the Mamelukes), commenced, about the year 1821, the conquest of the Sudan, which was completed about a half century later by General Gordon, who ruled it so well as to preserve peace for a time. On his departure the incapacity of his Egyptian successors drove the Sudanese into revolt. At first the rebellion was political, but a religious element speedily arose and ultimately asserted its predominance. An individual gave out that he was the divinely-promised Mahdi, the Mohammedan Messiah, come for the deliverance of the faithful, and to convert all their unbelieving foes to Islamism, or utterly to destroy them. At that time the constraining force of events had brought Great Britain into entanglement with the affairs of Egypt. A military revolt, headed by an Egyptian, Arabi Pasha, had been attended by the massacre of many European Christians at Alexandria, and the British fleet had been sent out to prevent a fresh outbreak, or, if one arose, to bring off as many of the Christians as possible. New forts being built to threaten the ships, the fleet had bombarded and captured them, with the older fortifications, on July 11, 1882, while an army sent out had heavily defeated the Egyptians in a short but very bloody fight at Tel-el-Kebir, on Sept. 13, 1882. The British government advised Egypt to give up all attempts to reconquer the Sudan, which was about as large as France, Germany, and Spain taken together

besides being mostly desert. The advice was neglected, an Egyptian army, headed by an Englishman, Hicks Pasha, was sent out, but was almost immediately destroyed and its leader killed. A second, under Baker Pasha (Col. Valentine Baker), was put to flight with great slaughter on Feb. 4, 1884.

The Egyptians were now willing to let the Sudan go, and as originally advised, include in it Khartum, the capital of Nubia. But the Sudanese, not contented to obtain their independence, desired also to massacre the Egyptian garrisons of about 20,000 men. Humanity shuddered at such a resolve, and public opinion urged that General Gordon should be sent out on a peaceful mission to negotiate for the withdrawal of the garrisons. He went to Egypt, but failed in his endeavor, and after defending himself in Khartum for about a year, was overcome by treachery on Jan. 26, 1885, the Mahdi's troops being admitted within the fortifications, and Gordon and many others slain, just as a relieving army was approaching for his deliverance. The Sudan was lost. But 12 years later it was reconquered by the British. The Mahdi had died in the meantime and been succeeded by Khalifa Abdulla. But Gordon's death was to be avenged at last. On Sept. 2, 1898, General Kitchener with an Anglo-Egyptian army defeated the hosts of the Mahdi and captured Omdurman, Khalifa Abdulla's capital and stronghold, thus ending Mahdist rule in the Sudan. See MOHAMMED AHMED.

Mahé (mä-hā′), an island in the Seychelles or Mahé Archipelago, in the Indian Ocean, about 17 miles long and 4 miles broad. It contains Port Victoria, the capital and headquarters of the British East African squadron.

Mahi Kantha (mä′hē kän′thä) **Agency,** in the presidency of Bombay, India, a group of 52 native states, bounded by Udaipur on the N. and Baroda and Ahmedabad on the W.; total area, 11,049 square miles, (nearly one-half belonging to the state of Edar or Idar); the British government assumed the management of these states in 1820.

Mähly, Jakob (mā′lē), a Swiss classical scholar; born in Basle, Dec. 24, 1828. He was Professor of Philology at Basle in 1863. Besides learned works, including "Richard Bentley" (1868), "History of Ancient Literature" (2 vols. 1880), etc., he wrote "Rhigmurmel" (1856), a volume of poems in the Basle dialect; the epic poems "Matilda" (2d ed. 1862) and "The Earthquake at Basle" (1856); the idyl "Peace" (1862); stories, comedies, juveniles, etc.

Mahmud (mä-möd′), Sultan of Ghazna, the founder of the Mohammedan empire in India; born in Ghazna, Afghanistan, about 970. His father, Sabaktagin, governor of Ghanza, owned a nominal allegiance to Persia, but was really independent. On his death Mahmud put aside his elder brother; formed an alliance against the Persian monarch, overthrew his kingdom and laid the foundation of an extensive empire in Central Asia (999). He then turned his attention to India, and in a series of 12 invasions secured a great amount of treasure and vastly extended his power. He was a patron of literature, and brought many men of learning about his court, among whom was the poet Firdusi. He established large educational institutions at Ghazni, and spent vast sums on public works. He died in Ghazna in 1030. See GHAZNAVIDES.

Mahmud, or **Mohammed I.,** Sultan of Turkey, son of Mustapha II.; born in Constantinople in 1696. After the deposition of his uncle, Achmet II., in 1730, he was raised, by the aid of the janissaries, to the vacant throne, on the condition that he should continue the war begun against the ruler of Persia, Nadir Shah. After a disastrous campaign a peace was concluded in 1736. Meanwhile, in 1734, the Russians had commenced hostilities against the Ottoman empire, and obtained several successes; their Austrian allies at the same time invading the Turkish province of Wallachia. The latter, however, being badly defeated by the Moslems at Krotska, on the Danube, in 1739, were forced to make peace and also surrender Belgrade. The Russians also effected a treaty, but one more advantageous, they retaining their previous conquests. In 1743, renewed hostilities broke out between Persia and Turkey, in which the latter power was the sufferer. Mahmud died in 1734.

Mahmud II., Sultan of Turkey; born July 20, 1785. He succeeded his brother Mustapha IV. in 1808, and shortly afterward, during an insurrection among the janissaries, caused the former monarch and his infant to be put to death. The janissaries, however, getting the upper hand, obliged Mahmud to submit to their demand. He continued to carry on the war with Russia and Servia till 1812, when a treaty of peace was effected, by which the Pruth was made the boundary of the two empires. This able ruler next successively crushed the Arabian Wahabees, and the revolt of ALI PASHA (*q. v.*). in 1822. A rebellion of his Greek subjects, in 1821, was put down with such relentless severity that Great Britain, France, and Russia found it their duty to interfere, when mediation proving unavailing, their united squadrons annihilated the Turkish fleet at

Navarino in 1827. Having organized his army on European principles, Mahmud after a fierce struggle destroyed the power of the janissaries, and next undertook a war against Russia, but being defeated by the latter under Diebitsch, he was induced by the representations of England, France, and Prussia to sign the treaty of Adrianople, in 1829. In 1832 Mahmud, endeavoring to drive the rebellious MEHEMET ALI (*q. v.*) out of Syria, was defeated by Ibrahim Pasha, son of the latter. In 1839 a second attempt to reduce his formidable vassal again subjected the Turkish arms to defeat by Ibrahim. Mahmud was an able and enlightened monarch, and one who contributed more to the civilization of his country than any of his predecessors. He died July 1, 1839.

Mahogany (from *mahogoni*, its Central American name), the timber of *Swietenia mahogoni*. It is close-grained and hard, susceptible of a fine polish, and is largely used for the manufacture of household furniture. It is fragrant and aromatic, and is considered febrifugal. Mahogany is said to have been first brought to England by Sir Walter Raleigh in 1595, but not to have come into general use till about 1720. Also the timber of *Persea indica*, a tree which grows in Madeira; it is very inferior to the genuine mahogany.

Mahogany Tree, *Swietenia mahogoni*, one of the *Cedrelaceæ*. It is a lofty, branching tree, with a large, handsome head, flowers like those of Melia, and fruits about the size of a turkey's egg. It grows in the warmest parts of Central America, in Cuba, Jamaica, Hispaniola, and the Bahamas.

Mahone, William, an American legislator; born in Southampton co., Va., Dec. 1, 1826; was graduated at the Virginia Military Institute in 1847, and became an engineer and constructor. When the Civil War broke out he entered the Confederate army; recruited and commanded the 6th Virginia Regiment; was known as the "Hero of the Crater," a sobriquet won by his bravery in the Petersburg campaign; promoted Brigadier-General in March, 1864, and Major-General in the following August. He was the organizer and leader of the Readjuster Party, which had for its policy the conditional repudiation of the Virginia State debt; and was a United States Senator in 1880–1887. He died in Washington, D. C., Oct. 8, 1895.

Mahony, Francis (ma-hō′ni), known as FATHER PROUT, an Irish journalist and poet; born in Cork, Ireland, in 1804. He was educated at a Jesuit seminary at Amiens, studied theology at Paris, received clerical ordination, and officiated for a short time at the chapel of the Bavarian Legation, London. About 1834 he began the contribution of an amusing series of articles known as the "Prout Papers" to "Fraser's Magazine." In 1846 he became Roman correspondent to the "Daily News," his letters being afterward republished under the title of "Facts and Figures from Italy." For the last 12 or 15 years of his life he was Paris correspondent for the "Globe." "Reliques of Father Prout" was published in 1836 and 1860, and "Final Reliques" in 1876. He died in Paris, France, May 18, 1866.

Mahrattas, Maráthás, or **Marhatas** (ma-rat′äz), a people of mixed origin, Hindus in religion and caste ordinances, inhabiting Western and Central India, from the Satpura Mountains to Nagpur. The Mahratta Brahmans claim to be Rajputs; the bulk of the people are Sudras, and probably of aboriginal blood mainly. They are first mentioned in history about the middle of the 17th century, when they possessed a narrow strip of territory on the W. side of the peninsula. The founder of the Mahratta power was Sivají, a freebooter or adventurer, whose father Shahji Bhonsla, was an officer in the service of the last King of Bijapúr. By policy or by force he eventually succeeded in compelling the several independent Hindu chiefs to acknowledge him as their leader, and with the large army then at his command overran and subdued a large portion of the emperor of Delhi's territory. His son and (1860) successor, Sambhaji, after vigorously following out his father's policy, was taken prisoner by Aurungzebe in 1869, and put to death. His son, a prisoner, resigned his rule to his minister, with the title of Peshwá; the descendants of Sivají henceforward reigned over but did not govern Sattara.

Under the fourth hereditary Peshwá there were five Mahratta states, more or less powerful and independent: that of the Peshwá at Poona; that of the Bhonslas at Nagpur; Gwalior, ruled by Sindhia; Indore, by Holkar; and Baroda, by the Guicowar. The invasion of the Delhi empire by Nadir Shah afforded these wild and warlike mountaineers an opportunity, of which they eagerly availed themselves, to wrest additional territory from the feeble grasp of the Mogul emperor. From this time they discharged the office of arbitraters in the quarrels between the emperor, his vizer, and his rebellious subjects; but the frightful defeat (in January, 1761) they sustained at the hands of Ahmed Shah Durâni, the ruler of Afghanistan, on the field of Panipat, where they lost 50,000 men, and all their chiefs except Holkar, weakened their power for a time. They still, however, continued to be the hired mercenaries of the Delhi emperor, till the growing influence of the British compelled them to look to their own safety.

After many long and bloody contests with the British and their allies (1780, 1803, 1817–1818), in which sometimes the whole, but more frequently a portion of the Mahrattas joined, they were one by one, with the exception of Sindhia, reduced to a state of dependence. This last-mentioned chief, having raised a powerful army, officered by Frenchmen and disciplined after the European method, continued the contest for a number of years till his power was finally broken in 1843. The dignity of Peshwá was abolished in 1818, and his territories were occupied by the British. The Mahrattas are almost all now in British or Mohammedan states; in the states called Mahratta states (Gwalior, Indore, Baroda) only the prince and his relatives are Mahrattas, the people being of other stocks.

Mai, Angelo (mī), an Italian scholar; born in Schilpario, Bergamo, Italy, March 7, 1782. In 1799 he entered the novitiate of the Society of Jesus, afterward became a priest, and in 1808 obtained the post of librarian of Milan. In 1819 he became chief librarian of the Vatican, held the office of secretary of the Propaganda (1833–1838), was created cardinal, and held several high offices in the Church. Through his labors in the decipherment of palimpsests he recovered some fragments of the orations of Cicero and writings of Philo, Porphyry, etc. He rendered valuable services to scholarship. He died near Rome, Sept. 9, 1854.

Maia (mā′yä), the eldest of the Pleiades, daughter of Atlas and Pleoine, and mother of Mercury by Jupiter. She was turned by him into a star, to avoid the rage of Juno.

Maidenhair, *Adiantum capillus veneris,* and the genus *Adiantum.* The former has many spreading capillary branches (whence the English name), a three to four pinnate frond, with the pinnules cuneate, lobed, crenate, glabrous. It is rare in Great Britain, but is found in the United States, in continental Europe, Asia, Africa, and Polynesia. Also *Passiflora adiantum.*

Maidenhair Tree, the *Salisburia adiantifolia,* a deciduous tree of the yew family, a native of Japan, so called from the likeness of its leaves to the maidenhair fern.

Maidenhead, a municipal borough and market-town of Berkshire, England, situated amid beautiful scenery 26 miles W. of London, on the right bank of the Thames (over which are two bridges, one of stone, built in 1772 at a cost of $100,000 and the other of brick) and on the Great Western Railway. In 1399 it was the scene of an engagement between the rival forces of Richard II. and Henry IV., and in 1647, at the Greyhound Inn, of the interview of Charles I., with his children. Pop. (1901) 12,980.

Maiden Plum, the name of two West Indian plants, *Comocladia integrifolia* and *C. dentata,* belonging to the natural order *Anacardiaceæ.* They yield a milky juice which, on exposure to air, becomes an indelible black dye.

Maiden Town, a name applied to Edinburgh, Scotland. An old legend has it that it was to this place the fair daughters of the Pictish monarchs were consigned for safety in time of war.

Maid of Norway, Margaret, the daughter of Eric, King of Norway, and Margaret, the daughter of Alexander III. of Scotland. On the death of Alexander she was acknowledged Queen of Scotland, and was betrothed to Edward, son of Edward I. of England, but died on her passage to England in 1290.

Maigre (-gur), in ordinary language, a fast. In ichthyology, *Sciæna aquila,* an acanthopterygian fish of the family *Sciænidæ,* common in the Mediterranean. Length seldom less than three, and sometimes as much as six feet. It is highly esteemed for the table. Its general appearance resembles that of the bass, but the head is shorter and more rounded, and the tongue and palate destitute of teeth. Fins brown, body bluish-white below and greenish-brown above. The maigre emits a peculiar sound, described as a purring or buzzing. Its otolites are very large, and were formerly in great repute as a charm for colics, provided they were received as a gift or actually removed by the sufferer from the head of the fish.

Maigre Dishes, dishes eaten by Roman Catholics on days when flesh-meat is forbidden; they include fish, vegetables, fruit, eggs, omelets, etc.

Maikov, Apollon Nikolaevich (mä-ē′-kof), a Russian poet; born in Moscow, Russia, May 23, 1821. He was probably the first Russian poet of his time. The tone of his writings is idealistic, and they are marked by great finish of form. During the Crimean War he published patriotic poems. His two plays are entitled "Tri Smerti" (Three Deaths), and "Dva Mira" (Two Worlds). The fourth edition of his works, in three volumes, appeared in 1884.

Mailáth, Count János (mī′lät), a Hungarian historian and poet; born in Budapest, Hungary, Oct. 3, 1786. His most important historical works were: "History of the Austrian Empire" (5 vols. 1834–1850), his masterpiece; "History of the Magyars" (5 vols. 1828–1831). His chief poetical writings were: "Poems" (1824) and "Magyar Legends, Narratives, and Tales"

(1826), together with translations from the German. He and his daughter committed suicide together in the Starnbergersee, Bavaria, Jan. 3, 1855.

Maildun, the hero of an ancient Irish romance, made familiar in the splendid verse of Tennyson. Maildun was the son of Allil Ocar Aga, of the tribe of Owenaught of Ninus, in the N. W. of County Clare, and before his birth his father was killed by a band of sea robbers. He grew up handsome and accomplished, but had scarce reached manhood before he set sail in a triple-hide surragh with a crew of 60 men to find his father's murderer. For three years and seven months he voyaged on the W. sea, seeing marvels such as no eyes had seen before. He visited islands of monstrous ants, of bloodthirsty quadrupeds, of red-hot animals, and of those which turn themselves round inside their skins, as well as the isles of the blest, of laughing, of weeping, of intoxicating wine-fruits, of the mystic lake, of the burning river, of the crystal bridge, and the four precious walls. Further wonders were the demon horserace, the palace of solitude, the miller of hell, speaking birds, a waterarch in the air, and the silver pillar of the sea. At length Maildun found the murderer of his father, but forgave him his wrong because of the great mercy of God in having delivered himself from so many dangers.

Mailed Cheeks, a popular name for the acanthopterous family *Sclerogenidæ,* of which scientific term it is an almost literal translation. The name refers to the enlargement in fishes of this family of certain bones of the head and gillcovers to form a bony armor for the cheeks.

Mailing Machine, a machine for folding, wrapping, and pasting newspapers, etc., attaching printed addresses to them, and feeding them into mail bags ready for mailing.

Maille, or **Maile,** a name given to several coins of various denominations and values: (1) A small copper coin of the value of half a denier, current in France under the kings of the Capetian race; (2) A silver halfpenny current in the reign of Henry V.

Maille Noble, the English half-noble of the time of Edward III., a gold coin of the value of 80 cents.

Maimbourg, Louis (ma*ng*-bör′), a French Jesuit historian; born in Nancy, France, in 1610. He was expelled in 1685 from the order for his defense of Gallicanism, but became a pensioner of Louis XIV. He wrote histories of Wyclifism, Lutheranism, Calvinism, and of the prerogatives of the Church of Rome. He died in Paris, France, Aug. 13, 1686.

Maimon, Solomon (mī′mon), a German philosopher; born of Jewish parents in a village on the Niemen, near Mir, in the W. of what is now the Russian government of Minsk, about 1754. His mind was trained in the study of the Talmud, and he qualified for a rabbi. But possessing a burning desire for truth, and having become acquainted with the philosophy of Maimonides, he made his way to Berlin, and studied modern philosophy, languages, and some science. A child of nature, with the strong, subtle intellect of the born philosopher; shy, eccentric, dirty, and unmethodical; improvident, intemperate, and wholly irregular in his habits, Maimon led a vagabond life, battling against chronic poverty, and always dependent on his friends for the bare necessities of existence. Besides cultivating his own mind, and teaching a little, he never did any work, except write some philosophical treatises and literary hack-work, done anywhere and at any time, mostly in poor taverns. Yet this ragged philosopher had Mendelssohn, the philosopher, among his friends, was admired by Kant, and attracted the attention of Goethe. This good fortune he owed to his "Attempt at a Philosophy of Transcendentalism" (1790), an eclectic system, in which he attempted to supplement Kant's by truths gleaned for the most part from Spinoza, Leibnitz, Hume, Locke, and others. He died in Siegersdorf, Lower Silesia, Nov. 22, 1800.

Maimonides, Moses (mī-mon′i-dēz), a Jewish philosopher; born in Cordova, Spain, March 30, 1135. He harmonized Judaism and philosophy. Driven with his family from Spain, he resided in Fez; then traveled by way of Palestine to Cairo, becoming there chief rabbi and the caliph's physician. His chief work, written in Hebrew, is "Mishneh Torah" (Repetition of the Law: 1170–1180), a masterly exposition of the whole of the Jewish law as contained in the Pentateuch and the voluminous Talmudic literature. His principal philosophical work, written in Arabic, was "Dalalt al Haïrin" (Guide of the Perplexed: 1190). The estimation in which he is held by the Jews can be seen in their saying, "From Moses [the lawgiver] to Moses [Maimonides] there is none like unto Moses." He died in Cairo, Egypt, Dec. 13, 1204.

Main (mīn), a river of Germany; rises in the Fichtelgebirge; flows in a generally W. direction for a distance of 300 miles; and joins the Rhine a little above the town of Mainz. It is navigable for about 200 miles, and has been improved so as to admit the largest Rhine steamers to Frankfort. By means of King Ludwig's canal it affords through navigation to the Danube.

Main, the Spanish. See SPANISH MAIN.

NEW BRUNSWICK
QUEBEC
AROOSTOOK
PISCATAQUIS
PENOBSCOT
SOMERSET
FRANKLIN
QUEBEC
Levis
St. Henri Sta.
Island of Orleans
St. Lawrence River
Crane I.
L'Islet
Montmagny
St. Anne
R. Quelle
Montmorency R.
R. St. Ange
R. du Sud
R. Etchemin
Chaudiere R.
Beauce Jc.
Francis Beauce
Tring Jc.
L. St. Francis
Megantic L.
Agnes
Depot L.
Great Black R.
St. John R.
Allegash
Allegash R.
Little Black R.
Connor
St. Francis
L. St. Francis
Edmundston
Upper Madawaska
St. David
Grand Isle
Frenchville
Fort Kent
Wheelock
St. Agatha
Long L.
Vanburen
Eaglelake
Eagle Lake
Wallagrass
Daigle
Guerette
Cross L.
Square L.
Collins
Stockholm
Hamlin
Grand Falls
Jemtland
Acadia
Winterville
Nelson
New Sweden Sta.
Lyndon
Limestone
Caribou
Winchell
N. Perham
Perham
Washburn
Crouseville
Maysville
Fort Fairfield
Maplegrove
Fairmount
Easton
Aroostook R.
Castlehill
Presque Isle
Mapleton
Sheridan
Ashland
Ft. Fairfield Jc. or Phair P.O.
Westfield
Mars Hill & Blaine Sta's
Robinsons
Boundary
Portage
Squa Pan
Masardis
Oxbow
Griswold
Bridgewater Cen. P.O. or Bridgewater Sta.
St. Croix
Howe Brook
Monticello
Weeksboro
Littleton
Houlton
New Limerick
Debec
Linneus
Hodgdon
Oakfield
Dyerbrook
Island Falls
Crystal
Patten
Sherman
Haynesville
Chesuncook L.
Chamberlain Lake
Moosehead Lake
Mt. Katahdin 5385
Spencer Mt. 3,135
Millinocket
Twinlakes
Grindstone
Mattawamkeag
Kineo
Greenville
Moose River
Jackman
Hogs Back
Bald Mt.
Schoodic or Grand Lakes
Forest City
Danforth
Vanceboro
McAdams Jc.
Harvey Sta.
Canterbury Sta.
Lawrence Sta.
Hartland
Newburgh Jc.
Bristol
Millville
Plaster Rock
Tobique R.
Aroostook Jc.
West Miramichi R.
Meduxnekeag R.
Monument Br.
St. Croix

MAINE

SCALE OF MILES

0 10 20 30 40 50

State Capital ⊛ County Seats ⊙

Size of type indicates relative importance of places

Hammond's 8 x 11 Map of Maine.
Copyright, 1908, by C.S. Hammond & Co., N.Y.

A 71 Kittery Depot Kitterypoint C 70° D Longitude E West 69° from F Greenwich G 68° H J 67°

45 44 G 7 8 9

Maine

Maine, a State of the North Atlantic Division of the North American Union; bounded by Quebec, New Brunswick, the Atlantic Ocean, Bay of Fundy, and New Hampshire; admitted to the Union, March 15, 1820; number of counties, 16; area, 29,395 square miles; pop. (1900) 694,466; (1910) 742,371; capital, Augusta.

Topography.— The surface of the State is as a rule hilly and mountainous, excepting along the coast, where it is flat and sometimes marshy. The main mountain system crosses the State in a N. E. direction from the White Mountains, past Mount Katahdin and Mount Abraham to Mars Hill near St. John river. The highest elevation is Mount Katahdin, in the center of the State, 5,383 feet. The coast line is very irregular, and, with its numerous indentations, presents a length of over 2,000 miles. The sea coast E. of the Kennebec rises abruptly to a height of from 1,000 to 2,800 feet, while the W. portion consists of swamps and sand flats, extending 10 to 20 miles inland. The rivers rise in the mountains at the N. of the State and in Canada and New Hampshire and flow rapidly and with numerous falls and rapids to the sea, affording excellent water power. The principal ones are the St. John, forming most of the Canadian boundary; the Penobscot, Kennebec and Androscoggin, rising in the N. and central portions of the State, and flowing into the Atlantic. Maine has over 1,500 lakes. Moosehead Lake, the largest, is 35 miles long, 10 miles wide, and 1,023 feet above sea-level. Rangeley and Richardson Lakes in the E. have an altitude of 1,500 feet.

Geology.— The rocks of Maine are largely of igneous and palæozoic origin. The Upper Silurian limestones appear in the N. W. and fossiliferous limestone and argillaceous schists of the Lower Silurian are found in the central portion of the State. The old red sandstone appears in the N., and strata of post-Tertiary, Miocene, and Pliocene formations exists in the S. E. Much of the sea coast formations are of recent origin.

Mineralogy.— The State is well supplied with minerals, especially in the N. E. counties. In building and monumental stones Maine is especially rich. In 1899 she ranked second in the United States in granite, with an output valued at $1,321,032. The limestone production was valued at $1,028,375, and slate, $181,766. In 1900 the clay production amounted to $724,934, and the mineral water to 795,912 gallons, valued at $104,190. The metallic products have not been worked to any extent, but consist of iron, tin, lead, copper, zinc and manganese. Gold occurs in small deposits, and tourmaline, beryl, and garnet are also found.

Soil.— The State presents a great variety of soil. That on the sea coast and mountain lands is sterile and does not repay cultivation. The soil in the river valleys between the Penobscot and Kennebec is of alluvial formation and exceedingly valuable for cereals. The great valley of the Aroostook contains the most fertile lands E. of the Mississippi valley, producing excellent wheat, potatoes, barley, rye and other grains in great abundance. The upland is the best for grazing and the clay loam for hay. The forests of the State are of great value. In the N. the trees are principally pine, fir, spruce, hemlock and other evergreens, with cedars in the N. E. In the central portion of the State the white and red oak, maple, beech, birch, and ash, are abundant, while further S. the poplar, elm, basswood, dogwood, sassafras, juniper, butterwood, butternut, chestnut, alder and willow abound.

Agriculture.— The most productive parts of Maine are the river valleys. The farm and garden fruits and vegetables are abundant. The apple, pear, cherry, plum, blackberry, blueberry, strawberry, and raspberry form the fruit crop. In 1900 the principal farm crops were: Hay, 343,997 tons, valued at $10,929,761; potatoes, 6,200,208 bushels, valued at $3,038,102; oats, 5,257,612 bushels, valued at $1,997,398; buckwheat, 719,760 bushels, valued at $352,682; corn, 440,244 bushels, valued at $242,134; barley, 315,319 bushels, valued at $195,498; wheat, 40,755 bushels, valued at $36,680; and rye, 17,080 bushels, valued at $14,006. In 1899 the farm animals were: Horses, 109,747, valued at $6,432,826; sheep, 254,027, valued at $787,484; milch cows, 203,814, valued at $5,890,225; and other cattle, 112,723, valued at $2,973,863.

Manufactures.— There were reported by the United States census in 1900, 6,702 manufacturing establishments, employing $122,918,826 in capital and 78,145 persons; paying $28,527,849 in wages and $68,863,408 for materials; and having finished products valued at $127,361,485. The principal manufactures were cotton goods, lumber and timber products, woolen goods, paper and wood pulp, canned fish, foundry and machine shop products, and flour and grist mill products.

Commerce.— During the year 1900 the imports of merchandise at the ports of Aroostook, Bangor, Bath, Belfast, Castine, Frenchman's Bay, Kennebunk, Machias, Passamaquoddy, Portland, Falmouth, Saco, Waldoboro, and Wiscasset, aggregated in value $2,926,496; and exports, $5,777,282. The imports of gold coin, bullion, and ore during the year amounted to $307,203; and exports, $60,680.

Banking.— On Oct. 31, 1901, there were 84 National banks in operation, having

$10,521,000 in capital; $6,261,284 in outstanding circulation; and $5,732,350 in United States bonds; There were also 51 mutual and stock savings banks with $69,533,058 in deposits; and 17 trust and loan associations, with $1,601,800 capital. The exchanges at the United States clearing house at Portland during the year ending Sept. 30, 1901, aggregated $64,889,638, an increase over those of the previous year of $24,478,953.

Education.— In 1900 the school population was 161,600; enrollment in public schools 131,588; and average daily attendance 97,706. There were 4,218 buildings used for public school purposes, 6,447 teachers; school property valued at $4,699,475; receipts for the previous year $1,507,345, and expenditures $1,513,125. For higher education there were 200 public high schools; 40 private secondary schools; 5 public and 2 private normal schools; Bowdoin College at Brunswick; Bates College, at Lewiston; University of Maine at Orano; Colby College at Waterville; Westbrook Seminary at Deering; and Maine Wesleyan Seminary and Female College at Kent's Hill.

Churches.— The strongest denominations in the State are the Roman Catholic; Congregational; Methodist Episcopal; Regular Baptist; Freewill Baptist; Advent Christians; Protestant Episcopal; and Universalist. In 1899 there were 2,006 Evangelical Sunday-schools, with 13,590 officers and teachers, and 110,315 scholars.

Postoffices and Periodicals.— In 1901 there were 1,272 postoffices of all grades, and 155 periodicals, of which 15 were daily, 5 semi-weekly, 96 weekly, 2 semi-monthly, 34 monthly, and 3 quarterly.

Finances.— The assessed property valuation in 1900 was divided as follows: real estate, $268,434,909; personal property, $68,264,740; total, $336,699,649; tax rate $2.75 per $1,000. The State debt Jan. 1, 1901, was, bonded debt, $2,103,000; temporary loan, $350,000; total $2,453,000; and the total resources of the State amounted to $1,132,375.

State Government.— The governor is elected for a term of two years and receives a salary of $2,000 per annum. Legislative sessions are held biennially, beginning on the first Wednesday in January, and have no time limit. The Legislature has 31 members in the Senate and 151 in the House, each of whom receives $150 per annum and mileage. There are four representatives in Congress. The State government in 1901 was Republican.

History.— The first attempt to settle on the territory was made by the French under De Monts, who, having received a patent from the French king, planted a large colony on Neutral Island in the St. Croix river. In 1613, French Jesuits established a mission on Mount Desert Island, which was expelled by the English the next year. In 1616, Sir Ferdinando Gorges, a leading promoter of colonization in Maine sent his agent, Richard Vines, with a small company to Saco to remain during the winter, explore the country, and test the climate. Capt. John Smith visited and explored the coast in 1614, examining it as far S. as Cape Cod. In 1620 the King of Great Britain made a division of the grand charter of 1606, and granted to the Plymouth Company in England the whole country lying between lat. 40° and 48° N., and to the Virginia Company the S. portion of the original patent. From 1630 to 1632 settlements were commenced in Saco, Biddeford, Scarboro, Cape Elizabeth, and Portland, all of which continued to prosper till the Indian War of 1625, when they were all overthrown. The territory between the Kennebec and Penobscot rivers was granted by Charles II., in 1664, to his brother the Duke of York, who had the year before established a seat of government there at the city of Pemaquid, where a strong fort was built. This country was surrendered to Massachusetts in 1686, which took possession, exercised government over it as far E. as Penobscot, which, with all the territory E. to the St. Croix and Nova Scotia, was confirmed to her by the provisional charter of 1691. She afterward relinquished Nova Scotia, but all the remainder was secured to her by the treaty of 1783, which established the independence of the United States, and she retained possession and jurisdiction till the separation of 1820 took place, which constituted Maine a separate and independent member of the Federal Union.

L. D. Carver.

Maine (mān), an old province of France, having Normandy on the N., Brittany on the W., and Anjou on the S., corresponding to the modern department of Sarthe and Mayenne; its chief town was Le Mans.

Maine, The, a second-class, twin-screw battleship of the United States navy, destroyed in the harbor of Havana on the evening of Feb. 15, 1898. She was of 6,648 tons displacement; her length was 318 feet; breadth, 57 feet; mean draft, 21 feet 6 inches; main battery, four 10-inch and six 6-inch breech-loading rifles; secondary battery, seven 6-pounder and eight 1-pounder rapid-fire guns, and four Gatlings; crew, 34 officers and 370 men; cost, $2,500,000. In 1910 Congress provided for raising the wreck and burying its dead. See Cuba.

Maine, The, the new vessel of this name, built for the United States navy, a

first-class battleship of over 12,000 tons displacement. Its main battery consists of four 12-inch, and ten 6-inch guns, and its speed is 18 knots an hour. The new "Maine" has underwater torpedo tubes, the first ever put in any ship in the American navy. It has very little woodwork and what there is has been treated by a process which renders it absolutely incombustible. Its comparatively shallow draft will enable it to maneuver in waters where other ships of the same fighting power would be aground. It is protected by 10-inch plates of the new "Kruppized" armor.

Maine, Sir Henry James Sumner, an English jurist; born near Leighton, England, Aug. 15, 1822. He was Professor of Civil Law at Cambridge, 1847–1854; reader on Roman law at the Inns of Court, London, 1852; legal member of the council of India, 1862–1869; Professor of Jurisprudence at Oxford, 1869–1878; master of Trinity Hall, Cambridge, 1877; Professor of International Law at Cambridge, 1887. Among his more noted works were: "Ancient Law" (1861), an epoch-making book; "Village Communities" (1871); "Popular Government" (1885); etc. He died in Cannes, France, Feb. 3, 1888.

Maine, University of, a coeducational non-sectarian institution in Orono, Me.; founded in 1865; has grounds and buildings valued at over $520,000; endowment funds, about $220,000; volumes in the library, 40,000; scientific apparatus, etc., $100,000; ordinary income, about $245,000; average number of faculty, 70; average students, including summer school, 870; graduates, over 1,500.

Maine de Biran, Marie François Pierre Gonthier (mān duh bē-ro*ng′*), a French philosopher; born in Bergerac, France, Nov. 29, 1766. He served in Louis XVI.'s army, and was member of the Council of Five Hundred in 1797. He was the founder of modern French spiritualism in philosophy. He wrote: "Influence of Habit Upon the Thinking Faculty" (1803); "Decomposition of Thought" (1805); "Foundations of Psychology" (1859); etc; ("Works" 3 vols., edited by Cousin, 1841; 3 vols. additional, edited by Naville, 1846–1859). He died in Paris, France, July 16, 1824.

Maine-et-Loire (-ā-lwär′), a department of France, formed out of the old province of Anjou, and watered by the rivers whose names it bears, divided into the arrondissements of Angers, Beaugé, Cholet, Saumur, and Segré; area, 2,749 square miles; pop. (1906) 513,490; the soil is fertile, and produces excellent corn and wine, with hemp, linseed, fruit, and green crops; slate quarries and coal mines are worked, and there are mills for cotton, woolen, and linen manufactures. Capital, Angers.

Maine Liquor Law, a law of the State of Maine vesting the sale of intoxicating liquors in special agents appointed by the State, and prohibiting all other persons from such sale. The manufacture of intoxicating liquor for unlawful sale is also forbidden. If an authorized agent violate the law, he is subject to a fine not exceeding $30, and imprisonment not exceeding three months; while the penalty for a violation of the law by a common seller is $100 fine or three months' imprisonment for the first, and $250 fine and four months' imprisonment for the second and every subsequent offense. Anyone injured by an intoxicated person may maintain an action against the seller of the liquor, and the owner or lessee of the building in which the liquor was sold is jointly liable if cognizant that the building was used for such purpose.

Mainotes (mī′nōtz), the inhabitants of the mountainous peninsula of Maina, lying between the Gulfs of Koron and Marathonisi in the extreme S. of Greece. They claim to be the descendants of the ancient Spartans, number close on 50,000, and are a well-built race, industrious and hospitable, but revengeful, great lovers of liberty, and formerly implacable foes of the Turks. They took a prominent part in the war for the liberation of Greece. In 1676 about 1,000 Mainotes emigrated to Corsica; their descendants still survive at Cargese in that island. Among the emigrants were some bearing the name Kalomeros, which in Italian is translated Buonaparte. Hence the people of Maina believe that the great Napoleon was of Greek origin. The emigrants were settled at Ajaccio from 1729 down to 1769, in which year Napoleon was born there. The Mainotes are handsome, fond of warfare, and quite superstitious. At one time they were robbers.

Mainprise, in English law, the taking or receiving of a person into friendly custody, who might otherwise be committed to prison, on security given that he shall be forthcoming at a time and place assigned. Mainprise differs from bail in that he who is mainprised is said to be at large till the day of his appearance; but he that is bailed is not said to be at large, or at his own liberty, but may be confined by his sureties. The writ of mainprise is directed to a sheriff, commanding him to take sureties for the prisoner's appearance, usually called mainpernors, and to set him at large.

Maintenon (*mangt-nông'*), **Françoise d'Aubigné, Marchioness de,** the second wife of Louis XIV.; born in the prison of Niort, France, Nov. 27, 1635. Her father, Constant d'Aubigné, was confined in the prison at Niort for having killed his first wife and her lover, whom he had taken in adultery. On his release he went with his family to Martinique, and died there in 1646, leaving his widow so poor that she returned to Europe without this child, who was sent after her to France, and there taken under the protection of her aunt, Madame Villette, who brought her up in the Protestant persuasion, from which, owing to the interference of her mother, a strict Catholic, she was afterward converted. Subsequently, being left in very reduced circumstances, she married the celebrated poet and novelist Scarron. On his death, in 1660, she obtained the continuance of his pension through the intercession of Madame de Montespan, who also appointed her governess of the children which she had by Louis XIV. This connection brought her under the notice of the monarch, who increased her pension, and in 1679 changed her name to Maintenon, giving her an estate with that title. Becoming fond of her society, he gradually passed from intimacy to love; Montespan was supplanted, and La Chaise, his confessor, having advised him to sanction his wishes by a secret but formal marriage, it was solemnized in 1685. After her elevation, she lived in a sort of retirement from the world. Louis visited her several times a day, and transacted business with his ministers in her apartments while she read or otherwise employed herself. The king, who sometimes teased her with his ill-humor, endeavored to atone for this by proofs of his esteem such as he had never shown to any other woman. But she feared to attract the notice of the nation, and would receive nothing more than the estate of Maintenon, with a pension of 48,000 livres. Having founded the school of St. Cyr for the education of poor girls of good family, she retired to it after the death of the king, and there passed the remainder of her life. She died, generally respected, April 15, 1719. Her "Memoirs" and "Correspondence" have been printed, the former in three volumes, the latter in nine.

MADAME MAINTENON.

Mainz (mīnts) (English, Mentz; French, Mayence), a fortified town of Germany, in the grand-duchy of Hesse, finely situated on the left bank of the Rhine, opposite the mouth of the Main, 20 miles W. S. W. of Frankfort. The Rhine is here crossed by a bridge connecting Mainz with the small town of Castel, which is within the system of fortifications; there is also a railway bridge. The older part of the town has been mostly modernized since the destruction caused by a powder magazine explosion in 1857, and an extensive new quarter has been added since the recent widening of the fortified circuit. Among the more interesting buildings are the cathedral (recently restored), a vast building of red sandstone, finished in the 14th century, adorned with several finely painted windows, frescoes, and a great number of ancient and curious monuments; the former electoral palace, now containing the City Library (150,000 vols.), picture gallery, museum, etc.; the old collegiate church of St. Stephen, a fine specimen of Gothic architecture; the grand-ducal castle; the courts of justice; the government buildings; the town hall, a new Renaissance structure; the theater, central railway station, Gutenberg's house and other buildings associated with the invention of printing, etc. There is a fine statue of Gutenberg by Thorwaldsen. The handsome new quay, about 330 feet in breadth, along the Rhine, affords a pleasant promenade; and there are several docks. The manufactures embrace leather, furniture, hardware, carriages, tobacco, beer, chemicals, musical instruments, etc. The trade, particularly transit, is extensive. Mainz was for long the first ecclesiastical city of the German empire, of which its archbishop-elector ranked as the premier prince. Its history during the 16th century is of considerable interest in connection with the progress of the Reformation. Pop. (1905) 91,124.

Mair, Charles, a Canadian poet; born in Lanark, Ontario, Sept. 21, 1840; was educated at Queen's University, Kingston; participated in the suppression of the Riel rebellion and the second rebellion in the Northwest Territories; wrote: "Dreamland and Other Poems" (1868); "Tecumseh" (1886), a drama; "The Last Bison"; etc.

Maistre, Count Joseph Marie de (māstr), a French statesman and writer; born in Chambéry, Savoy, April 1, 1754. He was senator of Savoy in 1788; chancellor of Sardinia, 1799; Sardinian minister at St. Petersburg, 1802; minister at Turin, 1817. He wrote: "Thoughts on the

Principle of Human Institutions" (1810); "Examinations of Bacon's Philosophy" (1835; new ed. 1864); etc. "St. Petersburg Evenings" was published in 1821; and his interesting correspondence in 1851 and 1858. ("Works," 8 vols, 1864.) He died in Turin, Feb. 26, 1821.

Maistre, Count Xavier de, a French soldier and writer, brother of Joseph Marie; born in Chambéry, Savoy, in October, 1764. After serving in Piedmont and Italy (1798-1799), going to Russia, he rose to the rank of Major-General. His masterpiece was the much admired "Journey Round My Room" (1794) in Sterne's style, written while under arrest for fighting a duel. He wrote besides: "The Siberian Girl" (1815); "Prisoners of the Caucasus" (1815); etc. The charm of his work is its dainty style, its power of narration, and its revelations of the author's personality. He died in St. Petersburg, Russia, June 12, 1852.

Maisur. See MYSORE.

Maitin, José Antonio (mä-ē'tēn), a Venezuelan poet; born in Porto Cabello in 1798. In 1824 he returned from Havana to his own country, from which he had fled on account of persecution, and subsequently lived in the valley of Choroni. In 1844 he made a collection of his best poems and published them under the title "Echoes from Choroni," and in 1851 a collected edition of all his works. He died in Choroni, in 1874.

Maitland, William, commonly known as SECRETARY LETHINGTON, a Scotch statesman, eldest son of Sir Richard Maitland; born about 1525. He early adopted the reformed doctrines, and was one of the first public men openly to renounce the mass. In 1558 he was appointed secretary of state by Mary of Guise. In the following year he joined the Lords of the Congregation, who had taken possession of Edinburgh. In 1560 he was speaker of the Parliament which abolished the authority of the Pope in Scotland. On Queen Mary's arrival in Scotland he was chosen one of her principal ministers, and was continually employed as her envoy to the English court. After Darnley's murder he conspired to effect Mary's escape from Lochleven; yet he attended the coronation of James VI. and fought against her at Langside. The regent Moray, suspecting him of being at the bottom of the intrigues in favor of Mary, had him arrested in 1569 as an accessory to Darnley's murder. He was set at liberty by Kirkcaldy of Grange, and after the assassination of Moray he became the life and soul of the queen's party and kept up an active correspondence with Mary. In 1571 he joined Kirkcaldy in Edinburgh Castle; was proclaimed a traitor by the Parliament, and attainted with his two brothers. On the surrender of Edinburgh Castle Kirkcaldy and his brother were hanged. Maitland was reputed a man of great learning and extraordinary capacity in statesmanship. He died in prison in Leith, June 9, 1573.

Maize, (a word of Haitian origin), the *Zea mays*, a cereal grass of the tribe Phalareæ. The leaves are broad, and hang down from the tops of sheaths. The flowers are monœcious. The males are in loose, terminal, compound racemes; the females in many rows on a spike, enveloped in bracts. Each grain is surmounted by a thread-like style, giving the spike a silky aspect. The seeds, when ripe, are compactly arranged in rows on a rachis. They are flattened at the apex, and may be pale-yellow, white, variegated, blood-red, or purple. The seeds are very firm, the outer part being horny and the central mass more or less brittle and soft. Maize is said to have come originally from Paraguay, but is now only known in a state of cultivation.

Maize See CORN, INDIAN.

Majano, Benedetto da, See BENEDETTO DA MAJANO.

Majesty, a title of honor now usually bestowed on sovereigns. Among the Romans, *majestas* was used to signify the power and dignity of the people, and after the overthrow of the republic became exclusively the attribute of the emperors. The "majestas" of the emperors of Rome was supposed to descend to those of Germany as their successors; but the adoption of the attribute by other European sovereigns is of comparatively late date. Its use began in England in the later part of the reign of Henry VIII., up to which time "Your Grace" or "Your Highness" had been the appropriate mode of addressing the sovereign. Henry II. was the first King of France who was styled "Most Christian and Catholic Majesty," the King of Spain came to be "Catholic Majesty," and of Hungary "Apostolic Majesty." All European emperors, kings, and queens are now generally addressed as "Your Majesty." The sovereign of the United Kingdom is personally addressed as "Your Majesty"; and formal letters are addressed to "The King's (or Queen's) Most Excellent Majesty."

Majolica, (mā-yol'i-kä) (from the Italian name of the island of MAJORCA (*q. v.*), where this ware seems to have been first made), a decorated kind of enameled pottery made in Italy from the 15th to the 18th century. It attained its greatest development in the duchy of Urbino, which included the four great manufactories of Pesaro, Gubbio, Urbino, and Castel Durante. Majolica is an earthenware usually of a coarse paste, covered with a stannifer-

ous glaze or enamel. It has sometimes been called "Raphael ware" from the fact that a number of the paintings on it were copied from the designs of that famous painter. Majolica is generally considered to be the most beautiful decorated pottery that was ever extensively made, at least during the Christian era. Some of the finer pieces when they come into the market bring large, almost fabulous, sums of money.

Major, in the army, a field officer next in rank above a captain and below a lieutenant-colonel. His duties are to superintend the exercises of the regiment or battalion, to carry out the orders of his superior officers, and to command in the absence of the lieutenant-colonel and colonel.

Major, in music, greater. A major third consists of four semitones, a minor third of three. A major tone is the whole tone having the ratio 8.9; a minor tone, that having the ratio 9.10. Intervals have had the term major applied to them in a conflicting manner.

Major Jack Downing. See SMITH, SEBA.

Major, Richard Henry, an English historian; born in London, England, Oct. 3, 1818. He was connected with the British Museum Library, 1844–1880; honorary secretary of the Hakluyt Society, 1849–1858; and vice-president of the Royal Geographical Society. He wrote: "Life of Prince Henry of Portugal" (1868); "The Discoveries of Prince Henry and Their Results" (1877); edited "Select Letters of Christopher Columbus" (1847); etc. He died in London, June 25, 1891.

Majorca (ma-jôr'kä), or **Mallorca** (mäl-yor'-), the largest of the BALEARIC ISLES (*q. v.*), lying about 100 miles from the Spanish coast and 150 N. of Algiers; length, 60 miles; breadth, 40 miles; area, 1,310 square miles; pop. (1900) 251,920. The climate is healthful, the sea breeze preserving a nearly equable temperature over the whole island. In the N. there are mountains reaching 3,500 to 5,000 feet in height. The hillsides are terraced; olive groves abound everywhere, and almond, orange, fig, and other fruit trees are common. The vine is grown and good wine made. The soil is extraordinarily fertile, and is cultivated with marvelous patience and skill by the inhabitants, who manufacture cloth, cotton goods, ropes, silk, soap, shoes, etc., and have a trade to and from Spain of the annual value of $7,050,000. There are railways (total 48 miles) connecting the capital, PALMA (*q. v.*), pop. (1900) 63,937, with Manacor (15,000), the second town of the island (where as well as at Arta there are magnificent caves), and La Puebla (5,000). Between this town and Alfudia, the port for Minorca and Barcelona, lie the marshes of Albufera (5,000 acres), drained by a London company in 1865–1871, and now of extraordinary fertility. Raymond Lully was born in Palma; at Valdemosa George Sand resided in 1838 and wrote her "Spiridion"; and the beautiful seat of the Austrian Archduke Ludwig Salvator is at Miramar. Large quantities of the lustered ware called MAJOLICA (*q. v.*) were exported to Italy and elsewhere in the 15th century; this ware is still made to a small extent. Many of the nobles have handsome palaces in the island.

Major Græcia. See MAGNA GRÆCIA.

Majorianus, Julius Valerius (-ā'nus), a Roman emperor, raised to the throne in 457. He made war against the Vandals with success, and drove Genseric from Italy. But the great fleet which he prepared for the invasion of Africa was burnt by the Vandals. He governed with equity and prudence, made excellent laws, and might probably have longer averted the fall of the Western empire had he not been deposed and murdered in 461, after a reign of less than four years.

Majority, in law, the period of full age, at which the laws of a country permit a young person to manage his own affairs. In the United States, as well as in most other countries, the age of majority is 21 years.

Majuba (mä-jö'bä) **Hill,** an eminence in the extreme N. of Natal, the scene of the defeat of 648 British troops, with the loss of their leader, Sir George Colley, by a greatly superior force of Transvaal Boers, Feb. 27, 1881. The night before, after an eight hours' climb, they had occupied the hill, which overlooked the enemy's position at Laing's Nek, and which toward noon was unexpectedly carried by a sudden rush of the Boers. The loss of the latter was about 130, of the British more than 200 in killed and prisoners, besides many wounded and some missing. To the British nation the name Majuba Hill became a synonym for disaster. The anniversary of this fight was marked by the success of Lord Roberts, commander of the British forces in the campaign of 1900, when he received the surrender of the Boer commander, General Cronje.

Makart, Hans (mäk'ärt), an Austrian painter; born in Salzburg, Austria, May 28, 1840; studied at Vienna and at Munich, where he became the best pupil of Piloty; visited Italy in 1869, and Egypt in 1876. His large picture, "Venice Doing Homage to Catharine Cornaro," was exhibited at the Centennial Exhibition in Philadelphia, in 1876. Among his other works are "Roman Ruins," "The Plague at Florence," "Cleopatra," "Entrance of Charles V. Into

Antwerp." He also painted many scenes from Shakespeare. His large canvases are brilliant in coloring, but often too crowded, and many of his themes are sensuous. He died in Vienna, Oct. 3, 1884.

Makassar. See MACASSAR.

Makemie, Francis, founder of the Presbyterian Church in the United States; born in Ireland in 1658; was licensed by the Presbytery of Laggan in 1681, and went to Barbadoes; removed to Maryland, where, in 1684, he organized a church at Snow Hill. He married a lady of Virginia and itinerated through the Southern States. In 1704 he visited England and brought over two more ministers. He assisted in forming the Presbytery of Philadelphia and was its moderator in 1706. In the following year he was arrested and imprisoned for preaching at Newtown, Long Island, and, though subsequently acquitted, was compelled to pay the costs. He died in 1708.

Makkari, Ahmed el-, a Moorish historian; born in Makkara, near Tlemçen, in Algeria, about 1585; traveled in Morocco, and in 1618 made the pilgrimage to Mecca; this he subsequently repeated five times, besides seven pilgrimages to Medina and two to Jerusalem. At Damascus he created an enthusiastic impression by his preaching in 1627. His chief residence, however, was at Cairo. His principal work was his "History of the Mohammedan Dynasties of Spain," partly translated into English by Gayangos (2 vols. 1840–1843). He died in Cairo, Egypt, in 1631.

Makololos (mä-kō-lō′lōz), a tribe of Basutos, who, under their chief, Sebituane, and his son Sekeletu, founded an extensive kingdom in the basin of the Upper Zambesi; but a successful rebellion by the conquered tribes broke up the kingdom in 1864, since which time the Makololos have ceased to exist as a people.

Makrizi, Taki-ed-din Ahmed el- (mäk-rē′zē), the most eminent of the Arabic historians of Egypt; born in Cairo, Egypt, in 1364. His surname was derived from his family's residence at Makrîz, a suburb of Baalbek in Syria. He studied theology and jurisprudence under the best teachers; made the pilgrimage to Mecca in 1385; and held various official posts, as secretary of state, inspector of the markets (1398), preacher, reader, and lecturer at several mosques and colleges at Cairo, and (1408) curator of the Kalânsiya and the Nurîya hospital at Damascus. Returning to Cairo, he devoted himself to the historical studies which have made him renowned. He made a second pilgrimage to Mecca (1430–1435). He wrote 16 works, besides smaller memoirs, of which the following are the most important: The "Khitat," or "History and Topography of Egypt and (especially) Cairo" (1853), never completely translated, a work of the highest importance to historians and archæologists; a general history from 1181 to 1440, of which a part has been translated by Quatremère as "History of the Mameluke Sultans" (1837–1844); biographies of famous men who lived in Egypt, unfinished and unpublished; a treatise on Mohammedan coins, translated by De Sacy (1797), and another on Mohammedan weights and measures, edited by Tychsen (1800); "History of Hadramaut," edited by Noskowyj (1866); "Arab Migrations to Egypt,' edited by Wüstenfeld (1847); and "Mohammedan Kings of Abyssinia," edited by Rink (1790). He died in Cairo, Egypt, in 1442.

Malabar (mal-a-bär′), a district on the S. W. coast of India, in the presidency of Madras, extending from lat. 10° 15′ to 12° 18′ N.; area, over 5,500 square miles; pop. (1901) 487,484, over two-thirds Hindus, and one-fourth Mohammedans. The surface is occupied in the E. by the Western Ghâts, which send down numerous rivers to the coast, many of them navigable for some distance. There are large forests. Rice is the staple crop; cocoanuts are largely grown, and also coffee and pepper. The name of this district is applied to the whole S. W. coast of Southern India.

Malabari, Behramji Merwanji (mä-lä-bä′rē), a social reformer and poet; born (Mehta) in Baroda, India, in 1853. He gave his fortune and his life to bettering the condition of women in India by the abolition of infant marriage and enforced widowhood. He was editor and proprietor of the "Indian Spectator" and the "Voice of India." Among his works are the fine "Niti Vinod," etc., in verse; "Gujarat and Gujaratis," liked for its picturesque and humorous style; various political and ethical productions; etc.

Malabar Leaf, the leaf of the *Cinnamomum malabathrum* of Malabar, formerly used in European medicine.

Malabar Plum. See ROSE APPLE.

Malacca, or **Malay Peninsula.** See STRAITS SETTLEMENTS.

Malacca, Strait of, a channel separating the Malay Peninsula on the N. E. from the island of Sumatra on the S. W., and connecting the Indian Ocean with the Chinese Sea; length, 480 miles; breadth, from 30 miles at the S. E. to 115 miles at the N. W. extremity. On this strait are the British settlements of Malacca, Penang, etc.

Malacca Bean, the fruit of the *Semecarpus Anacardium,* or marking nut tree of India, belonging to the natural order *Anacardiaceæ.* It closely resembles the cashew nut.

Malacca Cane, a cane, used as a walking stick, imported from Malacca, though the tree producing it, *Calamus scipionum,* is more common in Sumatra.

Malachi (mal'a-kī), the last of the Old Testament minor prophets. Of his history nothing is certainly known.

The Prophecies of Malachi, the last prophetic book of the Old Testament. When it was penned, the Jewish people were under a governor instead of a king (i: 8), and the Temple was rebuilt (i: 7, 10, iii: 1, 10). The governor was probably Nehemiah, during his second visit to Jerusalem. If so, then Malachi prophesied probably between 430 and 425 B. C., during the first part of the Peloponnesian war, and was a contemporary of Sophocles (496–405), Euripides (480–406), Herodotus (484–424), and Thucydides (471–396). In Malachi's time religion was at a low ebb. The priests were not pious or moral enough to gain the respect of the people (ii: 7, 8, 9), who withheld tithes and offerings (iii: 8, 10), or, when they did pay them, selected from their flocks and herds the lame, the sick, or the torn. With absence of piety came low morality. Divorces were far too many (ii: 14, 16); adultery, false swearing, fraud on the feeble and the dependent were common. The prophet sought to correct all these evils. He encouraged a small remnant who had remained faithful (iii: 16). He predicted the rise of "the Sun of righteousness" (iv: 2), the advent of Jehovah to His Temple (iii: 1), a "messenger," "Elijah the prophet" preparing His way (iii: 1, iv: 5, 6). We learn that this was fulfilled in the coming of John the Baptist (Matt. xi: 10–14, xvii: 10–13; Mark i: 2, ix: 11–13; Luke i: 17, 76, vii: 27). Malachi i: 2, 3 is referred to in Rom. ix: 13. The Hebrew style of the book is argumentative rather than poetical. Its canonical authority has never been doubted.

Malachite (-kīt), a monoclinic mineral rarely found in crystals, but mostly as fibrous or compact stalagmitic masses, with mammillary or botryoidal surfaces; or earthy. Crystals mostly twinned. Hardness, 3.5–4; sp. gr., 3.7–4.01. Luster of crystals adamantine, of fibrous kinds, silky to dull; color, bright green; streak, paler; translucent to opaque. Composition: Carbonic acid, 19.9; protoxide of copper, 71.9; water, 8.2; yielding the formula, CuOCO + CuOHO. Found with other copper ores extensively distributed, in great abundance in the Ural Mountains, Russia. The Russian mines, those of Namaqualand, West Africa, and the Burra Burra mines, South Australia, yield a close variety which takes a high polish and is much used in inlaying work.

Malachy (mal'a-kī), **St.,** an Irish prelate, Archbishop of Armagh, and the greatest of St. Patrick's successors; born in Armagh, Ireland, about 1095. In 1121 he became Abbot of Bangor. Archbishop Celsus, who had made him his vicar, procured his election to the see of Connor (1125), and on his deathbed (1129) recommended him as his successor in the primacy. It was not, however, till 1134 that Malachy could establish himself therein. In 1140 he journeyed to Rome, seeking the pallium, and Innocent II. appointed him papal legate for Ireland. In 1148 he once more repaired to France, to renew to Eugenius III. his request for the pallium; but before his arrival the Pope had gone back to Rome, and at Clairvaux, on Nov. 1, Malachy died of a fever in St. Bernard's arms. He was canonized by Clement IV. The curious "Prophecies of St. Malachy" were first published in his "Wood of Life" (Venice, 1595).

Malacology, the science which treats of the mollusca, or soft-bodied animals.

Malacopteri (-kop'tur-ī), in Professor Owen's classification, a sub-order of Teleostean fishes. The endoskeleton ossified, the exoskeleton in most as cycloid, in a few as ganoid scales; fins supported by rays, all except the first, sometimes in the dorsal and pectoral, soft or jointed, abdominal or apodal; gills free operculate, a swim-bladder and air duct. Called by Müller Physostomi. Owen divides the order into two sub-orders: *Apodes,* with the families *Symbranchidæ, Murænidæ,* and *Gymnotidæ;* and *Abdominales,* with the families *Heteropygii, Clupeidæ, Esocidæ, Salmonidæ, Scopelidæ, Characini, Galaxidæ, Mormyridæ, Cyprinodontidæ, Cyprinidæ, and Siluridæ.*

Malacostraca (-kos'tra-kä), the term applied by Aristotle to the class Crustacea, because their integument was softer than the shell of the Mollusca. Also the highest division of the Crustacea. They have a definite number of body segments, generally seven somites constituting the thorax, and an equal number, including the telson, forming the abdomen. It contains crabs, lobsters, shrimps, wood lice, sandhoppers, etc., and is divided into two great sections, the Edriophthalmata and the Podophthalmata. Dr. Henry Woodward calls it Thoracipoda.

Malaga, a seaport-town of Spain, capital of the province of the same name, situated on the Mediterranean, 68 miles N. E. of Gibraltar, and 254 S. W. of Madrid; lat. 36° 43′ 5″ N., lon. 4° 26′ E.; is commanded by an old Moorish fortress, called the Gibralfaro, and is of circular form, surrounded by a double wall, with a number of stately towers; the city is of Moorish construction, and combines a number of contrivances for mitigating the extremes of heat, and for enjoying the tranquillity of retirement, the streets narrow, the houses large,

and, in general, each has a court into which the windows open; the public buildings are obscured by private houses, and the city does not even contain a good square. The harbor of Malaga is capable of containing about 450 merchant vessels. A fine mole, of 700 yards in length, runs out into the sea, and two smaller ones have been subsequently built. The rivers Guadalmedina and Guadaljorce discharge their waters at this place into the ocean. The chief exports are fruit and wine. Manufactures linens, woolens, sailcloth, paper, rope, hats, leather, and soap. Malaga was founded by the Phœnicians. It fell into the hands of the Moors in 714, and was not wrested from them till 1487, when Ferdinand the Catholic took it. In 1810 it was taken by the French, and remained in their possession till the year 1812. Pop. (1900) 130,-109.

Malaga Wine, a sweet Spanish wine produced in the province of Malaga. It is one of the "muscatel" wines, and is rich, luscious, and full of body.

Malambo Bark, an aromatic, febrifugal bark imported from Santa Fé de Bogota, the capital of New Granada. It is believed to come from a species of *Galipea*, or some allied genus.

Malan, César Henri Abraham (mä-lo*ng'*), a Swiss Protestant clergyman; born in Geneva, Switzerland, July 8, 1787. He became a pastor of the State Church and a regent in the college. Through the influence of American and Scottish friends he became devoutly evangelical, and many of his works were translated into English: "The Church of Rome" (1844); "Stories for Children" (1852); "Pictures from Switzerland" (1854). Both words and music of "Chants de Zion" (Songs of Zion, 1826) are his own. He died in Geneva, May 8, 1864. His "Life" was written (1869) by his son, Solomon César, who, born in Geneva in 1812, studied at Oxford, and was vicar of Broadwindsor and prebendary of Sarum. He wrote on birds, and several theological works, and died Nov. 27, 1894.

Malaprop, Mrs., a character in Sheridan's "Rivals," whose remarks are not so much out of place or *mal-à-propos* as ingeniously perverse in "derangement of epitaphs"— *i. e.*, in confounding and misapplying words somewhat similar in sound or spelling — a "Derbyshire putrefaction," "a barbarous Vandyke," "an allegory on the banks of the Nile."

Mälar (mā'lär), **Lake,** one of the largest lakes, and the most beautiful, in Sweden; 80 miles in length from E. to W., and having numerous long narrow arms and offsets; area, 650 square miles. It is studded with upward of 1,200 islands, mostly well wooded. Its E. end is close by Stockholm, where its waters are poured into the Baltic Sea. The shores are very varied with bays and hills, woods, lawns, and cliffs, and are adorned with many castles, country-seats, and villas, including the royal palaces of Drottningholm and Gripesholm.

Malaria, a morbid poison usually due to microbes generated by the decomposition of animal or vegetable matter under certain conditions of heat and moisture, and which, in marshy districts where the people are obliged to drink the water impregnated with the microbes or to inhale the vapors arising therefrom, produces various kinds of malarial diseases. But investigations in the malarial districts of East Africa concluded by Dr. Robert Koch in the spring of 1898 establish the fact that infection may result from other causes than drinking the water or inhaling the air containing the microbes. Dr. Koch found that in many districts malaria among the natives was due to the transmission of the poisonous malaria microbe by bites of mosquitos that had absorbed the poisonous plasmodium in the malarial swamps where they breed and thrive, and he demonstrated that by administering quinine just prior to or immediately after inoculation the disease could be arrested. See Mosquito.

Malarial Fever, a fever produced by Malaria (*q. v.*). There are several forms of this disease, all produced by the same poison and all influenced by the same line of treatment, especially by the more marked anti-periodic remedies, particularly quinine. The principal forms of malarial fever are intermittent (commonly called ague, chills and fever, etc.), remittent or bilious, congestive, and a few complicated forms, wrongly designated typho-malarial, hæmorrhagic-malarial, etc., all being only aggravations of the usual form of malarial fever.

Malatesta, a distinguished Italian family the chief branch of which were lords of Rimini from 1295 to 1526, and celebrated for the active share they took in the stirring events of that period.

Malatia (mä-lä-tē'ä), a town in the N. W. of the province of Diarbekir in Asia Minor, 8 miles from the Euphrates, and on an important trade route. It was the Melitene of ancient Cappadocia, was long the headquarters of the Jacobite Christians, and has had many vicissitudes. Pop. 20,000.

Malayan Bear, *Helarctos* (*Ursus*) *malayanus,* a bear found in the Malayan Archipelago, Borneo, Sumatra, and Java. It is about 4½ feet in length; the fur is black, fading into brown on the nose. The chest bears a crescentic white mark; the Bornean variety has an orange-colored, heart-shaped patch. It usually feeds on grains

and fruits, and is very fond of honey. It occasionally indulges in animal food; and is said to attack man, when hard pressed, and there is no means of escape.

Malay Archipelago, Indian Archipelago, Asiatic Archipelago, or **Eastern Archipelago,** the great group of islands situated to the S. E. of Asia, and washed on the W. by the Indian and E. by the Pacific Ocean; may roughly be said to lie between the meridians of 95° and 135° E., and the parallels of 11° S. and 17° N. Within these limits lie some of the largest and finest islands in the world, as Borneo, Sumatra, Java, Celebes, the Philippines, etc., but New Guinea is not ranked as belonging to the group. The chief of the smaller islands are the Moluccas or Spice Islands, Billiton, Banca, Madura, Bali, Lombok, Sumbawa, Flores, Timor. The small islands may be truly called innumerable. The islands are generally fertile and covered with a luxuriant vegetation, and they produce all kinds of tropical products in abundance. Many of them contain volcanoes. As regards their fauna and flora they may be divided into two main groups, those E. of the Strait of Macassar and the channel between Bali and Lombok having more affinities with Australia, while the others are rather Asiatic in character. The chief native race is the Malayan. A large portion of the archipelago is really or nominally under the sway of Holland, and this portion is frequently called the Dutch East Indies.

Malay Peninsula. See STRAITS SETTLEMENTS.

Malays, a people inhabiting the Malay Peninsula and the Eastern or Malay Archipelago, or collectively Malaysia. They are of Mongolian affinity, and may be looked on as an oceanic branch of that division of mankind, being modified physically by mingling with the Papuan element in the E. and the Caucasian element in the central and W. parts of the archipelago. This enterprising race has made its way widely over the Pacific islands, reaching as far S. as Madagascar, where they exist as the dominant Hova element of the population. This widespread dominion is due to their bold, enterprising, and roving disposition, their place of residence on the peninsula and the larger islands being the coast region, whence they have driven the natives into the interior and where they long pursued a piratical career, darting from hidden streams in their well-manned proas on any vessel that approached too near the coast, or more boldly lying in wait in fleets in the open sea, for any expected rich prize. Physically considered, the Malays are of low stature, slight in figure, and with very small wrists and ankles. The face is round, the eyes black and somewhat almond-shaped, the nose short and small, cheek bones prominent, features flat, the hair straight and black, the complexion yellowish. In various respects they bear a close resemblance to the Mongolians of Eastern Asia, but differ from them radically in language, all their dialects belonging to a distinct Malayo-Polynesian family which is widely distributed throughout the Indian and Pacific oceans. Of late years the lessons taught them by European naval vessels have forced the Malays to desist from piracy, their old lawless, roving habits being largely abandoned for the more settled occupations of trade and agriculture, though the old spirit occasionally shows itself in outbreaks of murderous frenzy, known as "running amuck." Intellectually they seem at a low level, and have never developed a native literature, such civilization as they possess being due to Arab and Hindu influence. Under these incitements they have developed considerable poetic and dramatic literature, and historical and other prose writings.

Malcolm, the name of various Scotch rulers, as follows: MALCOLM I., King of Scotland; reigned from 943 to 954. MALCOLM II. succeeded Kenneth II. in 1005. In his reign Lothian and Strathclyde became parts of the Scottish kingdom. He was assassinated at Glams in 1034. He was the last direct male descendant of Kenneth MacAlpine. MALCOLM III., surnamed CANMORE (Great Head); born about 1024. After the murder of his father, Duncan, by Macbeth, he sought aid from Siward of Northumbria, and his cause was also espoused by Edward the Confessor. On the defeat and death of Macbeth he was crowned at Scone in 1058. In 1068 he granted asylum to Edgar Atheling, his mother, and two sisters (one of whom, Margaret, he married in 1070), with a number of Saxon exiles. His reign, which was mostly taken up with wars with England, had nevertheless an important bearing on the civilization and consolidation of Scotland. MALCOLM IV. (the Maiden) succeeded his grandfather, David I., in 1153. He surrendered Northumberland and Cumberland to Henry II. in 1157. Died in Jedburgh in 1165, at the age of 24.

Malcolm, Sir John, a British soldier and historian; born in Burnfoot, Dumfriesshire, Scotland, May 2, 1769. Employed by the East India Company, he distinguished himself as a fighter, diplomatist, and ruler; was president of Mysore, 1803; won the important battle of Mehidpur over the Mahrattas in 1817; was governor of Malwa, 1818–1822; of Bombay, 1827–1830; member of Parliament, 1831–1832. He wrote among others: "Political History of India"

(1811); "History of Persia" (2 vols. 1815), which is still an authority; "Memoir of Central India" (1823); and above all, "Sketches of Persia" (1827), still read, and a mine of good stories, legends, travel sketches, descriptions of Oriental life and ceremonial, and manly sense and thought. He died in London, England, May 30, 1833.

Malczewski, Antoni (mäl-chev'skē), a Polish poet; born in Warsaw, Poland, about 1793. The merit of his works, which were marked by a deeply religious spirit, was not recognized till after his death. His masterpiece, the famous epic "Marya" (Maria: 1825), has been several times edited and translated into English (London, 1836), French, German, and Bohemian. The tomb erected to him at Varsovia bears the inscription: "To the author of Maria." He died in abject poverty in Warsaw, May 2, 1826.

Malden, a city in Middlesex co., Mass.; on the Malden river and on the Boston and Maine railroad; 5 miles N. of Boston. It contains Converse Memorial Hall, Art Gallery and Library, hospital, United States niter depot, electric light plant, waterworks, daily and weekly newspapers, and National banks. The city is the trade center for surrounding towns, with trolley to Boston, Lynn, Salem, Beverly, Lowell, Haverhill, Lawrence, and Newburyport. It has about 300 manufacturing establishments, including one of the largest boot, shoe, and rubber works in the United States, and sand and emery paper, card and tassel, last and boot-tree, leather factories, etc., and an assessed property valuation of over $27,000,000. Pop. (1900) 33,664; (1910) 44,404.

Maldive Islands, a chain of 17 coral islets (atolls) in the Indian Ocean, about 300 miles from the S. E. coast of Hindustan, and 500 miles W. of Ceylon; lat. 0° 45′ and 7° 6′ N., lon. 72° 48′ and 73° 48′ E.; pop., (1901) 30,000, chiefly Mohammedans. They are divided into groups, separated by narrow channels, which form safe harbors for small vessels. They are seldom visited by Europeans, the climate being intensely hot and unhealthy. Products, millet, fruit, and poultry. The islands carry on a considerable trade with each other, and also with Hindustan and Sumatra. The principal island is Mali, about 5 miles in circumference. It is the residence of the Sultan, who pays an annual tribute to the British government at Ceylon.

Malebranche, Nicolas, a French philosopher; born Aug. 6, 1638, in Paris, France, where his father was secretary to the king and president of the chamber of accounts. His health being delicate he was classically instructed by a domestic tutor, but afterward went through courses of philosophy and divinity at the colleges of La Marche and of the Sorbonne. At the age of 22 he determined to embrace the monastic life, and was admitted into the Congregation of the Oratory. He applied himself first to ecclesiastical history, and afterward to Oriental learning and Biblical criticism; but having accidentally met with Descartes' "Treatise on Man," he determined to make himself master of that author's system of philosophy. The result of this study was his famous treatise "On the Search after Truth," first printed in 1674, but of which the best edition is that published by himself in 1712, in 2 vols. 4to, and 4 vols. 12mo. The doctrines of this celebrated work, which contains fine thoughts and uncommon reflections rendered still more striking by his chaste and elegant style, are founded on Cartesian principles, and are in some particulars Platonic. It is principally distinguished by the maintenace of a mysterious union between God and the soul of man, and the doctrine that the human mind immediately perceives God, "and sees all things in him." His next publication was "Christian Conversations" (1676). This was followed (in 1680) by a "Treatise on Nature and Grace," which led to several controversial pieces between him and Arnauld. Father Malebranche also wrote several works on physical subjects, and several papers for the Academy of Sciences, of which he was admitted an honorary member in 1699. His death took place in Paris, Oct. 13, 1715. As a philosopher Malebranche distinguished more than any previous metaphysician, the object from the sensation which it creates, and thereby led the way to a right understanding both of our external senses and mental powers.

Maleguetta Pepper. See GRAINS OF PARADISE.

Malesherbes, Chretien Guillaume de Lamoignon de (mäl-zārb'), a French statesman; born in Paris, France, Dec. 6, 1721. He succeeded his father as president of the Court of Aids, besides which he had the superintendence of the press. In 1771, on the abolition of the Parliaments, he was banished to his country-seat, but was recalled three years afterward, reinstated as president, and made minister of state, which post he soon resigned, and then went to Switzerland. In 1787 he was again called to the councils of his sovereign, Louis XVI., when he drew up two memoirs, "On the Calamities of France," and the "Means of Repairing Them"; but his advice was rejected, and he retired to his country-house, where he employed himself in agricultural pursuits. He, however, hastened, of his own accord, to plead the cause of his sovereign, in 1792; and he was one of the last who took leave of him before his execution. This generous attachment to a fallen mas-

ter excited the jealousy of the French rulers and caused his destruction. Shortly after his return home, his daughter, Madame de Rosambo, and her husband were arrested and conducted to Paris; and his

CHRETIEN MALESHERBES.

own arrest, with that of his grandchildren, soon followed. Almost his whole family were extirpated by the merciless proscription of his persecutors. Malesherbes was beheaded in Paris, April 22, 1792, and bore his sufferings with a spirit worthy of his virtuous and honorable life. He was admitted to the Academy of Sciences in 1750, later to the Academy of Inscriptions, and in 1775 to the French Academy. He left several works on topics of the time, and on agriculture and natural history.

Malet, Sir Edward Baldwin, an English diplomatist; born in The Hague, Holland, Oct. 10, 1837; was educated at Eton and at Corpus Christi Colleges, Oxford; was appointed attaché at Frankfort in 1854, and was afterward employed in the diplomatic service in the Argentine Confederation and at Washington, Paris, Peking, Athens, and Rome. In April, 1878, he was appointed minister plenipotentiary at Constantinople, and in the following year agent-consul-general and minister plenipotentiary to Egypt. In 1882 he was presented with a medal and the Khedive's star for his services in Egypt. He was ambassador to Germany in 1884–1895, and in the latter year was retired on a pension, after having achieved marked success in Berlin. He died June 30, 1908.

Malet, Lucas, pseudonym of MARY ST. LEGER HARRISON, an English novelist, youngest daughter of Charles Kingsley; born in Eversley Rectory, Hampshire, England, in 1852. She married William Harrison, rector of Clovelly, North Devon, England (died in 1897). Her novels include: "Colonel Enderby's Wife" (1885); "A Counsel of Perfection" (1888); "Little Peter" (1887); "Mrs. Lorimer" (1882); "The Wages of Sin" (1891); "The Carissima" (1896); "Sir Richard Calmady" (1901); etc.

Malherbe, François de (mä-lārb'), a French poet; born in Caen, France, in 1555. He became court poet in 1605. He was the inaugurator of French classicism, and made Parisian French the standard for the kingdom. His poems were marked by purity of diction and harmony of versification rather than by great poetic feeling. Besides translations from Latin, he wrote but one volume of poetry, containing "Stanzas," "Odes," "Sonnets," "Epigrams," and "Songs." The best edition of his works is in Lalanne's "Great Writers" (Paris, 5 vols. 1860–1865). He died in Paris, France, Oct. 16, 1628.

FRANÇOIS DE MALHERBE.

Malibran, Maria Felicita (mä-lē-bro*ng'*), a mezzo-soprano singer; born in Paris, France, March 24, 1808. She was the daughter of Manuel Garcia, a Spanish singer and teacher of singing. She made her début in London in 1825, and soon her reputation extended over Europe. Her father attempted to establish the Italian opera in New York, but without success; and she married M. Malibran, a French merchant there, who soon became bankrupt. Thereupon she returned to the stage, and was received with great enthusiasm in France, England, Germany, and Italy. Her first marriage having been dissolved, she married M. Beriot, a famous violinist, in 1836. She was one of the greatest of oper-

atic singers. She died in Manchester, England, Sept. 23, 1836.

Malic Acid, in chemistry, $C_4H_6O_5 = C_2H_3OH \begin{matrix} COOH \\ COOH \end{matrix}$ Discovered by Scheele in 1785. It is very widely diffused through the vegetable kingdom, chiefly in combination with potassium and calcium. It is found in abundance in nearly all garden fruits, such as apples, cherries, and strawberries, and in many roots, as, for instance, marshmallow, liquorice and madder; also in carrots, lettuce, tobacco, poppy, sage, thyme, in the flowers of chamomile and elder, and in the seeds of parsley, flax, and pepper, etc. It can be prepared by precipitating the vegetable extract with lead acetate, and decomposing with sulphydric acid. The aqueous solution left to evaporate yields groups of colorless shining needles, or prisms, which melt at 100°. They are odorless, have a sour taste, and are soluble in alcohol. Active malic acid rotates the plane of polarization to the left, $[a] = -5°$. By the action of reducing agents it is converted into succinic acid. Malic acid yields neutral and acid salts and possesses a strong tendency to form the latter. Ammonium malate, the neutral salt, is soluble and uncrystallizable. Ammonium malate (acid salts), $C_4H_5(NH_4)O_5$. It crystallizes in transparent prisms with well-defined and strongly reflecting faces. It deflects the plane of polarization to the left $[a] = -6°$. Calcium malate, $\left.\begin{matrix} CaO_2 \\ C_4H_4O_3 \end{matrix}\right\} 2OH_2$. The crystalline form of this salt is hemihedral, and it produces dextrorotation. It is only slightly soluble in cold water.

Malice, in law, a premeditated or formed design to do mischief or injury to another, called also "malice prepense" or "aforethought."

"Malice prepense, *malitia praecogitata,* is not so properly spite or malevolence to the deceased in particular, as any evil design in general; the dictate of a wicked, depraved, and malignant heart; and it may be either express or implied in law. Express malice is when one, with a sedate deliberate mind and formed design, doth kill another; which formed design is evidenced by external circumstances discovering that inward intention. . . . Also in many cases where no malice is expressed, the law will imply it; as where a man wilfully poisons another; in such a deliberate act the law presumes malice, though no particular enmity can be proved."— Blackstone.

Malignants, a term used in England by the Parliament men to designate those whom they considered to be the evil advisers of Charles I. They are so called in the "Grand Remonstrance," Laud and Strafford being singled out as the most prominent, and to their door are laid all the evils which afflicted the kingdom. Afterward the name was extended to all who sided with the king against the Parliament.

Malines (mä-lēn′), or **Mechlin** (me*h*′-lin), a city of Belgium, on the Dyle, 14 miles S. S. E. of Antwerp. It has fine squares, noble buildings, and wide regular streets, but has lost its former greatness, and fallen far behind other Belgian cities in commercial enterprise and industrial activity. As the see of the primate of Belgium it still retains a certain degree of ecclesiastical importance, and possesses numerous churches, the most noteworthy of which is St. Rombold's Cathedral, a vast building, covering nearly two acres, its interior adorned with Van Dyck's "Crucifixion." It was mostly built in 1437–1452, but its clock tower, 324 feet high, remains unfinished. The churches of St. John and of Our Lady contain works by Rubens; the town hall dates from the 15th century; the Cloth Hall (1340) is now used as a guard house; noteworthy also are the splendid modern archiepiscopal palace, the Beguinage, the Salm inn (1534), and the monument to Margaret of Austria (1849). The manufacture of pillow lace, so famous in the 17th century (see LACE), has been largely transferred to Brussels, etc.; but linen and woolen fabrics, beer, needles, etc., are made here. Pop. (1906) 58,494.

Malingering, feigning disease on the part of a soldier, sailor, prisoner, etc., in order to obtain discharge from service, or escape from duty or labor. As defined in the British Army Act of 1881 it implies some overt act, such as the previous application of a ligature, or the taking of some drug, which produced the appearance of the disease said to exist. A worse form of the same crime, "wilfully maiming" — as blowing off the trigger-finger — is erroneously called malingering.

Mallery, Garrick, an American ethnologist; born in Wilkesbarre, Pa., April 23, 1831; was graduated at Yale (1850); became a lawyer; on the outbreak of the Civil War, went to the front, and rose through the various grades to that of lieutenant-colonel. His published works in part are: "A Calendar of the Dakota Nation" (1877); "Sign Language among the North American Indians compared with That among Other Peoples and Deaf Mutes" (1881). He contributed much to periodicals. He died in Washington, D. C., Oct. 24, 1894.

Mallet, or **Malet, Claude François de** (mä-lā′), a French military officer; born in Dôle, Franche-Comté, France, June 28, 1754. He became an eager supporter of the Revolution. Entering the army, he had risen to the rank of a Brigadier-General by 1799. But in 1801 he was detected in a conspiracy against Napoleon, and again in 1808; he was arrested and kept in confinement till 1812. During Napoleon's campaign in Russia Mallet made his escape from prison on the night of Oct. 22–23, and by circulating the false news of Napoleon's

death and by dexterous use of a forged decree of the Senate won over some of the national guards. While the latter occupied the principal public offices in his name, Mallet himself proceeded to liberate his fellow-conspirators, Generals Guidal and Lahorie, from prison. But at the house of Hullin, commandant of the troops in Paris, Mallet was himself taken prisoner by Hullin's adjutant, Laborde. He was shot, along with his fellow-conspirators, Oct. 29, 1812.

Mallet, or **Malloch, David** (mal'let or mal'lo*h*), a Scotch poet and dramatist; born in Crieff, Perthshire, Scotland, about 1700. He was under-secretary to the Prince of Wales, and a friend of Pope, Bolingbroke, and other celebrities of the time. He wrote in verse "The Excursion" (1728); "The Hermit" (1747); "Edwin and Emma" (1760); the tragedies "Eurydice" (1731); "Mustapha" (1739); etc. The famous English patriotic song "Rule Britannia" appeared in "Alfred: a Masque" (1740), written with James Thomson; its authorship has been claimed for each. He died in London, April 21, 1765.

Mallian, Julien de (mä-yäng'), a West-Indian dramatist; born in Le Moule, Guadeloupe, in 1805. He gained wide reputation as a writer of comedies and dramas, many of which have been presented on the metropolitan stage. The most popular are: "Two Roses" (1831), a historical drama of the civil wars in England; "The Carpenter" (1831), a comedy; and "The Wandering Jew" (1834). He died in Paris, France, in 1851.

Mallock, William Hurrell, an English author; born in Devonshire, England, in 1849. He was educated by a private tutor, and afterward at Oxford, where, in 1871, he gained the Newdigate Prize Poem. He never entered a profession, though at one time he contemplated the diplomatic service. "The New Republic," most of which he wrote while at Oxford, was published in 1876; a year later "The New Paul and Virginia"; in 1879 "Is Life Worth Living?" appeared; in 1880 a small edition of "Poems," written, most of them, many years previous; the following year "A Romance of the Nineteenth Century," and, in 1882, "Social Equality." Other of his works are "Every Man His Own Poet"; "Prosperity and Progress"; "Labor and the Popular Welfare" (1893); "Aristocracy and Evolution" (1898); "The Individualist"; etc. He also translated Lucretius.

WILLIAM H. MALLOCK.

Mallon, Isabel Allerdice, pseudonym Bab, an American journalist; born in Baltimore, Md., July 13, 1857. Being thrown on her own resources in early life by the death of her husband, she entered journalism; became a bright and clever writer; and her weekly letters in papers all over the country attracted attention. She was the "Ruth Ashmore" of the "Ladies' Home Journal." She died in New York city, Dec. 27, 1898.

Mallorca. See Majorca.

Mallow, a genus of plants of the natural order *Malvaceæ,* whose species are herbaceous plants, or more rarely shrubs. The common mallow is plentiful over most of Europe, and in Great Britain on waysides and heaps of rubbish. It is a perennial, with rather large bluish-red flowers on erect stalks. The dwarf mallow, also a common native of Great Britain, has smaller whitish or reddish-white flowers. These two plants have a mucilaginous and somewhat bitter taste, and the leaves are used as an emollient and demulcent medicine, a decoction of them being employed in cases of irritation of the pulmonary and of the urinary organs; and poultices made of them are very frequently employed to allay external inflammation. Other species have similar properties. The musk mallow has a faint musk-like smell. The fiber of *M. crispa* is used in Syria for textile purposes, and the fibers of many species are probably fit for similar use and for the manufacture of paper. The young leaves of some are boiled as vegetables. A mallow grows on the Bass Rock and in Haddingtonshire. The marsh mallow belongs to another genus.

Malmaison (mäl-mā-zông'), a château on the left bank of the Seine, 10 miles W. of Paris. It was the favorite residence of Josephine, wife of Napoleon I., and here she died. The château belonged to Richelieu, and was restored by Napoleon III. in 1861. A sortie by Ducrot from Paris in 1870 was repulsed here by the Germans.

Malmesbury, a market-town of Wiltshire, England; on a bold eminence between the two head streams of the Avon, 26 miles N. N. E. of Bath. It owes its name to Maildulf, an Irish missionary. Aldhelm, his scholar, became about 673 first abbot of the famous abbey here, in which Athelstan was buried, and of which William of Malmesbury was librarian and precentor in

the first half of the 12th century. To his time belong the building of a short-lived castle, and the rebuilding (also by Bishop Roger of Salisbury) of the abbey church, which, Transition Norman in style, and cruciform in plan, with a central spire, was 350 feet long. Little more than the nave — now the parish church — remains; but this is a most interesting fragment, its finest feature the S. porch. At the Dissolution (1539) the mitered Benedictine abbey became a cloth factory. A beautiful market cross (temp. Henry VII.) is noteworthy. Hobbes was a native of Malmesbury.

Malmesbury (mämz'be-ri), **James Harris, 1st Earl of,** an English diplomatist; born in Salisbury, England, April 21, 1746. Educated at Winchester, at Merton College, Oxford, and at Leyden, in 1768 he became secretary of legation at Madrid, and in 1772 minister at Berlin, in 1777 at St. Petersburg, in 1784 at The Hague. In 1779 he received the Order of the Bath, and in 1788 was created Baron, in 1800 Earl of, Malmesbury. Meanwhile, in 1793, with other Whigs he had seceded from Fox to Pitt, and in 1795 had married by proxy and conducted to England the Princess Caroline. He died in London, Nov. 20, 1820.

Malmesbury, James Howard Harris, 3d Earl of, an English statesman; born in London, March 25, 1807. In 1837 he stood as a Tory parliamentary candidate for Portsmouth, and in 1841 had just been returned for Wilton, when his father's death called him to the House of Lords. In 1852 he was Foreign Secretary under Lord Derby, as again in 1858–1859, when his policy prior to the outbreak of the Franco-Austrian War was directed wisely if unsuccessfully to the preservation of the peace of Europe. In 1866–1868, and again in 1874–1876, he was Lord Privy Seal; in 1884 appeared his valuable and entertaining "Memoirs of an Ex-Minister." He died in London, May 17, 1889.

Malmesbury, William of. See WILLIAM.

Malmö (mäl'muh), the third largest town of Sweden, on the Sound, nearly opposite to and 17 miles from Copenhagen; besides being a busy seaport, it has manufactures of cigars, sugar, beer, and woolens, and some shipbuilding; the exports (chiefly grain, flour, butter, eggs, cement, chalk, matches, live stock, and timber) are carried away every year in about 3,500 vessels of 750,000 tons burden, and the imports (coal, machinery, cotton, grain, textiles, coffee, etc.), brought by 3,600 vessels of 720,000 tons; the town hall is a fine Renaissance building of 1546. The only remaining part of the old fortifications is the castle in which the Earl of Bothwell was confined; it is now used as a prison. Down to the 16th century Malmö was one of the busiest commercial towns in that part of the Baltic. In 1523 a treaty of peace between the Danes and Gustavus Vasa was signed here. Pop. (1906) 72,459.

Malmsey (mäm'zi), a name bestowed originally on the red and white wines of Napoli di Malvasia or Monemvasia, in the Morea, not because it produced them, but because it exported them; they were grown in the islands of the Ægean and the Levant. The Malmsley wines of modern commerce are mostly the produce of Teneriffe, Madeira, the Azores, Sardinia, Sicily, and one or two other places.

Malmström, Bernhard Elis (mälm'-struhm), a Swedish poet and historian; born in Nerike, March 14, 1816; was Professor of Æsthetics and Literature at Upsala in 1858. He published: "Poems" (1845–1847; latest ed. 1889); "Ariadne," of which many editions have appeared; the prose work "History of Swedish Literature" (5 vols. 1866–1868); etc. Much of his poetry has great perfection of form. He died in Upsala, June 21, 1865.

Maloewa. See OMBAY.

Malojaroslavetz (mä"lō-yä-rō-slä'vets), a town of Russia, province of Kaluga. It is noted as the scene of a most sanguinary battle in 1812, between the French army under Napoleon I. and the Russians, in which the latter were defeated.

Malone, a village and county-seat of Franklin co., N. Y.; on the Salmon river and on the Central Vermont and the New York Central and Hudson River railroads; 60 miles N. E. of Ogdensburg. It contains the Northern New York Institution for Deaf Mutes, Franklin Academy, the Wead Public Library, electric light plants, National banks, and several weekly newspapers. It has flour, woolen, and paper mills, a tannery, machine shops, etc. Malone was the birthplace and subsequent home of Vice-President William A. Wheeler. Pop. (1900) 5,935; (1910) 6,467.

Malone, Edmond, a British Shakespearean scholar; born in Dublin, Ireland, Oct. 4, 1741. He was graduated with credit at the university there, and called to the Irish bar in 1767. Falling soon after into a fortune, he went to London to devote himself to literary pursuits, his first work being a "supplement" to Steevens's edition of Shakespeare (1778). His contributions to Steevens' 3d edition of Shakespeare (1785) led to a serious quarrel between the two, in which Steevens was wholly to blame. Malone's own edition of the great dramatist (1790) was warmly received, especially the essays on the "History of the Stage" and the "Genuineness of the Three Plays of Henry VI." As an editor

Malone displays great good sense, conscientiousness, much acuteness, extensive research, and a becoming respect for the text of the earlier editions. He had been one of the first to express his unbelief in the antiquity of Chatterton's Rowley poems, and in 1796 he denounced the impudent forgeries of the wretched Ireland. Next year he published a posthumous edition of the works of his friend Sir Joshua Reynolds. His own death occurred in London, May 25, 1812. He left behind a large mass of materials for another edition of Shakespeare, which at length appeared in 1821, in 21 volumes, under the editorship of James Boswell the younger, and as the "Variorum Shakespeare" is known and valued by all scholars.

Malory, Sir Thomas (mal'-), the author of "MORTE D'ARTHUR" (*q. v.*); born probably about 1430. But little is known of his life. He died after 1470.

Malot, Hector (mä-lō'), a French novelist; born near Rouen, France, May 20, 1830. He was a prolific writer. Of his numerous works the best known are: "The Victims of Love," in three parts; "The Lovers"; "Husband and Wife"; "The Children"; "Doctor Claude"; "Accomplices"; "In the Bosom of the Family"; etc., mostly treating of French life under the Second Empire. He died July 19, 1907.

Malpighi, Marcello (mäl-pe'gē), an Italian physician and anatomist; born in Crevalenore, Italy, March 10, 1628. He was Professor of Medicine at Bologna and Pisa, and became first physician to Pope Innocent XII. in 1691. His discoveries in anatomy were considerable, particularly respecting the structure of the skin and the secreting glands; and his merit was very high as a vegetable physiologist. He died in Rome, Nov. 29, 1694.

Malplaquet (mäl-plä-kā'), a village in the French department of Nord, 10 miles S. of Mons in Belgium. Here, Sept. 11, 1709, over 90,000 British and Dutch, under Marlborough and Prince Eugene, defeated about the same number of French under Marshal Villars. In this "very murderous battle," as Marlborough called it, the loss of the allies was from 20,000 to 30,000, of the French from 6,000 to 16,000. Its result was the capture of Mons.

Malt, grain, usually barley, steeped in water and fermented, by which the starch of the grain is converted into saccharine matter, dried on a kiln, and then used in brewing ale, stout, beer, or porter, and in the distillation of whisky.

Malta (mâl'tä) (anciently Melita), an island in the Mediterranean belonging to Great Britain; 62 miles S. S. W. of Sicily, and 197 miles N. of Africa; length 17 miles; central breadth, about 9 miles; area, 95 square miles, to which the adjoining islands of Gozo and Comino add 24; pop. (1906) 205,059. It is of an irregular oval shape, deeply indented on all sides except the S., where the coast forms a continuous and almost unbroken line. The most important indentation is the double bay on which the capital, Valetta, stands. The greatest elevation of the island is about 750 feet. There are only a few small streams, but the springs are so numerous and copious that no deficiency of water is felt. An extensive series of waterworks, including reservoirs for irrigation, have recently been constructed. The soil is thin, and rests on a calcareous rock; in some parts earth has been brought from Sicily and put down. Corn, cotton, potatoes, and clover are the chief crops. Both the vine and olive are cultivated, and fruit, particularly figs and oranges, is very abundant. The manufactures consist of cotton goods, lace, jewelry, etc. The central position of Malta in the Mediterranean makes Valetta an invaluable naval station, although the habor is open to objection on account of its small size; it has been provided with excellent docks and very strong fortifications. The climate is very hot in summer, but pleasant and healthy in winter, attracting many visitors at this season.

Malta passed successively through the hands of the Phœnicians, Greeks, and Carthaginians, and was finally attached to Rome during the 2d Punic war. After the fall of the Roman empire it was seized at different times by Vandals, Goths, and Saracens. From the last it passed to Sicily, and followed its fortunes till 1522, when Charles V. granted it to the order of St. John of Jerusalem. In 1798 the grand-master surrendered it without defense to Napoleon. It was taken by the British in 1800, and finally annexed by them in 1814. The executive government is in the hands of a governor and council. By a new constitution adopted in 1888 the legislative council consists of the governor and the members of council (6), with 14 members elected by the constituencies into which Malta and the islands of Gozo and Comino have been divided. The people are mainly of Arabic race and speak a kind of Arabic mixed with Italian. Italian and English are also spoken. The educational institutions include a university, a lyceum, two secondary schools, besides primary and infant schools. Besides the capital Valetta and the Three Cities adjoining there are several considerable towns or villages.

Malte-Brun, Conrad (mält-bru*ng'*), a Danish geographer; born in Thisted, Jutland, Aug. 12, 1775. After studying theology a short time at the University of Copenhagen, he devoted himself to literature and politics. Having given offense by his writings in favor of the liberty of the press and

the enfranchisement of the peasants, he was banished to Sweden in 1796. After having resided for a time at Stockholm, he went to Paris, where he soon acquired great reputation, particularly as a geographer. He edited the foreign political department of the "Journal des Debats," was a contributor to "Manual of Universal Geography," "Universal Biography," and produced various works. Among these the greatest is the well-known "Summary of Universal Geography" (8 vols. 8vo.), the first volume of which appeared in 1810, and the last after his death, in 1829. The first six volumes only were completed by Malte-Brun. Among his other works are "Ancient and Modern Poland," "History of Travel," and the valuable treatise, published in conjunction with Mentelle, "Mathematical, Physical and Political Geography" (16 vols. 8vo.). He died in Paris Dec. 14, 1826.

Maltese Dog, a small variety of spaniel, with long, silky hair, most frequently white; the muzzle is round.

Maltese Cross, a cross formed of four arrow-heads meeting at the points; the badge of the Knights of Malta. The eight points of this cross are said to symbolize the eight beatitudes. This form of cross is the emblem of the order known as "King's Daughters."

Maltese Islands. See MALTA.

Maltha, according to Pliny, a name used for an inflammable mud which flowed from a pool at Samosata, Commagene, North Syria, and resembling naphtha. It has since been used to designate the viscid bitumens. Dana includes it among his Pittoliums.

Malthus, Thomas Robert, an English political economist; born in Albury, Surrey, England, Feb. 14, 1766. He was appointed, about 1805, Professor of History and Political Economy in the college of the East India Company at Haileybury, and continued to hold that situation till his death. His best-known work, the "Essay on the Principle of Population," which gave rise to so much discussion, first appeared in 1798. It was subsequently enlarged, and passed through many editions. The Malthusian system is founded on the hypothesis that population increases in a geometrical, while provisions only increase in an arithmetical ratio. It proposes to remedy or alleviate the consequent evils and miseries of poverty by a preventive check — the moral restraint on marriage, dictated by reason and reflection, and adhered to by deliberate and benevolent choice. He died in Bath, Dec. 29, 1834.

Malting, a process by which barley, wheat, rye, or any other description of grain is converted into malt. It consists of four operations: viz., steeping, couching, flooring, and kiln-drying. The grain is steeped, in water for from 30 to 50 hours, according to the temperature of the air, to enable it to take up enough moisture to soften it. The water is then drained from the cistern, and the softened grain thrown out into a rectangular vessel called a couch, where it remains till germination has fairly commenced. As this must not be allowed to proceed too rapidly, the grain is at the end of 20 or 24 hours thrown on the floor to a depth varying from 10 or 12 inches to 3 or 4 inches according to the season. On the floor the germination is regulated, the grain being turned every four or five hours, so that the whole of it may be brought under similar conditions as to heat, light and moisture. When the acrospire has reached about three-fourths the length of the seed, the grain is then spread more thinly on the floor, that it may wither, and that germination may be arrested. At the end of five or six days after the grain has left the cistern, it is thrown on the kiln, where it is subjected to a gradual heat, not exceeding 60° for pale malt, 77° for amber malt, and 93° for brown or porter malt. The object in malting is not, as stated in many old works, to convert the starch of the grain into sugar, but to develop certain soluble albuminous bodies which possess the power of rapidly changing starch into sugar in presence of water at a temperature of 57° to 70°. Good barley yields about 80 per cent. by weight, or 109 per cent. by measure of dry malt.

Maluwa. See OMBAY.

Malvaceæ (-vā′se-ē), in botany, mallowworts, an order of hypogynous exogens, the typical one of the alliance Malvales. It consists of herbs, shrubs, or trees, with alternate more or less divided stipulate leaves, the hairs, if any are present, stellate. Peduncles usually axillary, flowers large, showy, surrounded by bracts. Sepals five, three, or four, valvate in æstivation. Petals, as many as the sepals. Stamens, indefinite, monadelphous; anthers one-celled, reniform, bursting transversely; ovary consisting of many carpels, arranged around a common axis; styles as many as the carpels. Fruit, capsular or baccate; seeds, one or more in each carpel. Found largely in the tropics, and in smaller numbers in temperate climates. They are mucilaginous, and without exception wholesome. Known genera 60, species 700.

Malvasia (mäl-vä-sē′ä) (the Italian Napoli di Malvasia) a great fortress and commercial center of the Levant during the Middle Ages; now a small town with about 1,000 inhabitants on the E. shore of the Morea.

Malvern, Great, one of the most fashionable watering-places in England, on the E. side of the Malvern Hills, at the foot of the Worcestershire Beacon, from the summit of which (1,444 feet above the sea-level)

extensive views are obtained. It is irregularly laid out, and has a fine cruciform church, with a square embattled tower 124 feet high rising from the center, rebuilt in the reign of Henry VII., and restored in 1860–1861. On the outskirts is Malvern College. Madame Goldschmidt (Jennie Lind) resided near Malvern many years previous to her death.

Malvern Hill, an eminence near the James river, S. E. of Richmond, Va. Here, on July 1, 1862, the Confederates under Lee were defeated by the Union army under McClellan.

Malwah, or **Malwa,** an ancient kingdom of Hindustan. It is now divided into a number of states under British protection.

Mamiani della Rovere, Count Terenzio (ma-mē-a′nē del′la rō′ve-re), an Italian statesman and writer; born in Pesaro, Italy, in 1800. Was imprisoned and exiled for taking part in the revolution at Bologna in 1831; made Minister of the Interior in 1848; Minister of Public Instruction in 1860; Minister to Athens. He wrote numerous and important books, among which are: "Confessions of a Metaphysician" (2d ed. 1865); "The Religion of the Future" (1879); "Social Questions" (1882); etc. He died in Rome, May 21, 1885.

Mammalia (Latin, *mamma*, a breast), the highest class at once of the *Vertebrata* and of the animal kingdom, including those animals we familiarly term quadrupeds, the whales, dolphins, and other fish-like forms, and man himself. The characters which separate the mammals primarily from other *Vertebrata*, and from all other animals, may be summed up in the definition that they are vertebrate animals possessing a typical body covering of hairs, and which nourish the young for a longer or shorter period by the milk, a fluid secreted by special glands — the mammary or milk glands. The nature of the body covering and the possession of mammary glands constitute points sufficient to distinguish mammals from all other animal forms.

The exoskeleton of the *Mammalia*, or outer skeleton of the body, appertaining to the skin, exists, as already stated, in the form of hairs. These hairs are modifications of the outer or epidermal layer of the skin, and are each formed in a minute hair sac, by horny matter being deposited on a small papilla or prominence, which arises from the derma or true skin from the bottom of the sac. The whales and porpoises alone among mammals are destitute of a hairy covering, the skin in such forms being entirely naked. But even in the whales a few hairs or bristles may surround the mouth; and in other cetaceans (for example, dolphins), which are wholly destitute of hairs when fully grown, these appendages are present in the embryonic or fœtal condition. In the *Echidna*, hedgehog, and porcupine, the hairy structure merges into that of strong spines. In the scaly ant-eaters (*Manis*) or pangolins we find the integument to secrete horny scales; while in the armadillos both epidermis and dermis develop hard structures; the latter secreting an armor-casing of bony plates or scutes, while the epidermis secretes horny plates which cover the bony scutes.

The endo or internal skeleton exhibits certain variations in general conformation, in consistency with the different modes of life pursued by mammals; but throughout it exhibits a uniformity of essential structure, and in most points agrees with the conformation of man's own bony frame. The spine or vertebral column, except in the whales and allied forms, generally exhibits a division into the definite regions of neck, back, loins, sacral region, and tail, coccygeal, or caudal region. In man, certain bats, and monkeys, the lowest numbers of vertebræ are found. Man possesses 7 cervical, 12 dorsal, 5 lumbar, 5 sacral, and 3 or 4 coccygeal vertebræ. The cervical vertebræ of mammals are wonderfully constant in number, being with few exceptions seven in number, as in man. Thus in the long-necked giraffe or short-necked porpoise the cervical vertebræ uniformly number seven. The most notable exceptions to this rule on the side of reduced vertebræ are found in the manatee and a two-toed sloth (*Cholœpus Hoffmanni*), in which only six are present; while on the side of a greater number the three-toed sloth (*Bradypus tridactylus*) may be cited, as presenting us with nine cervical segments. The hinder two neck vertebræ in the latter instance, however, might be referred by some anatomists to the dorsal or back region. The dorsal or back vertebræ in mammals average 13 in number. The lowest number is 10, as in Azara's armadillo. The slow lemur possesses 16. The elephants have 20 dorsal vertebræ, while the two-toed sloth has 24, exactly double the number found in man. The lumbar vertebræ, or those of the loins, are generally to be distinctly recognized save in whales, etc. Some monkeys have only four lumbar segments; while below this number the *Ornithorhynchus* and *Echidna* present us with two, and the two-toed sloth with three only. The largest numbers are found in the dolphins, where there are 24 lumbar vertebræ; though, as already remarked, there is great difficulty in determining the exact limits of the hinder regions of the body in the *Cetacea* and consequently in settling the true number of segments belonging to any given region — this difficulty being due to the rudimentary nature of the pelvis and absence of hind limbs in these forms. The slow lemur possesses nine lumbar vertebræ, but the average number

is above that of man, and appears to be 7 or 8. Eight is generally the largest number of lumbar vertebræ found in higher mammals. The five sacral vertebræ in man unite to form a single bone known as the sacrum. This number of sacral vertebræ is rarely exceeded throughout the class *Mammalia*. Thus some apes have six sacral vertebræ, and the highest number is ten, found in some armadillos. In the cetaceans, in which the pelvis is rudimentary, no sacrum exists; and the corresponding free vertebræ are inseparable from the general and unspecific arrangement of the hinder segments of the spine in these animals. The four coccygeal vertebræ of man are very small, and are appended to the lower extremity of the sacrum, to which about middle life they generally become ossified; but throughout the mammalian class these vertebræ become widely developed, and in greatly varying and different degrees, to become the useful "tail" of many forms. Thus, in the long-tailed pangolin or scaly ant-eater 46 coccygeal vertebræ exist. Thirty-three vertebræ exist in the tail of the spider monkeys. In the magot (*Inuus*) or Barbary ape the tail vertebræ number three, while in the bats two only exist. The first cervical vertebra or atlas supports the head, which fits into it by the two articular processes of the backbone (occipital) of the skull — occipital condyles. The second cervical vertebra or axis possesses a blunt process (odontoid process), on which the axis vertebra together with the skull turns. In those mammals (for example, whales) in which there is little movement permitted between the head and neck the cervical vertebræ are ossified together, and the odontoid process is quite rudimentary.

In all mammals, but especially in those which move with the body in a horizontal position, a large band of fibrous tissue stretches from the back of the skull to be attached to the spines of the cervical and dorsal vertebræ. This great elastic band is the ligamentum nuchæ, and on it devolves the function of supporting the head of the animals, and of thus relieving the muscular attachments of considerable weight. In those mammals which possess long necks this ligament is more largely developed, as in the giraffe, where it extends backward and is attached to the sacrum. The horse and elephant also exemplify mammals in which the ligamentum nuchæ is largely developed for the purpose of supporting the head. But at the other extreme, as in whales and in man, we find this structure becoming rudimentary, on account of there being little or no necessity for supporting the head. In whales the coalescence of the cervical vertebræ already pointed out, and in man the erect position, respectively annul the functions of this ligament. In some cases (as in the mole), it may become ossified by the deposition in its fibers of bony material. The cavity of the thorax or chest in mammals is bounded by the ribs. These bones vary greatly in number, but generally correspond to that of the dorsal vertebræ. Each rib articulates with two vertebræ — by its terminal portion or head, and with the transverse process of the lower vertebra by its tubercle. The ribs are divided into true and false ribs. The former are those which are joined to the sternum or breast bone, the latter are those which are not so attached. In man there are seven upper true ribs, which are united to the breast bone in front by cartilages — the costal cartilages. Of the remaining five lower or false ribs the upper three are each attached to the costal cartilage above, and not to the sternum; while the last two — 11th and 12th ribs — fall short of the cartilages, and terminate in free blunted points. The last two ribs in this way become popularly known, from their being unattached in front, as the "floating ribs." The number of true relative to the number of false ribs found in man — namely seven to five — is also an average proportion in most other mammals. The seals have many more true than false ribs; while of the whalebone whales the reverse is true, but one pair of true ribs being found in certain forms. The actual number of ribs varies both above and below the number in man. Thus in certain cetaceans (*Hyperoodon*) only nine pairs of ribs are found, while in the two-toed sloths no less than 24 pairs are present. The ribs in man consist simply of two pieces, the rib proper, or vertebral rib, and the costal cartilage attaching the rib to the sternum. In some forms three parts may be demonstrable as composing the rib. This is the case in the lowest mammals (*Ornithorhynchus* and *Echidna*), in which a third and additional piece is placed between the sternal or costal cartilage and the rib proper or vertebral portion.

The conformation and comparative anatomy of the skull presents so many abstruse and technical points, that a few of the most general observations on this head will suffice in the present instance. In mammals the sutures, or places of firm union between the bones of the skull, are, with the exception of the *Monotremata*, to be distinctly recognized in the fully grown animal. In the *Monotremata* the sutures become obliterated by the firm osseous union of the bones, and this characteristic is common to these lowest mammals, with birds especially. The entire skull and the bony skeleton of the trunk also have been mapped out to form a series of complicated vertebræ — the vertebra or segment of the backbone being thus taken as the type upon which the entire form is built up.

Two condyles exist on the occipital or posterior bone of the skull, by which, as previously mentioned, the skull articulates with the atlas vertebra. In birds and reptiles only one occipital condyle exists; though in *Amphibia* (frogs, etc) two condyles are present. In these latter forms, however, the skull is of much lower structure than that of the *Mammalia*. The simple structure of the mammalian lower jaw or mandible is highly distinctive of the class when compared with that of birds and reptiles. In the latter classes, each half of the lower jaw is composed of a number of pieces, and the bone is thus of compound nature. In birds and reptiles the lower jaw is articulated to the skull by the intervention of a separate bone — the os quadratum or quadrate bone. In mammals the lower jaw articulates directly, and of itself, with the skull, or squamosal part of the temporal bone; while the quadrate bone becomes the malleus, one of the auditory ossicles or bones of the internal ear. The jaws of mammals exhibit a division into various parts, corresponding with the actual and more apparent divisions of these bones in lower vertebrate forms. The upper jaw or maxilla consists of a front portion, the premaxilla, in which the incisor or front teeth are fixed, but which is more or less disguised in man; and of a hinder, and by far the larger portion, known simply as the maxilla. This latter part is also divisible into a complicated number of parts corresponding to its divisions in lower forms. All the other teeth are situated in the maxilla. The maxilla is much elongated in whales, and in such forms as the great ant-eaters. The halves of the mammalian upper jaw are generally united in the adult either by firm bony union or anchylosis, or by suture. In the *Ornithorhynchus*, however, and in certain bats, the premaxilla of one side is separated from the opposite premaxilla by a distinct interval. In the *Echidna*, on the other hand, the two premaxillæ are firmly united both above and below. And finally, in the three-toed sloths the two premaxillæ are firmly united, but are separated in turn from the maxilla as it exists in man. The lower jaw in man is divisible into two halves or rami, united at the front by a symphysis. Each ramus has a horizontal and ascending portion, and terminates above in two processes, the front one being termed the coronoid process and the hinder the condyle. By the condyles the jaw articulates with the glenoid cavities in the temporal bones. Throughout the *Mammalia* the mandible may undergo alteration and change from its state and development in man. The ascending ramus of the lower jaw is less developed than in man; in *Rodentia*, as in the porcupines, it is low, and but faintly marked. In carnivores (for example, dog) the coronoid process is greatly developed for muscular attachments, while in most rodents it is of rudimentary nature. Before birth the two halves of the lower jaw are separable, but at birth are united at the symphysis. In man and in a high ape (the Siamang gibbon) alone does the symphysis project to form a true chin.

The limbs in mammals, like those of all other *Vertebrata*, are never more than four in number. The front limbs are invariably present, but in cetaceans and such allied forms as the dugongs and manatees the hinder limbs are unrepresented.

The teeth of mammals, as well as those of other vertebrate animals, are to be regarded as developments of the dermis or true skin. Each tooth consists of a crown or portion above the jaw, and of a fang or fangs, or, as they are popularly termed, roots, by which the tooth is secured in the jaw. The mode of formation and development of the teeth will be described in the article TOOTH. Teeth are wanting in several mammals, and of imperfect structure in several orders of the group. Thus in the *Echidna* — a monotreme — in the edentate pangolins (*Manis*), and in the ant-eaters (*Myrmecophaga*), teeth are absent entirely; while in the whalebone whales (*Balænidæ*), they are represented in the fœtal or embryonic state only, and become absorbed as development advances. In the *Ornithorhynchus* horny teeth of a rudimentary character are present; and in the order *Edentate* generally (for example, sloths and armadillos), the teeth exhibit an imperfection in structure, in that they are destitute of the enamel which forms so important an element in the conformation of the perfect teeth of other mammalian forms. The teeth of mammals are further lodged in alveoli or sockets, and are never, as a normal phase of structure, ossified to the jaw bones as in lower forms. And in all mammals the teeth are situated on the edges of the jaws only, and are not borne by any of the other bones which enter into the composition of the mouth. The sockets of those teeth which continue to grow throughout life are modified from the other and ordinary teeth; such modified sockets are seen in the tusks or incisor teeth of the elephants and in the incisor or cutting teeth of rodents, in which the roots are long and provided with a persistent pulp. The number of teeth varies greatly throughout the mammalian class. Man possesses 32 teeth in his permanent set, and the *Catarrhine* or Old World monkeys agree with him in this respect; the New World apes also closely resemble his dentition save in some minor points. In the Priodon or large armadillo 90 teeth exist, and in the dolphins as many as 220 may be found. in the narwhal or sea-unicorn only two teeth are present.

Mammalia

In form the teeth of mammals may differ very widely, as is best seen on comparing each kind of teeth with its representatives throughout the class. The differences in diet necessitate different forms of teeth, and we generally find the incisors, canines, and molars clearly defined in mammals; though occasionally, as in the dolphins, the teeth resemble each other so closely that it is impossible to satisfactorily separate them or determine their true nature. The upper incisor, front, or cutting teeth are defined as those which are borne by the premaxilla. The upper canine is the tooth which is foremost in the maxilla, provided it be not at a considerable distance from the anterior end of that bone. The lower canine is the tooth biting in front of the upper canine. The lower incisors are those teeth situated in front of or in a line with the lower canine or, where the latter tooth is absent, the lower incisors are those which correspond with the upper teeth of the same name. The molar teeth are divided into two sets, the premolars or bicuspids, and the true molars. The true molars are the only teeth of the permanent set not preceded by "milk" or temporary teeth, and are hence defined to be teeth which are situated "behind the hindmost tooth which has a vertical predecessor." The premolar teeth — sometimes called false molars, in contradistinction to the true molars — are defined as those situated "behind the place of the canine teeth, and in front of the true molars." Or in cases where the true molars are absent the premolars are said to be those teeth behind the place of the canines and which have vertical predecessors; or in front of molars which have such predecessors.

In describing the dentition or arrangement of the teeth in animal forms, but particularly in mammals, the naturalist is accustomed to use for convenience' sake an arrangement of symbols and numbers to which the name of a dental formula is given. Thus the dental formula of the permanent teeth of man, who possesses two incisors, one canine, two premolars, and three molars in each side of each jaw, is given thus:

$$\text{I}\frac{2—2}{2—2} : \text{C}\frac{1—1}{1—1} : \text{P.M.}\frac{2—2}{2—2} : \text{M}\frac{3—3}{3—3} = 32$$

The meaning of these symbols and figures will thus be evident. The letters stand for the names of the teeth. The figures above the horizontal lines express the teeth in the upper jaw, and those below the lines express the teeth in the lower jaw; while the upper and lower figures of each set are again divided to represent the teeth in each half of each jaw. Thus $\text{I}\frac{2—2}{2—2}$ simply reads that there are two incisor teeth in each half of the upper jaw and two in each half of the lower jaw; and similarly with the other symbols in this and in other dental formulæ. In most mammals two sets of teeth occur as in man — a milk, temporary, or deciduous set, which is replaced at an earlier or later period by the second or permanent set. No mammal ever possesses more than two sets, and some forms have only one set throughout life. Such is the case in the dolphins, porpoises, and many of the edentate mammals in which a milk set is wanting. Mammals with only one set of teeth are termed monophyodont, and those with the ordinary two sets diphyodont *Mammalia*. The teeth of the milk set are not necessarily all replaced by permanent teeth. As we have already noticed, the true molars have no preëxisting representatives in the milk set; but several other and wide variations may be observed in this respect throughout the class. Thus in the *Marsupialia* the only tooth preceded by a temporary one is the tooth corresponding typically to the fourth premolar. The permanent canines of man are developed before the last true molars or "wisdom" teeth; but in the higher apes the canines appear after the true molars are developed. In the guinea pigs the milk teeth are shed while the animal is still *in utero;* and on the other hand the *Ungulata* generally retain their milk teeth until adult age is reached — these instances exemplifying extreme types of variation in the succession of the sets of teeth. And from the form, number, and disposition of the teeth valuable characters in the classification of the *Mammalia* and in the distinction of genera are drawn. The chief peculiarities in dentition will be noted in the consideration of the mammalian orders. Man and a lemur (*Tarsius*) are the only mammalian forms in which the teeth are placed in a continuous series, and are unseparated by any diastema or interval. Generally in higher mammals (for example, apes) we find interspaces to exist between certain of the teeth, as between the canines and first premolars of the lower jaw, and between the canines and outer incisors of the upper jaw; this arrangement accommodating the large pointed crowns of the canines in the movements and in the closure of the jaws.

Little need be said in the present instance regarding the internal anatomy and viscera of *Mammalia*. The chest or thorax in all mammals is separated from the abdominal cavity by a complete diaphragm or "midriff," which thus constitutes a great muscular partition between these cavities, and also forms the most important agent in effecting the movements of the chest during respiration. Within the thorax the heart and lungs are contained; while the abdomen and its lesser pelvic cavity contain the

organs relating generally to digestion, excretion, and reproduction (for example, stomach, intestines, liver, pancreas, spleen, kidneys, and generative organs). With the exception of cetaceans all mammals possess salivary glands, and in some cases (for example, ant-eaters) certain of these glands undergo enormous development. In the dolphins the tongue is non-protrusible, and constitutes the floor of the mouth as it were. In the elephant it is incapable of being freely moved about, and in the manatees it is of small size, and fixed to the floor of the mouth. In the seals the tongue is bifid at the point, and in the Greenland whale it is fixed to the mouth by the sides, and is free at the point only. In the pangolin it attains its greatest length among mammals, and in the tamandua ant-eater, etc., it is provided with recurved spines. The stomach, generally simple, may, as in some monkeys, in the kangaroos, in the pig, and most of all in the ruminants, exhibit a division into compartments. In the great ant-eater a structure resembling the gizzard of birds is developed. A liver and pancreas are present in all *Mammalia*. The lungs agree in essential structure with those of man, as also does the heart with its four chambers — right and left auricles and right and left ventricles. The right side of the heart, as in birds, is venous, that is, is exclusively occupied in sending the venous blood to the lungs to be purified. The left side is as exclusively arterial, and sends the purified or arterial blood from the lungs through the system. The red corpuscles of the blood are non-nucleated, that is, do not each possess a little central particle or nucleus, as is the case with all vertebrates below mammals. The red blood corpuscles are elliptical or oval in shape in the *Camelidæ* or camels; in all other mammals they are circular. The musk deer possesses the smallest red blood corpuscles known, these latter being only about $\frac{1}{12325}$ of an inch in diameter. The red corpuscles of man average $\frac{1}{3200}$ of an inch in diameter. The kidneys of mammals lie in the lumbar region or that of the loins. The Wolffian bodies or primordial kidneys of the embryo mammal are replaced by the true kidneys developed before birth.

The reproductive organs vary exceedingly in their conformation throughout the mammalian class; and, as will be afterward noticed, one system of mammalian classification has been founded on the structure of the reproductive organs; so definite characters and differences do these structures afford and exhibit. All female *Mammalia* possess two ovaries, and the mammalian oviducts are known as Fallopian tubes. The simplest condition of the internal reproductive organs is seen in the monotrematous and marsupial mammals, in which each Fallopian tube dilates into a cavity — the uterus or womb — which opens either into a vagina or passage leading from the external to the internal generative organs as in the kangaroos; or into a cloaca, as in *Ornithorhynchus*. These mammals thus possess two distinct uteri or wombs, and therefore are, broadly speaking, known as didelphous (Greek, *dis*, two; *delphus*, womb) *Mammalia*. In all the other and remaining orders of *Mammalia* — save in the *Quadrumana* and in man — the two uterine cavities unite inferiorly in the adult, and thus open into the vagina by a single opening, though their superior or upper extremities are not united, and divided into the horns or cornua of the uteri. In man and in the higher monkeys the two uteri are still more completely united than in the majority of higher mammals; for in man and most *Quadrumana* there are no cornua, and the uteri unite completely both above and below so as to form a single uterus and uterine cavity, opening, as in the previous case, by a single opening into the vagina. The Fallopian tubes of man and the *Quadrumana*, in turn, open into the upper part or fundus of the single uterus. Man and all other mammals, excepting the monotremes and marsupials, are therefore known as monodelphous (Greek, *monos*, single) *Mammalia*. The males in this class possess two testes, corresponding to the female ovaries. In the elephants, cetaceans, *Monotremata*, and some *Edentates*, the testes are retained permanently in the abdominal cavity; while in others (for example, bats, hedgehogs, some rodents, etc.) they descend partially from the abdomen, especially at the breeding seasons. In others and in the highest mammals the testes pass at an early period of life from the abdomen into an integumentary pouch known as the scrotum, which is generally placed behind the penis or intromittent organ; but occasionally, as in the *Marsupialia*, the scrotum is situated before the penis.

The mammary or milk glands form the last structures of interest in the general consideration of mammalian characteristics. They are regarded as extreme modifications of the ordinary sebaceous glands of the skin. All mammals possess these glands, which, however, may differ chiefly in number and position. In male mammals the glands are represented, but are — unless under pathological or abnormal conditions — functionally useless. These glands are placed on the ventral or lower surface of the body and may vary greatly in their exact position on this surface. When placed on the breast, as in man and apes, the mammæ are termed "pectoral"; when further back and on the abdominal surface they are called "ventral" or "abdominal." In number these glands vary from two, as in man, to 22, as in the tenrecs, belonging to the *Insectivora*. The hedgehog and sow

Mammalia

possess each 10 mammary glands. The number two is not, however, limited to man and the *Quadrumana*, for the *Cetacea* possess two glands situated at the hinder extremity of the body; while in the dugongs and manatees (*Sirenia*), and in elephants and sloths there are but two mammæ, situated, as in man, on the breast. In *Ruminantia* the glands are united to form the udder on the surface of which the teats open. In some lemurs (for example, the aye-aye) nearly allied to the apes, the mammæ are placed in the groin (*inguinal*), and are two in number; in other lemurs (for example, *Tarsius*) a pair of inguinal and a pair of pectoral mammæ exist; and in *Galago*, another lemur, there are four glands, situated on the breast. The mammary glands of the *Monotremata* have no nipples, the ducts opening on the surfaces of the glands, which are not elevated to form teats. In the allied order *Marsupialia* (kangaroos, etc.) the teats are greatly elongated, and in the latter forms the mammæ and teats are contained within the characteristic marsupium or pouch. In both monotremes and marsupials the mammary glands can be compressed at the will of the parent by special muscles, which force the milk into the mouths of the attached and helpless young. The nipples in some opossums form an odd number; but there is never a single nipple only. In the kangaroos four nipples exist; in other *Marsupialia* eight are found, and in some oppossums 9, 11, and 13 respectively exist. In the *Echidna*, one of the *Monotremata*, the skin around the nipples is depressed to form a kind of shallow pouch, while the gland is functionally active. In man from 15 to 20 milk or laticiferous ducts open on the surface of each nipple; and in *Sirenia*, *Marsupialia*, elephants, and highest apes, the ducts opening in each teat are similarly numerous. But in some forms (for example, *Cetacea*, pigs, *Ruminantia*) a single duct only opens in each teat. In horses and apes generally two open in each nipple; while five or six are found in each teat of some rodents and carnivorous *Mammalia*.

The classification of this large and important group has been variously attempted at different times and by different authorities. A familiar and at the same time a classification of modern kind was that of Owen, which divided the class *Mammalia* into two primary sections or divisions, accordingly as the structure known by the name of the placenta was present or not in the development of the young. This placenta, or "after-birth," as it is familiarly designated, is the structure through which the blood of the mother is conveyed to the fœtus or embryo; and all mammals, in the development of which a placenta was formed, were termed *Placentalia*, or placental mammals. Those in the development of which such a structure was ascertained to be absent were, on the contrary, known as *Implacentalia*, or non-placental mammals; and in this latter group only two orders, the *Monotremata* and *Marsupialia*, were included. The placental or higher mammals thus included all mammals other than these two orders, and therefore by far the greater number of mammals.

The orders which are included at the present time in the class *Mammalia* have not so much undergone alteration in constitution and arrangement as the characters which have been selected for their separation and distinctions, or as the primary divisions of the class; and even at the present time the constitution of the last mentioned groups or sub-classes is still argued according to different systems and modes of arrangement. Thus we have still extant the separation of the mammals into *Placentals* and *Implacentals*. Then, secondly, the class is also primarily subdivided by Owen into four main groups — the *Lyencephala* (*Marsupials* and *Monotremes*); the *Lissencephala* (*Edentates*, *Insectivores*, rodents, and bats); the *Gyrencephala* (monkeys, ungulates, elephants, carnivores, cetaceans, and *Sirenia*); and the *Archencephala* (man) — the structure and relative perfection of the brain being taken as the basis of this arrangement. Several important points in this latter classification, it may be remarked, have been strenuously opposed as incorrect by some eminent authorities; and it will be seen from a glance at the forms included in each primary division that this system has the effect of classifying orders, which from other points of view and in other systems are very widely separated. Edentates, rodents, and bats are thus brought together in Owen's cerebral classification — orders which under other arrangements and in all points, save the brain structure, are widely separable. The nature of the reproductive organs was taken by De Blainville in 1816 as the basis of his classification of the mammals, and in the present day this system of arrangement has been largely adopted. The three primary divisions of *Mammalia*, according to De Blainville, are the *Ornithodelphia*, *Didelphia*, and *Monodelphia*. The meanings of the two latter terms have already been explained in treating of the mammalian reproductive organs; the former term is applied to the monotremata from the bird-like disposition of the female generative organs, the two uteri being distinct and separate throughout their entire extent, and opening, not into a vagina or genital passage (as in the *Didelphia*), but directly into a chamber known as the cloaca, which also receives the contents of the ureters and the rectum. This condition essentially resembles the arrangement of parts in birds, and hence the origin of the term

Mammalia

Ornithodelphia (Greek, *ornithos*, of a bird; *delphus*, womb). The *Monotremata* form the only order included in this primary division of the class. The second sub-class of De Blainville, the *Didelphia* or "double-wombed" *Mammalia*, likewise includes a single order only, that of the *Marsupialia* or kangaroos, opossums, etc. And these forms possess, as already remarked, two uteri, which open each into a distinct vagina; the latter passages opening, in turn, into a urogenital canal. This canal thus receives the ducts of the genital organs, and also those of the urinary apparatus; but the rectum terminates by a separate aperture, and in this latter respect the *Didelphia* differ from the preceding division. The *Monodelphia*, or "single-wombed" mammals, as already noticed, possess a single uterus only, and this structure opens into a single vagina, which is entirely separated from the rectum. Man and all mammals other than the monotremes and marsupials belong to this higher section of the class. The *Implacental* section of Owen thus corresponds to De Blainville's *Ornithodelphia* and *Didelphia;* while the *Placentalia* agree with the higher section of the latter zoölogist — that of the *Monodelphia*.

A brief enumeration of the chief orders and ordinal characters of the mammalia may fitly conclude the general consideration of the class — the more special characters of the various mammalian groups being discussed in separate articles under the headings of the respective orders.

1. The *Monotremata* (G. *monos*, single; *trema*, opening) form the lowest order of the class. The group includes two genera only, the *Ornithorhynchus* (of which but a single species, *O. paradoxus*, is known), or duck-billed water-mole of Australia; and the *Echidna* or porcupine ant-eaters of the same province. These are the ornithodelphous *Mammalia*. The characters of the reproductive organs in these forms have been already noticed, but we have not mentioned that, as recently discovered, the young are undoubtedly produced from eggs. The two mammary glands are abdominal, and are destitute of teats. There is no placenta. The so-called "marsupial bones" are present, but are never associated with a "marsupium," or pouch, as in the next order.

2. The *Marsupialia* (L. *marsupium*, a pouch) form the didelphous mammals, and constitute the second order of the class. They are represented by the kangaroos, opossums, wombats, phalangers, bandicoots, Tasmanian wolf, etc. The didelphous characters have already been noted. The testes are lodged in a scrotum, which is remarkable for being situated in front of, and not behind, the penis. Marsupial bones are present, and in the females mostly support a marsupium or pouch, in which the immature young are lodged and protected. The nipples project into the pouch. These forms are implacental, like the *Monotremata*.

3. The *Edentata* (Latin *e*, without; *dens*, a tooth) are represented by the sloths, armadillos, true ant-eaters, pangolins, etc. These forms are primarily distinguished by the rudimentary nature of the teeth, these organs being destitute of enamel, not forming roots, and being rarely replaced by a second set. Though not absolutely toothless, as the name edentate would lead one to believe — only two genera wholly want teeth — the middle incisors are invariably wanting; and in only one species (an armadillo) are any incisors present. Canines are generally absent, and sometimes molars are also wanting. The toes are clawed. Mammary glands are borne on the chest, and sometimes abdominal or inguinal glands are present. The edentates and all succeeding orders are placental mammals. In the *Edentata* the placenta may either be deciduate or non-deciduate — these latter terms having reference to the amount of the maternal or placental tissues which are thrown off at birth. Thus, where a placenta is deciduate, the entire structure, representing a large amount of maternal vascular tissue, is thrown off. Where it is non-deciduate, no such extrusion of embryonic and maternal structures takes place at birth.

4. The *Cetacea* (whales, dolphins, porpoises, narwhals) are aquatic *Mammalia*, having no hind limbs or sacrum, and possessing a horizontal tail-fin. The fore limbs exist as swimming paddles, and are destitute of nails. A dorsal fin or expansion of the skin sometimes exists. The nostrils are situated on the top of the head, and may be single or double. There are two mammæ, and these are inguinal in position. Hairs are at the most part sparsely developed. One set of teeth only is developed, and teeth may, in the adults, be wholly wanting. A non-deciduate placenta.

5. The *Sirenia*, including the manatees or sea cows and dugongs, are sometimes classified as a section of the cetacean order. They are also aquatic forms, and possess a horizontal tail-fin. In the disposition of their limbs the *Sirenia* also agree with the preceding group. Teeth are developed, however, in the *Sirenia*, two sets being present. The nostrils are always separate, and are placed on the upper aspect of the snout. Hairs are scantily distributed over the body surface. The swimming paddles bear rudimentary nails. There is never a dorsal fin. The mammæ are two in number, and are pectoral — that is, are situated on the chest. Placenta non-deciduate.

6. The *Ungulata* or "hoofed" quadrupeds form a very large group, which comprises no less than three orders of the former system of classification. The *Ruminantia*, the

Mammalia

Solidungula (or horses), and the *Pachydermata* or thick-skinned mammals (rhinoceroses, etc.), are thus included under the single order *Ungulata,* but are parceled out to form subdivisions of this large group. The chief characters of this compound ungulate order are embraced in the facts, firstly, that there are never more than four fully developed toes on each limb; and the terminal phalanges are encased in thick nails, largely developed to form hoofs. Clavicles are wanting. The teats may be inguinal in position and few in number, or abdominal when they are numerous. The placenta is non-deciduate.

7. The *Hyracoidea* — represented by the single genus, *Hyrax,* one species of which is the coney of Scripture — form a small order constituted to receive these forms, which from several anomalous features could not satisfactorily be classified with any of the other orders. In some systems of arrangement the *Hyracoidea* are included in the *Ungulata,* and are classified with the rhinoceroses. The distinctive features of these forms as an order are found in the absence of canine teeth, and in the possession of elongated curved upper incisor teeth, which grow from permanent pulps like those of the *Rodentia.* The lower incisors are straight and grooved in a logitudinal manner. There are no clavicles. There are four toes on the front and three on the hind feet. The placenta is deciduate. There are four inguinal teats, and two situated in the axillæ or armpits.

8. The *Proboscidea* include the elephants only. This order was separated from the ungulate group — the elephants being formerly included in the pachydermatous division — from the possession of very distinct characters, seen chiefly in the possession of molar and upper incisor teeth only: the latter growing from persistent pulps and constituting the well known "tusks." Clavicles are wanting. The feet are provided each with five toes. The mammary glands number two, and are situated between the fore legs. The nose is prolonged to form a muscular proboscis. Hairs are scanty. Placenta deciduate.

9. The *Carnivora* or flesh-eating mammals, comprising very many families (lions, tigers, cats, dogs, seals, bears, walruses, etc.), are characterized by the presence of three kinds of teeth, of which the canines are large and the molars have sharp or trenchant edges. The clavicles are rudimentary. Nails developed to form claws. Teats never fewer than four, and placed abdominally. Placentation deciduate.

10. The *Rodentia* (rats, mice, beaver, porcupines, rabbits, hares, squirrels, etc.) are distinguished by the want of canine teeth, and by the presence of only two incisors in the lower, and generally two — but sometimes four — in the upper jaw. The incisors grow from persistent pulps, and grow throughout life. Teats generally numerous. Placentation deciduate.

11. The *Cheiroptera* or bats possess the four fingers of the hand greatly elongated to support a patagium or "flying membrane," which extends along the sides of the body uniting the fore and hind limbs of each side, and frequently the hind limbs and tail. By aid of this membrane the bats can support themselves in the air. The hind limbs are short, and have their digits invariably of a normal and usual length. Clavicles are developed. The thumbs of the fore limbs are of normal size. The teats are pectoral and number two or four. Canine teeth are always present. Placentation deciduate.

12. The *Insectivora,* comprising the moles, hedgehogs, and shrew mice, have their molar teeth provided with sharp cusps adapted for crushing the insect diet. Generally more than four incisors are present in the jaw. Well developed clavicles are present in the great majority of *Insectivora.* The placentation is deciduate. The flying lemurs (*Galeopithecus*) are by some authorities included in this group.

13. The *Primates* include the orders *Quadrumana* (monkeys) and *Bimana* (man) of some systems of classification. To include both in one order appears the course most consistent with the structural relations of both series of forms; the anatomical differences — which are alone expressed in a zoölogical classification — being susceptible of expression through the subdivisions of the single and compound order. Linnæus first constituted the division *Primates,* which is distinguished as a whole by possessing never more than four upper and four lower incisors. The hallux or great toe has generally a flat nail, and can be abducted or adducted in a greater or less degree. Well developed clavicles always exist. The divisions of this order include:

(*a*) The *Anthropidæ* (*Bimana*), represented by man, in whom the teeth form an uninterrupted series. The thumb or pollex can be opposed to the other digits; but the great toe or hallux is nearly as long as the second toe, and is incapable of opposition. The erect position is maintained. The arms are shorter than the legs; the lower limbs growing faster after birth than the upper members or the rest of the body. The mammæ are two in number, and are placed on the breast.

(*b*) The *Simiadæ* include the apes and monkeys, or higher *Quadrumana,* in which the teeth are uneven and interrupted by a diastema or interval. The great toe is much shorter than the second toe, and can be abducted or adducted with freedom. The arms may be longer or shorter than the lower limbs; the latter, however, do not

grow in the same proportion to the rest of the body as in man. The mammary glands are pectoral and number two.

(*c*) The *Lemuridæ* or lemurs comprise the lower *Quadrumana*, in which the teeth are arranged in the majority of instances as in the apes. The great toe is of large size; the second toe being small or rudimentary. The teats may number more than two. The placentation of the primates is deciduate. The features, structural and mental, which separate man from the *Quadrumana* will be discussed under the article MAN; and for detailed information regarding the various mammalian orders the reader is referred to the articles descriptive of the orders; and also to the articles descriptive of the leading genera of each order, which latter are given under their familiar titles.

Mammary Glands, the glands characteristic of the highest group of living forms — the class *Mammalia*. These structures are to be regarded as peculiar developments of the skin or cutaneous glands, and present in man an essentially lobular structure. The lobes are divisible into smaller lobules, and these latter are in turn seen to be made up of sacculi, or the pouch-like extremities of certain ducts which are lined by peculiar epithelial cells, known as glandular or spheroidal epithelium. The lobules and the larger lobes are united by areolar or fibrous tissue; and the whole structure is invested and covered by a layer of yellow fat, which sends processes between the lobules, and constitutes a considerable portion of the bulk of the gland. This fatty layer is itself circumscribed and divided into lobes by bands of the areolar tissue which unites the lobules; and the latter tissue unites with the investing skin of the gland above, and attaches the gland below to the pectoralis major or great muscle of the breast, on which it rests. The lower surface of the gland is flattened, and is loosely connected to the great muscle below.

The sacculi or follicles of which the ultimate lobules consist, and in which the minuter ducts of the gland take origin, are abundantly supplied with minute blood-vessels; and from the blood thus brought to the intimate structure of the gland the epithelial cells of the sacculi secrete the milk. The smaller ducts from the lobules unite to form the larger ducts of the lobes; and these latter, known as the laticiferous or galactophorous ducts, from 15 to 20 in number, open on the surface of the nipple, each by a distinct orifice. Before terminating in the nipple each duct dilates to form a reservoir-like sac or receptacle, averaging from two to three lines in width. These receptacles contain and store up the milk secreted by the gland during its periods of functional activity, till the secretion is required. The walls of the milk ducts themselves are composed of fibrous and elastic tissue; and internally they are lined by a layer of epithelial cells of a columnar shape and thus differing from the secreting cells which line the saccules of the gland. The nipple of the breast, or mammilla, as it is termed, is situated a little below the center of the gland. It is surrounded by a disk or circle of darker colored skin known as the areola, and is composed of unstriped muscular fibers and areolar tissue. For the differences in conformation of these glands in various mammals see the article MAMMALIA.

Mammea (mam′-), a genus of Clusiaceæ, tribe Garcinieæ. The only known species, *Mammea americana*, the Mammee apple, or South American apricot, is a large tree with showy odoriferous flowers. The fruits are several inches in diameter, with a double rind, the outer one leathery, the inner with yellowish pulp like that of an apricot. It is bitter, but nourishing, and good for pectoral complaints. It is eaten raw or cut in slices with wine and sugar, or boiled. The gum derived from the bark is used by negroes for destroying chigoes in their feet.

Mammet, or **Mammot,** an idol. Great injustice was done in making the name of Mohammed synonymous with an idol, when one distinctive feature of the religion introduced by the great Arabian was its uncompromising hostility to every kind of idolatry. But almost the only one of the non-Christian faiths of the world practically known to our ancestors was Mohammedism, and it was made to stand as the type of all false religions, idolatrous as well as non-idolatrous.

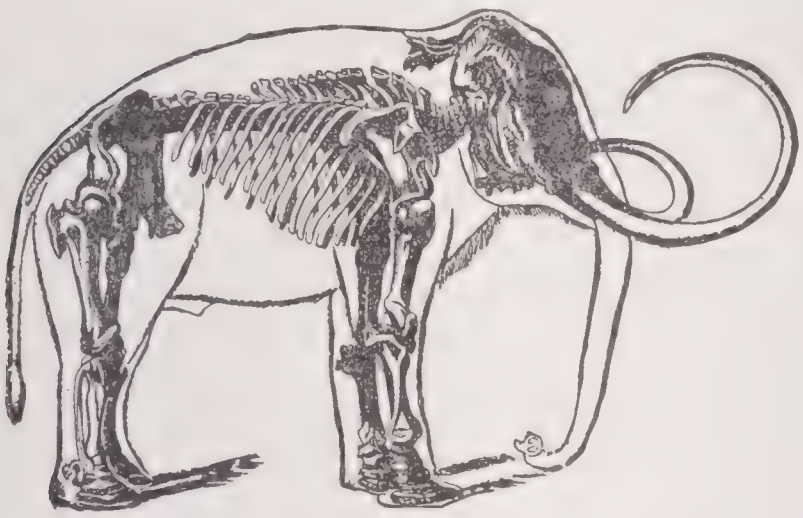
Mammon, according to Schleusner, the Syrian god of riches, but no traces have been obtained of an idol actually worshiped under that name in Syria. The word is, therefore, now held to be a mere personification of riches. It is used in this latter sense in Matt. vi: 24, and Luke xvi: 9. Milton poetically makes Mammon a fallen angel of sordid character.

Mammoth, a gigantic prehistoric mammal. The first mammoth discovered was found imbedded in ice in 1799 on the shores of the Lena, by a Tungoosian fisherman named Schumachoff. A Russian engineer, named Benkendorf, thus describes a mammoth unearthed from a tundra in the N. of Siberia, where so many lie buried in the same manner as do the remains of *Cervus megaceros* in the peat bogs of Ireland:

"Picture to yourself an elephant, with a body covered with thick fur, about 13 feet in height, and 15 in length, with tusks 8 feet long, thick, and curving outward at their ends, a stout trunk of 6 feet in length, colossal limbs 1½ feet in thickness, and a tail naked to the end, which was covered with thick tufty hair. His parchment-like large naked ears lay fearfully turned

up over the head; about the shoulders and back he had stiff hair, about a foot in length like a mane. . . . Under the outer hair there appeared everywhere a wool, very soft, warm, and thick, and of a yellow-brown color. As compared with our Indian elephants, the head was rough, the brain case low and narrow, but the trunk and mouth were larger."

W. Boyd Dawkins, treating of the range of the mammoth in time and space, comes to the conclusion that it existed in Great Britain before, during, and after the Glacial period. Its remains are found in France in "enormous abundance"; there it was contemporary with the Cave-men of the Pleistocene, as is proved by a spirited engraving of it on a piece of mammoth ivory found in the Cave of La Madeleine, Dordogne; it has been found in nearly every county in England; and, broadly speaking,



SKELETON OF THE MAMMOTH.

its range extended "over the whole land of the Northern Hemisphere." It is a noteworthy fact that the teeth of the mammoth found in the N. regions have narrow plates, while the plates of those discovered further S. are broad. This Darwin attributes to difference of food. He is also of opinion "that the mammoth may be taken as the ancestor of the Indian elephant." To show how plentiful these animals once were in Asiatic Russia, H. H. Howorth says that from 1825 to 1831 there were never less than 1,500 poods of fossil ivory sold at Yakutsk, and one year the sale reached 2,000 poods; and similar ivory was offered for sale in Khiva as early as the 10th century.

Mammoth Cave, a cavern near Green river, Edmonson co., Ky., about 85 miles S. S. W. of Louisville. The cave is about 10 miles long, but it requires upward of 150 miles of traveling to explore its multitudinous avenues, chambers, grottoes, rivers, and cataracts. The main cave is 4 miles long, from 40 to 300 feet wide, and rises in height to 125 feet. The most interesting features of the cave are: The Chief City or Temple, covering an area of about four acres, and having a dome of solid rock 120 feet high; the Star Chamber, about 500 feet long by 70 feet wide, with a ceiling 70 feet high, consisting of black gypsum dotted with many white points which, when the chamber is lighted, have all the appearance of stars; Silliman's avenue, 1½ miles long, 20 to 200 feet wide, and 20 to 40 feet high; Cleveland's Cabinet, an arch 50 feet wide, 10 feet high, and 2 miles long, covered with a variety of formations in all sorts of shapes and of many colors; the Maelstrom Abyss and Bottomless Pit, each of which is 20 feet wide and about 175 feet deep; and the river Styx, 450 feet long and crossed by a natural bridge about 30 feet high. The cave contains various kinds of animals, and there are also found lizards, crickets, frogs, bats, and different sorts of fish. The latter include the famous eyeless fish, which are white in color. The Mammoth Cave is supposed to have been discovered in 1809. The atmosphere is pure and healthful and there is a temperature throughout the year of about 59°. It is visited annually by many sightseers.

Man, a collective term for the human species. Since the middle of the 19th century there has been a growing tendency to refer all the sciences relating to man to one comprehensive science, Anthropology. Scripture teaches that on the sixth day of creation "God created man in His own image" (Gen. i: 27), a littler lower than the angels (Psalm viii: 4, 5), planted for him a garden (Gen. ii: 8), gave him leave to eat of its fruits with the exception of one, of which he was forbidden to partake on pain of death (ii: 16, 17, iii: 2, 3). Both his wife (Eve) and he disobediently ate the fruit, became liable to death, and were expelled from Eden (iii: 6–24). The duration of human life was then nearly 1,000 years (v: 4, 8, 10, 14, 27, 31, etc.). But after the flood, brought on by the wickedness of the antediluvian world (vi: 3, 5, 6, 7, etc.), it was gradually curtailed (xi: 11, 13, 15, 17, 19, 23, 25), till finally it reached the limits which still continue (Psalm xc: 10). God selected for Himself as His special people the Jewish race, one of those descended from Abraham (Gen. xii: 1–3, xvii: 21, xxviii: 4, Exod. v: 1, etc.). "God so loved the world that He gave His only begotten Son, that whosoever believeth in Him should not perish but have everlasting life" (John iii: 16), thus to some extent at least counteracting the influence on mankind of Adam's sin (Rom. v: 19). A distinction is drawn between the "spirit" of man and that of the inferior animals (Eccles. iii: 21). An obscure passage in the New Testament may perhaps have some bearing on the case of the latter (Rom. viii: 19–23). Darwin is of opinion that man sprung from one of the naked mollusks called Ascidians, the line of descent or ascent running through some humble fish, like the lancelet, then up through the gan-

oids and other fish, the amphibians, reptiles and birds, the Monotremata, the lowest Mammals, the Marsupialia, the Placental Mammalia, the Lemurs, the Simiadæ, and the anthropoid apes.

Blumenbach divided mankind into five races, the Caucasian, the Mongolian, the Ethiopian, the American, and the Malay. Cuvier reduces the five to three, the Caucasian, the Mongolian, and the Ethiopian. Pritchard extended them to seven, the Iranian (the same as the Caucasian), the Turanian (the same as the Mongolian), the Native Americans, the Hottentots, the Negroes, the Papuas or Wooly-headed Polynesians, the Alfuro and Native Australians. Latham divides mankind into three varieties, Mongolidæ, Atlantidæ, and Japetidæ. Huxley's classification of mankind is into the Australoid, Negroid, Mongoloid, Xanthochroic, and Melanchroic races.

Tools distinguish man from other animals, and so where tools are found in geological strata and debris it is known that man must have been. The earliest tools were flaked stones and cracked bones. All flaked stones and cracked bones, however, may not be tools. Some of the flaked stones, for example, may have been produced by action of fire. Man is the only animal which uses fire, of course, but then fire may exist without the agency of man. Lightning, volcanic action, spontaneous combustion, and burning wells and springs may produce conflagrations, and therefore produce flaked flint stones. A large portion of the supposed tools, accordingly, have to be left out of the discussion for want of absolute proof as to their origin. The earliest deposits in which stone tools and weapons clearly shaped by man are known to have been found are the gravel beds in the valleys of the Thames in England, the Somme in France, the Manzares in Spain, and in other portions of Western Europe. These tools and hunting weapons are found alongside of tropical fauna, like the lion, elephant, hippopotamus, and large apes.

It is known, therefore, that man lived in Europe during a period when that country had a tropical climate. But since that time Europe has been through the ice age. Vast arrays of evidence show that since the time when the valley of the Thames had a climate like that of the valley of the Nile glaciers covered all Western Europe. Geological deposits on top of the remains of tropical animals and man's tools contain the remains of arctic animals, like the musk ox, reindeer, and white fox. Man, therefore, hunted the tropical lion and elephant in England, Spain, and France before he hunted the arctic reindeer and white fox. The question, therefore, to be determined is, How long ago was the ice age? The same ice age which visited Europe prevailed in the United States. Investigations into the age and duration of the glacial movement have therefore been carried on independently on both continents. The cutting of post-glacial river channels, like those below the falls of St. Anthony and Niagara, and the filling of glacial lake beds and the piling of post-glacial debris, have served as geological chronometers for the guidance of investigators on both continents. From these evidences it has been universally agreed that from 10,000 to 12,000 years have elapsed since the departure of the glacial mass from the now thickly-settled portions of Europe and the N. part of the United States. The period of formation of the glacial mass and duration of the ice age is placed by the investigators at from 20,000 to 30,000 years. Allowing additional time for the primeval man in the tropical period to develop and spread over the area under consideration, the total of 50,000 years is arrived at as the approximate time which has elapsed since the earliest authentic traces of man on the earth.

Man, Isle of. See Isle of Man.

Manaar (mä-när'), **Gulf of,** an inlet of salt water lying between Ceylon and the Madras coast, and closed on the N. by a low reef of rocks and islands called Adam's Bridge. Its extreme width is nearly 200 miles. The gulf is famous for its pearl fisheries.

Manacle Rocks, a dangerous reef on the S. coast of Cornwall, England, not far from Lizard Head and near the town of Falmouth. They are barely visible, except at low water, and there is no warning of their presence to the mariner except a bell buoy. Many wrecks have occurred here.

Managua (mä-nä'gwä), the capital of Nicaragua, situated in a fertile district, on the S. shore of Lake Managua, 53 miles S. E. of Leon. Pop. (1909) about 45,000.

Manakin (man'-), the name given to the dentirostral insessorial birds forming the sub-family *Piprinæ*. They are generally small and of brilliant plumage, and are mostly confined to South America, a few species being found in Central America and Mexico. The typical genus is *Pipra*, which includes the bearded manakin (*P. Manacus*), and several others. An allied species is the beautiful orange manakin or cock-of-the-rock (*Rupicola aurantia*).

Manaos (mä-nä'ös), capital of the State of Amazonas, Brazil, on the Rio Negro, 12 miles above its confluence with the Amazon. A whitewashed cathedral rises in the center of the town, which also has a custom house, a tiny fort, and a military hospital. The city is a steamboat station, and has a considerable trade in various forest products, but principally in india-rubber. Pop. (1906) 40,000.

Manasarowara (mä′″nä-sä″rō-wä′rä), a lake of Tibet, N. of the main chain of the Himalaya Mountains; it is almost circular in form, about 15 miles in diameter, and drained by the Sutlej.

Manassas Junction, a small town in Prince William co., Va. (twice during the Civil War an important military position), where the Alexandria and Manassas Gap railways meet, near a creek named Bull Run, 35 miles S. W. of Washington, D. C. The battles of Bull Run, fought July 21, 1861, and Aug. 29–30, 1862, were known to the Confederates as the battles of Manassas.

Manasseh, in Scripture history, the eldest son of Joseph, born in Egypt. His descendants constituted a full tribe. This was divided in the promised land; one part having settled E. of the Jordan, in the country of Bashan, from the river Jabbok N.; and the other W. of the Jordan, between Ephraim and Issachar, extending from the Jordan to the Mediterranean. A King of Judah, who succeeded his father, Hezekiah, at the age of 12 years. The commencement of his reign was disgraced by a series of crimes and idolatrous abominations, and "innocent blood filled Jerusalem from one end to the other." In 677 B. C. Esarhaddon, King of Assyria, invaded his dominions, and carried Manasseh captive to Babylon, where his misfortunes produced repentance. After a long captivity, the King of Babylon gave him his liberty and restored him to his kingdom. On his return to Jerusalem, he established the worship of the true God. There is a fine prayer by him in the Apocrypha. He died in 643 B. C.

Manatee, any individual of the genus *Manatus,* more particularly *M. australis* (*americanus*), first discovered by the early Spanish colonists. Haslan was of the opinion that there were two species of *Manatus* in this country, and the N. form he named *M. latirostris;* they are now generally considered as constituting a single species. Desmarest separated the African manatee from its American congener, on account of cranial differences, not however, of great importance, and called it *M. senegalensis.* Manatees are found in the creeks, lagoons, and estuaries of some of the West India islands, on the American coast from Florida as far as 20° S., in the great rivers of Brazil, on the coast of Africa from 16° N. to 10° S., and in Lake Tchad. They are slow and inactive and quite inoffensive; they browse on aquatic, preferably fluviatile, plants in shallow water. Their numbers are rapidly diminishing, as they are hunted for the sake of their skin, the oil they yield, and their flesh.

Manby, George William, an English inventor; born in Hilgay, Norfolk, England, Nov. 28, 1765; served in the militia, and became barrack-master at Yarmouth in 1805. In 1808 he succeeded, with a life-saving apparatus designed by him, in rescuing the crew of the brig "Elizabeth." A career of usefulness was thus commenced, which he followed for the remainder of his life. He repeatedly received grants of money from Parliament. He died in Southtown, Nov. 18, 1854.

Mancha, La (män′chä), a district of Spain, in the old kingdom of New Castile, comprising most of the present province of Ciudad Real, with parts of Albacete, Toledo, and Cuenca. It is the country of the ever-memorable Don Quixote, his squire Sancho Panza, and of the peerless Dulcinea del Toboso.

Manche (mänsh), a maritime department in the N. W. of France, formed from the old province of Normandy, derives its name from La Manche (the English Channel), which washes its rocky coasts; greatest length, 81 miles; average breadth, 28 miles; area, 2,289 square miles; pop. (1906) 487,443. The climate is mild, but humid. Cereals, flax, hemp, beet root, and fruits are extensively cultivated. Immense quantities of apples are grown, from which over 28,000,000 gallons of cider are made annually. Horses of the true Norman breed are reared, and excellent cattle and sheep are fed on the extensive pastures. There are valuable granite quarries. The port of Cherbourg and the rock of St. Michel (with its celebrated abbey) belong to this department.

Manchester, a town in Hartford co., Conn.; on the Hockanum river and on the New England railroad; 8 miles E. of Hartford. There is a public library, high school, electric street railroad, and electric lights, and several newspapers. It has extensive manufacturing plants, including the great Cheney silk mills, paper mills, cotton and woolen mills, electrical supply works, etc., and an assessed property valuation of over $5,000,000. The town contains the villages of Manchester, South Manchester, Buckland, Manchester Green, and Highland Park, and was incorporated in 1823. Pop. (1900) 10,601, (1910) 13,641.

Manchester, a city and one of the county-seats of Hillsboro co., N. H.; on the Merrimac river and on several branches of the Boston and Maine railroad; 56 miles N. of Boston. It derives water power for manufacturing from the Amoskeag Falls in the Merrimac, by means of two canals. There are the Elliott and Sacred Heart Hospitals, the Woman's Aid Home, United States Government Building, public library, high school, and training school. The city has waterworks supplied by gravity from Lake Massabesic, electric light and street railroad plants, several National banks, daily and weekly newspapers, and more

Manchester

than 30 churches. The chief industrial plants are the great Amoskeag, Stark, Manchester, and Amory cotton mills, with a combined capital of about $14,000,000 and an annual output estimated at $11,000,000. The city also has manufactories of locomotives, steam fire engines, machinery, hosiery, shoes, etc., and an assessed property valuation of nearly $33,000,000. Pop. (1900) 56,987; (1910) 70,063.

Manchester, a city in Chesterfield co., Va., on the James river and on the Southern and the Atlantic Coast Line railroads; opposite Richmond, with which it is connected by several bridges. There are separate high schools for white and negro pupils, waterworks, an electric light plant, and weekly newspapers. It has large coal-mining, agricultural, and manufacturing interests, and an assessed property valuation of over $3,000,000. Pop. (1890) 9,246; (1900) 9,715.

Manchester, a city in Lancaster co., England; on the Irwell, an affluent of the Mersey, 31 miles E. of Liverpool. Including Salford, a suburban town on the W. bank of the Irwell, it stands in a large plain, covering over 3,000 acres, surrounded with hills except on the W., and is the center of the cotton trade of Great Britain, and one of the principal manufacturing cities in the world. The Irk and the Medlock join the Irwell near the town, and are of the greatest advantage to it. Factories and warehouses are numerous and of gigantic proportions. The principal among its public buildings are, the Exchange, built in the Doric style; the Town Hall, an elegant building of Ionic architecture, formed on the model of the Temple of Erectheus at Athens, and the Corn Exchange. It has also several educational institutions, one of which, the college founded by Humphrey Chatham in 1665, contains a large library. There are, besides, several public libraries, possessing collectively over 100,000 volumes; and a number of associations for promoting literature and science. It is as a manufacturing city that Manchester derives its importance, being the grand center of the cotton manufacture of England, which, next to agriculture, forms the principal occupation of the county, absorbing with its neighborhood for 10 miles round, fully three-fourths of the trade, and comprising, besides spinning mills, extensive power loom factories, and large dyeing and printing establishments. The manufacture of silk goods, which was introduced in 1816, has generally flourished since 1826, producing every description of fabrics from the rich brocade to the flimsy Persian. In some cotton factories the process of spinning only is carried on. Several thousands of spindles are at work in each of the principal factories, and in many of them upward of 600 power looms are in action, each producing from 15 to 20 pieces of fabric, of 24 yards each, per week. Besides the population connected with the factories, which almost absorb the plain goods trade, upward of 9,000 hand loom weavers are employed in weaving cotton, silk, and mixed goods. The principal articles manufactured are velvets, fustians, dimities, calicoes, checks, tickings, jeans, shirtings, ginghams, quiltings, handkerchiefs, nankeens, diapers, muslinets, muslins, cambrics, and almost every kind of fancy cotton and silk goods. The spinning trade is extensive, and considerable quantities of yarn are annually exported. There are over 60,000 persons employed in the cotton mills, besides 7,000 skilled mechanics engaged in the production of steam engines, looms, and other machinery. Manchester derives considerable advantages from the almost inexhaustible coal fields in its neighborhood, and from the canals and railways which connect it with different parts of the country and the E. and W. seaboard. The climate of Manchester is very healthy, despite the disadvantage of the prevalence of smoke arising from the number of factories, etc. Pop. (1901) 543,969.

Manchester, Edward Montagu, 2d Earl of, an English military officer; born in 1602. After leaving Cambridge he accompanied Prince Charles to Spain, and afterward sat in the House of Lords as Baron Kimbolton. But siding with the popular party, and being an acknowledged leader of the Puritans in the Upper House, he was charged by the king (Jan. 3, 1642) with entertaining traitorous designs, along with the five independent members of the House of Commons. He succeeded his father as earl in the same year. On the outbreak of hostilities he fought for the Parliament. He served under Essex at Edgehill, then held the associated (E.) counties against Newcastle, took Lincoln (1644), and routed Prince Rupert at Marston Moor — that is to say, he nominally commanded; the real fighting was done by Cromwell and his Ironsides. He then marched to oppose the royalists in the S. W., and defeated them at Newbury (the second battle). But after this battle he again showed slackness in following up the victory, the same fault that had been noticed after Marston Moor. In consequence Cromwell accused him, in the House of Commons, of military incompetency, and the two had a downright quarrel. The Self-Denying Ordinance deprived Manchester of his command, and this did not allay his bitterness against Cromwell. He opposed the trial of the king and protested against the Commonwealth. Afterward, having been active in promoting the Restoration, he was made Lord Chamber-

lain, a step designed to conciliate the Presbyterians. He died, May 5, 1671.

His grandson, CHARLES MONTAGU, 4TH EARL, supported William of Orange in Ireland, was sent as ambassador extraordinary to Venice (1696), Paris (1699) and Vienna (1707), and was made Duke of Manchester in 1719 for having favored the Hanoverian succession. He died Jan. 20, 1722.

Manchester, William Angus Drogo Montagu, Duke of, an English nobleman; born in London, England, March 3, 1877. He was a son of the 8th duke and Consuelo Yznaga de Valle, of Louisiana. He succeeded his father in 1890, and on Nov. 14, 1900, married Helena, daughter of Eugene Zimmerman, of Cincinnati, O.

Manchester Party or **School,** the name given to an English political party whose exertions were particularly directed to the development and thorough carrying out of the principles of free trade. They had their chief seat in Manchester, and Richard Cobden and John Bright were the principal leaders. From their advocating non-intervention in foreign affairs, of arbitration instead of war, etc., they were sometimes called the "peace-at-any-price" party.

Manchineel (-tshi-nēl′), a euphorbiaceous tree 40 or 50 feet high, growing on the sandy coasts of the West Indian Islands, Venezuela, Panama, etc. It has ovate or elliptical shining leaves, with small, inconspicuous flowers. It is very poisonous. If a single drop of the white juice fall upon the skin it will cause a wound extremely difficult to heal. The juice of the fruit similarly burns the lips of any one who bites it. Deleterious as it is, its venomous effects have been much exaggerated by credulity. *Bignonia leucoxylon* is said to be an antidote to the poison.

Manchuria (-tshö′ri-ä) (Chinese Shing-King), a Chinese territory occupying the N. E. corner of the empire; bounded on the N. and E. by the Amur and Usuri, which separate it from the Russian territory; on the W. by the provinces of Irkutsk, Mongolia, and Chih-li, on the S. by the Gulf of Leaotong, the Yellow Sea, and Korea; it is divided into three provinces, Shing-King, Feng-Tien, or Leaotong in the S. (of which Mukden is the capital), Kirin in the center (with a capital of the same name), and He-Lung-Kiang in the N. (with capital Tsitsihar); total area, 363,610 square miles; pop. (1906) est. 16,000,000. The country is mountainous, but on the whole fertile. The climate is good; though the winters are severe, they are healthy and bracing. The vast forests of the N. are rich in useful timber of all kinds. The principal food crops are pulse, millet, barley, and wheat. The vine, indigo, cotton, opium, tobacco, etc., are cultivated. The administration is military, the governors of the two N. provinces being subordinate to the governor of Mukden. The Manchus are a hardy race and their country has long been the great recruiting ground for the Chinese army; but of late years vast numbers of Chinese proper have flocked into it, so that now they by far outnumber the native race. In the 17th century the Manchus invaded China and placed their leader's son on the throne. Since that time the Manchu dynasty has continued to reign in China, and the Manchu language has become the court and official language. The chief seaport is the treaty port Newchwang.

For a considerable time prior to 1891, when the first sod was turned for the construction of the great Siberian railroad, the Russian government was anxious to secure control of this territory. On Nov. 9, 1901, the Russian Minister of Finance, in announcing the completion of this railroad from Transbaikal territory to Vladivostok and Port Arthur, used the phrase "Our enterprise in Manchuria is practically, though not entirely, concluded." In the meantime the Russian authorities had been earnestly seeking, and were popularly believed to have secured, from the Chinese government, the cession or other political control of Manchuria, the English particularly claiming that the late Li Hung Chang was secretly strongly pro-Russian. A number of times it was declared that the Chinese government, under pressure from Li Hung Chang, had signed a secret treaty with Russia for the cession of this territory. In 1900, while the allied army was hastening to the relief of the legations in Peking, a Russian military force occupied the right bank of the Amur river, and declared it to be Russian territory, and a provisional Russian administration was established. Official declarations were sent out from St. Petersburg to the effect that the current rumors of an incorporation of Manchuria with the Russian empire were groundless. Shortly before the death of Li Hung Chang, Nov. 7, 1901, political Europe was again stirred up by the report that negotiations affecting the future of Manchuria had been resumed, and rumor even went so far as to declare positively that the Russian authorities undertook to force Li Hung Chang to sign a treaty for the cession of Manchuria while on his death bed. Prince Ching (fellow commissioner of Li Hung Chang in settling the difficulties with the powers) left Kai-fong-Foo, on Nov. 18, with the instructions to conclude the Manchurian treaty. On Feb. 6, 1904, Japan broke off diplomatic relations with Russia; on the next day seized Masaupo, Korea; and on the 8th and 9th did much damage to the Russian fleets at Port Arthur and Chemulpo, Korea.

Mancini, Pasquale (män-chē′nē), an Italian statesman; born in Castel-Baronia, in 1817. He was graduated at the university of that city, and became Professor of Jurisprudence there. He was a member of the Neapolitan Parliament in 1848, and was prominent in opposition to the king. He was then obliged to flee to Turin, where he became Professor of International Law. He entered the Sardinian Parliament, and in 1860 he became minister of justice and religion at Naples. Attending the Peace Congress at Ghent in 1873 as delegate from Italy, he was chosen its president. He died in Naples, Dec. 26, 1888.

Manco Capac (kä-päk′), the founder and legislator of the Peruvian empire, supposed to have flourished in the 12th century. Another inca of Peru, named Manco, succeeded his brother, who was put to death by Pizarro, 1533, and after some years of warfare was killed by the Spaniards.

Mandæans (-dē′anz), an Oriental religious sect of great antiquity, formed of heterogeneous Christian, Jewish, and heathen elements, and still found about the cities of Wâsit and Basra, and in Khûzistân (Susiana) on the E. shore of the Tigris, working as jewellers, blacksmiths, carpenters, etc. Their religion is a kind of Gnosticism, retaining various Jewish and Parsee elements. They worship a number of personifications, particularly of the attributes or names of God. They publicly call themselves Sabians (*Subbâ*, "baptists"), thus professing to identify themselves with the Sabæans tolerated in the Koran. They were formerly called Christians of St. John the Baptist from their habit of baptism or ablution. They have five important sacred books: "Sidrâ rabbâ" ("the great book"), called also "ginza, "treasure"; "Sidrâ d'Yahyâ" ("book of John"); the "Qolasta," a collection of hymns; "Dîwân," a ritual; and "Asfar Malwâsê," a manual of astrology.

Mandalay (man′da-lā), the capital of Burma from 1860 to its annexation by India in 1886; situated in a level plain about two miles from the left bank of the Irrawaddy. It consists of four concentric quadrangles, of which under native rule the innermost contained the palace, etc.; the second, which was surrounded by a moat and walls, contained the houses of the government officials, soldiers, etc.; while outside dwelt the general body of the people. Since the British occupation the town has suffered severely from fires and floods. Pop. (1901) 182,498.

Mandamus (-dā′-), a writ issued by a superior court and directed to some inferior tribunal, or to some corporation or person exercising public authority, commanding the performance of some specified duty.

Mandarin (-rēn′), a general term applied by foreigners to Chinese officers of every grade; derived from the Portuguese *mandar*, "to command."

Mandeville, Bernard, a Dutch poet and philosophical writer; born in Dordrecht, Holland, about 1670. His most celebrated production is the "Fable of the Bees, or Private Vices Public Benefits," the first part of which appeared in 1723, and the second in 1728. It created quite a sensation, and called forth replies from Bishop Berkeley, William Law, and others. Among his other works are "Free Thoughts on Religion" (1720), and "Origin of Honor" (1732). He died in London, England, Jan. 21, 1733.

Mandeville, Sir John, an English traveler who flourished in the 14th century. He was the author of a popular book of travels of that century, the writer of which claimed to have visited Turkey, Armenia, Tartary, Persia, Syria, Arabia, Egypt, Libya, Ethiopia, Chaldea, Amazonia, and India; to have been in the service of the Sultan of Egypt; etc. It is in fact a most entertaining and curious compilation of legends, miracles and wonder-stories from many sources.

Mandible, a name applied to various jaw-organs — *e. g.*, the third pair of appendages in crustaceans, the first pair of true appendages in insects, the lower jaw in vertebrates.

Mandingoes (män-dēng′gōz), a negro tribe of West Africa, remarkable for their intelligence, and generally for the advances they have made in civilization. The original country of this people, who are now spread over a great portion of West Africa, was the N. slope of the high table-land of Senegambia. They are nominally Mohammedans, are keen traders, work iron and gold, manufacture cotton cloth and leather, and cultivate a variety of crops. They live in small independent states, their clay-built walled towns often containing about 10,000 inhabitants.

Mandogarh. See MANDU.

Mandolin, an Italian fretted guitar, so called from its almond shape. There are several varieties, each with different tunings. The Neapolitan, considered the most perfect, has four strings tuned like the violin, *i. e.*, G, D, A, E. The Milanese, next in favor, has five double strings tuned G, C, A, D, E. A plectrum is used in the right hand, and the left is employed in stopping the strings. It is written on the G clef. In the Neapolitan mandolin the E strings are of catgut, the A strings of steel, the D strings of copper, and the G strings of

catgut covered with copper wire. The compass is about three octaves.

Mandrabul, a character in classic fable who, having found a gold mine in Samos, offered Juno a golden ram from the discovery; next year he gave a silver one, then a brazen, one, and in the fourth year nothing. Hence the saying, "from gold to nothing, like Mandrabul's offering."

Mandrake, a perennial herb. From the rude resemblance of the bifurcated root to the human figure many superstitious notions have gathered round this plant. Columnella calls it *semihomo* (v: 19), and Pliny speaks of the precautions with which it was to be plucked up (H. N., xxv: 94). Bulleine's "Bulwark of Defense" is a mine of quaint lore on the subject, and Browne ("Vulgar Errors," bk. ii, ch. vi) follows in his track. On being torn from the ground, the mandrake was said to utter groans inspiring horror (Cyril Tournour: "Atheist's Tragedy," v: 1), causing madness (Shakespeare: "Romeo and Juliet," iv: 3; Webster: "Duchess of Malfi," ii: 5), or even death (Shakespeare: "Henry IV., Pt. II.," iii: 2). It was an emblem of incontinence (Shakespeare: "Henry IV., Pt. II.," iii: 2); soporific qualities were attributed to it (Marlowe: "Jew of Malta," v: 1); it was used in magic (Nabbes: "Microcosmus," iv), and formed an ingredient in love-potions (Burton: "Anatomy of Melancholy," ed. 1881, p. 550).

MANDRAKE.

Mandrake Apple, the fruit of the mandrake; it is beautiful, fragrant, and in no way poisonous.

Mandrill, an African baboon. It was well known to the ancients, and Aristotle speaks of it under the name of Chœropithecus (hog-ape). A full grown male measures about five feet when erect; the hair is light olive-brown above, and silvery-white beneath. It has a small pointed yellow beard, and a tuft of hair on the top of the head, which gives the whole face a triangular appearance. Nicholson says that it is "rendered probably without exception the most disgustingly hideous living being by the possession of large, blood-red natal callosities, and of enormous cheek protuberances striped with brilliant colors in alternate ribs." Mandrills are insectivorous; and in addition to their immense canine teeth approach the Carnivora in many points of anatomical detail.

MANDRILL.

Mandu, or **Mandogarh,** a deserted town in Dhar State, Central India, the ancient capital of Malwah, 38 miles S. W. of Indore. It is celebrated for its magnificent ruins, including the great mosque, the finest specimen of Afghan architecture in India; a marble mausoleum of one of the Kings of Malwah, a royal palace, etc. It occupies about 8 square miles of ground.

Mandvi, the chief seaport of the principality of Cutch, in India, on the N. shore of the Gulf of Cutch, 36 miles S. W. of Bhuj, the capital. It has a good roadstead and a breakwater, but the harbor is choked with sand. Pop. (1901) est. 40,000.

Mambres. See JAMNES.

Maneh (mä′-), a weight among ancient Hebrews. Its amount cannot be precisely determined; the passage (Ezek. xlv: 12) relating to the subject being ambiguous. It may mean that there were three manehs, one of 20 shekels, one of 25 shekels, and one of 15; or it may signify that the maneh was = 20 + 25 + 15 = 60 shekels. Gesenius thinks the former to be the more probable hypothesis.

Manes (mā′nēz), in Roman mythology, the Good Ones, a euphemistic expression for the infernal deities (as benevolent spirits) opposed to larvæ and lemures. In the description of the funeral rites of Polydorus,

Vergil (Æneid iii: 62–68) has a noted passage on the ceremonies with which the Manes were worshiped. The term was also applied to shades not yet deified. The Manes might be called up by magic (*ib.* iv: 490), they were invoked to be present at funeral rites (v: 99), and from them came deceptive dreams (vi: 897). Tylor, mentioning that the Romans inscribed on their tombs "D. M." (*Diis Manibus*), remarks that "the occurrence of this 'D. M.' in Christian epitaphs is an often noticed case of religious survival."

Manes Worship, the term adopted by Tylor to denote the worship of the dead, whether of an ancestor of the particular worshiper or of some deified hero of his race. It has a very wide range both in time and space. Herbert Spencer thinks it developed from the universal — or almost universal — belief in an other-self, which survived after death, and that manes worship was the outcome of a desire and endeavor to propitiate the ghost. He brings forward evidence as to its existence among Turanians and Aryans, and notes that among the Jews the offerer of first fruits to Jehovah was required to say that he had not "given thereof for the dead." (Deut. xxvi: 14; see Eccles. vii: 33; Tobit iv: 17.) Sir John Lubbock says of manes worship that it "is a natural development of the dread of ghosts," and both Tylor and Spencer see in the cultus of saints in the Roman Church "a survival of the manes worship of a less advanced age."

Manet, Edouard (mä-nā′), a French painter; born in Paris, France, in 1833. He was the founder of impressionism. He died in Paris, April 30, 1883.

Manfred, King of Naples and Sicily; born in Sicily about 1232. He was a natural son of the Emperor Frederick II. After the death of his brother Conrad he became regent of the kingdom during the minority of Conradin, his nephew. Pope Innocent IV. exciting a revolt against him, he was driven from his kingdom; but he reconquered it a year afterward, and caused himself to be crowned in 1258. Pope Urban IV. excommunicated him and offered his kingdom to Charles of Anjou. Manfred perished in a desperate battle with the latter near Benevento in 1266.

Manfredonia, a walled seaport of Italy, on the Gulf of Manfredonia, a bay of the Adriatic. Founded by Manfred in 1261 from the ruins of ancient Sipontum, it has an old castle and a cathedral.

Mangalore, a seaport, military station, and chief town in the district of South Kanara, presidency of Madras, India. A clean, picturesque town, embosomed in cocoanut palm groves, it ships large quantities of coffee (from Coorg and Mysore) in small Arabian and Indian vessels; the total trade reaches an annual average of nearly $4,000,000. The town has a Roman Catholic bishop and college; and is also the headquarters in India of the Basel Lutheran Mission, the members of which teach their people to weave cloth, print and bind books, and make roof tiles. The town, which was three times sacked by the Portuguese in the 16th century, was taken by Hyder Ali in 1763, and made the headquarters of his navy. In 1784 its English garrison yielded to Tippoo Sultan after a nine months' siege. It became British in 1799, and was burned by the Coorg rebels in 1837. Pop. (1901) 44,108.

Mangan, James Clarence, an Irish poet; born in Dublin, Ireland, May 1, 1803. He was employed for many years in an attorney's office. There is fine quality in his original verse as well as in his translations from the German, but more especially from the old Irish, as in the impassioned ballad of "Dark Rosaleen." His "German Anthology" was published in two volumes in 1845; a complete edition of his poems in New York in 1870, with a biographical introduction by John Mitchel. An edition edited by Louise Imogen Guiney was published in 1897. He died in Dublin, June 20, 1849.

Manganese (man′ga-nēz), a diatomic metallic element, proved by Pott in 1740, to be distinct from iron, but the metal itself was first eliminated by Gahn (1774). Symbol, Mn; at. wt., 55. It occurs chiefly in the form of peroxide (black oxide of manganese), and as sulphide and carbonate. The metal has been prepared in two ways: first, by reducing the oxide with oil and charcoal in a closed crucible, and also by reducing the fluoride by sodium in a hessian crucible heated in a blast furnace. The metal obtained by the first method is soft and brittle, and has a sp. gr. of 8.013; that by the second is brittle, but hard enough to scratch glass, sp. gr. = 7.206. Both varieties have a grayish-white color, but by exposure to the air speedily become oxidized. Manganese enters into compounds both as a base and also as an acid radical. It forms several well-characterized oxides.

The production of manganese ores in the United States in the calendar year 1908 amounted to 6,144 long tons, valued at $62,779, an increase in a year of only 540 long tons. This output came from the States of Arkansas, California, Tennessee, South Carolina, Utah, and Virginia, the latter yielding 6,028 long tons. The bulk of the manganese ore used by the various steel companies in the United States during the year came from Brazil, Cuba, India, France, Turkey, Japan, Great Britain, and Canada.

Manganese Bronze, a kind of bronze in which the copper forming the base of the alloy is mixed with a certain proportion of ferro-manganese, and which has exceptional qualities in the way of strength, hardness, toughness, etc. Various qualities are manufactured, each suited for certain special purposes. One quality, in which the zinc alloyed with the treated copper is considerably in excess of the tin, is made into rods, plates, etc., and when simply cast is said to have a tensile strength of about 24 tons per square inch, with an elastic limit of from 14 to 15 tons. Another quality used in gun founding has all the characteristics of forged steel without any of its defects. Another quality is in extensive use for toothed wheels, gearing, brackets, and all kinds of machinery supports. From its non-liability to corrosion it is largely employed in the manufacture of propellers.

Mange, a disease of the skin occurring in dogs, horses, cattle, etc., and similar to the itch in human beings.

Mangel Wurzel. See MANGOLD WURZEL.

Mango, an umbrageous tree, wild on the Western Ghauts, in the Chutia Nagpore Hills and the Naga Hills, and cultivated all over India. The fruit is considered one of the very best in India; it is laxative. The bark of the root and, to a certain extent, of the stem, is used in diarrhœa, etc. The young leaves are good for pectoral complaints, the old ones for cleaning the teeth. The seeds are anthelmintic and the resin of the bark antisyphilitic. The seeds contain gallic acid. The bark and the leaves yield an inferior yellow dye. The dry unripe fruit is used as a mordant, especially in dyeing with safflower. The leaves and the bark are used in parts of India in tanning. The bark and kernel are given in diarrhœa.

Mango Fish, *Polynemus paradiseus* or *longifilis,* known in India as the tupsee. It is about 8 or 9 inches in length, and is found in the Bay of Bengal, ascending the Ganges and other rivers to a considerable extent. Its popular English name has reference to its beautiful yellow color, resembling that of a ripe mango.

Mangold Wurzel, or **Mangel Wurzel,** *Beta vulgaris,* variety *macrorhiza.* It is cultivated chiefly as fodder for cattle. The roots are used for food; they have sugar enough in their composition to be profitably extracted, as is the case with ordinary beet.

Mangosteen, or **Mangostan,** the fruit of *Garcinia mangostana,* a fruit about the size of an orange, filled with a sweet pulp. The tree bearing it grows in Malacca and is cultivated in South Tenasserim. The rind of the tree is used as an astringent in diarrhœa and dysentery, especially in the chronic diarrhœa of children.

Mangrove, a tree inhabiting the shores of the tropical parts of the world in either hemisphere, and well known to navigators on account of the dense groves which it forms, even down into the water itself. It belongs to the genus *Rhizophora* (its name being *Rhizophora Mangle*), and is principally remarkable for its seeds germinating before they leave the case in which they were generated on the branches. The young radicle grows downward through the humid air till it reaches the mud, in which it fixes itself, and then the leaves and new stem unfold at the opposite end. The white mangrove is *Laguncularia racemosa,* and the black mangrove, *Avicennia tomentosa.*

Manhattan, one of the boroughs comprising the city of New York. It is the parent settlement, built on the island of Manhattan, and is the richest and most important of the boroughs. It is joined by the borough of the Bronx. Pop. (1910) 2,331,542. See NEW YORK CITY.

Manhattan College, an educational institution in Manhattan borough of New York City; chartered and opened in 1863 under the auspices of the Roman Catholic Church; has grounds and buildings valued at over $750,000; volumes in the library, about 12,000; scientific apparatus, etc., $25,000; ordinary income, about $45,000; average number of faculty, 27; average students, 360; graduates, over 850.

Manheim, or **Mannheim** (män'hīm), a town and capital of the grand-duchy of Baden, circle of the Lower Rhine, at the confluence of the Neckar and the Rhine, 37 miles S. E. of Mayence. The principal public buildings are the palace, containing museums of antiquities, natural history, etc., and a library of 80,000 volumes; the observatory, a noble building, with a curious tower 108 feet in height, and the custom house; manufactures tinsel ware, carpets, linen, and silk goods, tobacco, ribbons, shawls, etc. Its neighborhood produces hops and garden stuff in large quantities, and besides its traffic in cattle and agricultural products it has a considerable transit trade by the Rhine and the Neckar. Pop. (1905) 163,693.

Manhole, a hole in a cesspool, drain, iron boiler, tank, or a chamber or compartment of an iron ship, designed to allow the entrance of a man for examination, cleansing, and repairs. In boilers and tanks it is usually secured by a bridge and bolt, so as to render it water, steam, or air tight, as the case may be. In drains, the cover is a lid with an air tight joint to prevent the escape of sewer gas.

Mani (mä′nē), the son of Mundilfori; taken to heaven by the gods to drive the moon-car. He is followed by a wolf, which, when time shall be no more, will devour both Mani and his sister Sol.

Manica (mä-nē′kä), a gold-field in Africa, long worked by the Portuguese, 130 miles N. W. of the port of Sofala, and now mostly included in the British sphere of influence as an E. section of Mashonaland. It is intersected by the railway from the Pungwe river (near Beira) to Fort Salisbury.

Manichæism, or **Manicheeism** (-kē′-), the religious system founded by Mani or Manes, who either claimed to be or was regarded by his followers as the Paraclete promised by Jesus (John xiv: 16, 17). The system is Dualism tempered with Gnosticism rather than a lapse from primitive Christianity. Mani postulated two primal beings, Light (God) and Darkness, under the similitude of kingdoms, and from the latter Satan and his angels were born. Adam owed his being to Satan. Continual conflict exists between the two kingdoms, and, when the Kingdom of Light is victorious, the world will be destroyed by fire, and the supremacy of God established. The ethics of the system were severely ascetic. The Manichæans were divided into two classes — the "elect" and the "hearers." The former were bound to observe the three seals: (1) Of the mouth, forbidding animal food, the use of wine and milk, and impure speech; (2) of the hands, forbidding the destruction of life, whether animal or vegetable; and (3) of the bosom, forbidding (probably) marriage (certainly offspring), since woman was regarded as the gift of the demons. The hearers were less strictly bound. The Old Testament was rejected, and only so much of the New taken as suited the peculiar tenets of the sect. They had a kind of hierarchy, fasting was practised, and among the later Manichæans rites existed analogous to baptism and the Eucharist. The sect spread rapidly in the East, extended to Northern Africa, where the persecution of the Vandals, in the latter part of the 5th century, stamped them out, and to Southern Europe, where some of their tenets reappeared later in the doctrines of the Paulicians, and later still in those of the Albigenses.

Manichord, an instrument resembling the spinet and harpsichord. It was originally a monochord (single string), and is referred to by Biraud de Calanson, a poet of Provence. It was played by quills operated by jacks and keys on a key board. It was one of the predecessors of the pianoforte.

Manifest, Ship's, a formal statement of a cargo for the use of the custom house officers, and usually containing a list of all the packages on board, with their distinguishing marks, numbers, and descriptions, all of which details are indicated by a printed form.

Manihiki (mä-nē-hē′kē) **Islands,** a group of low, wooded atolls, scattered over the Central Pacific, between the Marquesas and Union groups; area 12 square miles; pop. (1900) 1,000. Most of these islands, as Caroline, Malden, Starbuck, Penrhyn, Humphrey, Vostok, Flint, and two or three others, belong to Great Britain.

Manila, the chief town of the Philippine Islands and capital of Luzon; on the E. side of a wide bay on the S. W. coast of Luzon, 650 miles S. E. of Hong Kong, with which city it has been connected by telegraph since 1881. It is divided into two portions by the Pasig river. On the S. bank stands the old town (founded in 1571 by Legazpi), surrounded by crumbling walls, with tolerably wide, straight streets crossing each other at right angles. Here are the archbishop's palace, numerous churches and monasteries, the cathedral, university, Jesuit observatory, arsenal, and the barracks of the former Spanish garrison. On the N. bank are the modern suburbs, Binondo, etc., the commercial and native quarters, with the palaces of the former governor-general and the admiral of the station. The city is liable to visitations of earthquakes, typhoons, and thunderstorms of exceptional violence; for instance, a violent earthquake did great damage in 1880, and a hurricane in 1882 ruined half the city.

The native houses are generally constructed of bamboo and thatched with the leaves of the nipa palm. Glass is not used in the windows, but the translucent shell (operculum) of a mollusk; and the window-frames all slide horizontally. This is to exclude the great heat, the mean for the year being 82° F.; but during the rainy season (May to November) it ranges from 65° to 68°. Almost the only industry is the manufacture of cigars, which employs about 25,000 persons. The harbor is not very safe during S. W. and N. E. winds, though shelter is afforded by a small breakwater. Large ocean-going vessels anchor at the naval station of Cavite, 2 miles to the S. W. A railway extends from Manila to Dagupan, a distance of 120 miles. The principal port of the Philippines, Manila has an export trade valued approximately at $17,000,000 annually, and an import trade that falls but little short of that figure. Sugar, hemp, cigars and tobacco, and coffee account for three-fourths of the exports, and cotton goods, rice, wine, silk, and flour are the chief imports.

On the morning of May 1, 1898, after war had broken out between the United States and Spain, was fought the battle of Manila Bay (see MANILA BAY, BATTLE OF). On

May 4 Commodore Dewey seized the arsenal. Manila was invested by American troops, June 30, 1898, and on Aug. 13, after an organized attack by sea and land and two hours' hard fighting, it surrendered and the flag of the United States was raised over the city. Pop. (1903 census) 219,928.

Manila Bay, Battle of, a remarkable engagement between the American Asiatic squadron, under command of Com. George Dewey, and a Spanish naval force, under command of Admiral Montojo, supported by land batteries, fought on May 1, 1898.

When it became evident, in March, 1898, that war between the United States and Spain was inevitable, Commodore Dewey began to mobilize his vessels in the harbor of Hong Kong preparatory to striking a blow at the Philippine Islands on the breaking out of hostilities. By April 1 he had gathered there his flagship, the "Olympia," a steel protected cruiser; the "Boston," a partially protected steel cruiser; the "Raleigh," protected steel cruiser; the "Concord," steel gunboat; and the "Petrel," steel gunboat. Toward the close of the month, the "Baltimore," a steel protected cruiser, the "Hugh McCulloch," revenue cutter, and two newly-purchased ships loaded with coal and other supplies, joined the fleet. Lying in Manila Bay, one of the largest and most important in the world, was a Spanish squadron, comprising the "Reina Christina," steel cruiser; "Castilla," wood cruiser; "Velasco," iron cruiser; "Don Antonio de Ulloa," iron cruiser; "Don Juan de Austria," iron cruiser; "Isla de Cuba," steel protected cruiser; "Isla de Luzon," steel protected cruiser; "General Lezo," gunboat; "El Cano," gunboat; "Isla de Mindanao," auxiliary cruiser; "Marques del Duero"; and two torpedo boats. It was supposed that the harbor had been planted with mines and torpedoes and supplied with numerous searchlights, and that the forts on the shore had been strengthened in anticipation of an attack.

The United States squadron entered the bay on the night of April 30, and at 5 o'clock on Sunday morning, May 1, opened fire on the Spanish squadron and the forts. Two engagements were fought, and during the brief interval the United States squadron drew off to the E. side of the bay to enable officers and men to get their breakfast. The entire battle lasted less than two hours. The Spanish flagship, "Reina Christina," was completely burned; the "Castilla" suffered the same fate; the "Don Juan de Austria" was blown up by a shell from one of the United States vessels; one or more ships were burned; and the entire Spanish fleet was destroyed. After his second attack, in which he destroyed the water battery at Cavite, Commodore Dewey anchored off the city of Manila and sent word to the governor-general that if a shot was fired from the city at the fleet, he would lay Manila in ashes. The Spanish loss was about 2,000 officers and men. The United States squadron did not lose a ship or a man. Two vessels were damaged in their upper works, and eight men were variously injured. On receipt of reports of the battle, the United States government ordered the immediate shipment of supplies and reinforcements to Commodore Dewey; and political Europe found suddenly a new Eastern problem before it. See DEWEY, GEORGE: SPANISH-AMERICAN WAR.

Manin, Daniele (mä-nēn'), an Italian patriot; born in Venice, May 13, 1804. In 1847 he took an active part in promoting the national movement; for this he was, with his friend, Tommaseo, cast into prison, but while awaiting his trial the Revolution of 1848, that burst out at Paris, Naples, and Vienna, found an echo at Venice, and the two prisoners were set at liberty by the people and borne in triumph. The expulsion of the Austrians and the proclamation of the republic immediately followed. During the siege, which commenced in the autumn of the same year and lasted 12 months, Manin was at the head of the civil government, and to his counsels and patriotic spirit it was mainly owing that the Venetians maintained so long and brilliant a defense. After the capitulation Manin retired to Paris, where he maintained himself by giving lessons in Italian, and continued in various pamphlets and through the press to advocate the cause of Italian independence. He died in Paris, Sept. 22, 1857.

Man in the Iron Mask. See IRON MASK, MAN IN THE.

Manioc. See CASSAVA.

Maniple, one of the divisions of the ancient Roman army. It consisted of 60 rank and file, two officers called centuriones, and one standard-bearer called vexillarius. Of the 60 soldiers, 20 carried only a spear and javelins; the remaining 40 had oblong shields, and probably body armor also. In the Roman Catholic ritual, one of the sacred vestments assumed by a bishop after the *Confitcor* in the mass, and by a priest after the stole and before the chasuble. It is attached to the left arm, to leave the right at liberty for ministering, and varies in color and character with the vestment. It is also worn by the deacon and subdeacon.

Manipur (man-ī-pör), a native State in the N. E. of India, situated in the heavily timbered mountain-land between Burma, Assam, Chittagong, and Cachar; area about 8,000 square miles; pop. in 1901,

283,957, collected most thickly in one valley, 650 square miles; situated 2,500 feet above sea-level. The men are lazy, but very fond of polo. The Manipuris combine Mongolian and Aryan characteristics, and are mainly Hindus. A British political agent was established at the rajah's court in the capital city of Manipur (pop. 1901, 67,093), in 1835. In 1891 the British chief-commissioner of Assam, accompanied by an escort of Ghoorkas, came hither in March on a mission; and he and the resident were overpowered and killed. A British military expedition reached the capital before the end of April; and after trial the regent and a prince were transported for life, and the "Senaputty" and chief-general executed.

Manis, Pangolin, or scaly ant-eater; a genus of edentate mammals, belonging to the group *Effodientia* (diggers). There are no teeth, the ears small and indistinct, the tongue round and exsertile; the body and tail covered with horny imbricate scales; tail long. They can roll themselves into a ball, and are then protected by their scales, which act as a very effective armor-plate. The genus is confined to Africa and southern Asia. See ANT-EATER.

Manissa, or **Manisa,** the ancient *Magnesia ad Sipylum*, a chief town of the viláyet of Aidin, Asia Minor; situated in a valley at the foot of Mount Sipylus, on the left bank of the Gediz Chai, and about 20 miles N. E. of Smyrna; connected by railroad with Smyrna, Ala-Shehr, and Konia. It contains a number of interesting mosques, synagogues, churches, and secular buildings, among which the palace of Kara Osman Oglu is worthy of special mention. Other notable edifices are the Konak (government house), the Tekke of the Mevlevi dervishes, the Khan of Sultan Murad II., and a lunatic asylum. Manissa is a commercial center, and the chief industries are the manufacture of cotton goods and pack-saddles. When John Ducas was made emperor, he selected the town as the Byzantine seat of government; in 1313 it was taken by Suru Khan; here in 1419 a great insurrection occurred, which was quelled by Murad II., who was a resident during the periods following his abdications of the Turkish throne. It was at this place that the Romans vanquished Antiochus the Great in 190 B.C. Pop. 38,000, divided as follows: Moslems, 22,000; Christians, 15,000; Jews, 1,000.

Manistee, a city and county-seat of Manistee co., Mich., on Lake Michigan, at the mouth of the Manistee river, and on the Manistee and Northeastern and the Flint and Père Marquette railroads; 130 miles N. W. of Lansing. It contains a city hospital, county infirmary, Industrial Home, Holly system of water works, electric light and street railroad plants, National banks, and several daily and weekly newspapers. A fine court house, several business blocks, and the two bridges that span the Manistee river are principal points of interest. Orchard Beach, a popular lake resort, is an attractive amusement park. It has industries in lumber, salt, flour, furniture, shingles, laths, etc., and an assessed property valuation of over $8,000,000. Manistee was settled about 1849, and was incorporated twenty years later. Its charter was revised in 1890, and the government is at present administered under it by a mayor, who is annually elected. Pop. (1900) 14,260; (1910) 12,381.

Manistique, a city and county-seat of Schoolcraft co., Mich., on Lake Michigan, at the mouth of the Manistique river, and on the Minneapolis, St. Paul, and Sault Ste. Marie, and the Manistique and Northwestern railroads; about 70 miles S. E. of Marquette. It is also on the Ann Arbor and Père Marquette steamship lines, and is the only part of the northern peninsula of Michigan which is open the year round. Hence opportunities for trade by both rail and lake are most excellent. Manufactures comprise lumber, iron, chemicals, alcohol, and lime, while charcoal is a chief product, and the fishing interests are considerable. Though generally known as a commercial and industrial center, it enjoys the added charms of being a summer resort and a sportsman's rendezvous. The city has good public and parish schools and a public library which was founded in 1894. Manistique was settled about 1860 and received its city charter in 1901. Pop. (1900) 4,126; (1904) 4,596.

Manitch, or **Manytch** (mä-nēch′), a river in South Russia, which in its course connects a series of long, narrow salt lakes, and joins the Don near Tcherkask. It has been proposed to utilize it in the construction of a canal to join the Sea of Azov and the Caspian.

Manito (man′i-tō), or **Manitou** (-tö), among American Indians the name given to a spirit, god, or devil, or whatever is an object of religious awe or reverence. Two spirits are especially spoken of by this name; one, the spirit of good and life, the other the spirit of evil.

Manitoba, a province of the Dominion of Canada; bounded on the N. by Keewatin, on the E. by Keewatin and Ontario, on the S. by the United States, and on the W. by Saskatchewan. When first formed, its boundaries began at lon. 96° W. on the international boundary line of lat. 49° N., going west to lon. 99° W., thence north to lat. 50° 30′ N., and from that point the northern and eastern boundaries were fixed by completing the oblong. On July 1, 1881, the boundaries of the province were enlarged by the Dominion Parliament, the western being removed west to lon. 101° 25′ W., and the northern carried up to lat. 52° 51′ N. As a result of the boundaries dis-

pute the province gained certain territory eastward, its eastern boundary being fixed at 95° 9′ W. The present area of the province of Manitoba is, in consequence of those changes, given at the present time as 73,732 square miles. The city of Winnipeg is the capital of the province and the center of trade, finance, law, education, the press, and religious institutions, not only for the province of Manitoba, but also largely for the whole Canadian West.

General Features.—Manitoba is largely a prairie province, although some portions of it are mountainous. The condition of the surface is largely governed by the geological features of the country. On the eastern side of the province is a district consisting of gneiss and other rocks of the Archæan age. There is little soil upon it. A few trees—spruces, cedars, and tamaracks—grow in the valleys. The rocks will probably be found in places to contain gold, silver, and iron.

The central portion of the province is the Lake area, the largest three lakes being Winnipeg, Manitoba, and Winnipegosis. Into these lakes flow a number of important rivers. From the Archæan area spoken of enter the rivers Winnipeg and Brokenhead. From the south, flowing like the preceding rivers into Lake Winnipeg, is the Red river, whose greatest tributary from the west is the Assiniboine. The Lake region lying along the Red and Assiniboine rivers is one of note. It has underlying it limestone rocks of the Silurian and Devonian periods. These are covered by deep soil, which is diversified by groves and belts of woodland more observable than in other parts of the prairie.

While the Lake basin occupies more than half of the area of Manitoba, and is known as the first prairie steppe, to the west of it rises a higher area, which begins the second prairie steppe, a high table-land extending for four or five hundred miles west of Manitoba through the new province of Saskatchewan. (See SASKATCHEWAN.) This area, whose eastern part is in Manitoba, rises up from the west side of the Lake basin in an escarpment varying from two to seven hundred feet in height. Commencing on the international boundary line, some forty miles west of Red river, this escarpment is known as Pembina mountain. North of this are the Tiger hills; and after a gap made by the Assiniboine valley, the so-called range is resumed, which, running northwestward, reaches its greatest height in the Riding and Duck mountains. These wooded heights are the source of the Assiniboine and other streams of western Manitoba. Summing up the features of the whole surface of Manitoba, it is found that there are 64,327 square miles of land surface.

Climate.—The climatic conditions are determined by the great distance of the province from the sea and its high latitude. The climate is noted for its steadiness. The summer climate is one of the most delightful in the world, being generally dry and salubrious. Few of the summer days are found oppressive, and the nights are generally cool. In June, after a preceding dry spring, occurs a somewhat rainy season, which is favorable to growth in the great wheat-producing plains. After July the heavy dews of the night and the moisture retained by the soil are amply sufficient for the growing crops.

Soil.—The basin of the lakes is the most fertile portion of the Canadian West. Underlying the drift of this region are found limestones belonging to the Trenton and Hudson river rocks, divisions of the Lower Silurian period. The Lake basin is the lowest portion of Manitoba, representing the bottom of the glacial Lake Agassiz (see AGASSIZ, LAKE), which formerly covered the region and into which the glaciers from the northern ice-cap carried down the detritus and débris which were deposited along the bottom and slopes of the lake to make up the soil or drift. This soil is on an average some seventy feet in depth, lying on the limestone formation mentioned. In ascending order it is found to be a layer of boulders, a layer of boulder clay, then some forty feet of blue clay, and a thinner deposit of calcareous marl (known locally as "white mud"); while on the surface is the vegetable deposit of humus some four feet thick, which is the marvelously fertile soil now celebrated in all parts of Great Britain and the North American continent. The underlying rock of the second prairie steppe is entirely different in character from the limestones of the Lake basin. It is of the Cretaceous period, and consists of beds of sandstones and shales.

Another glacial lake, called Lake Souris, seems to have acted the same part in depositing the drift that was served by Lake Agassiz on the lower plain. The drift on the second prairie level, while substantially the same in contents, is much thicker than that found in the Lake basin.

Agriculture and Live Stock.—The growth of vegetation in Manitoba is exuberant. The wheat plant, being near the northern limit of its production, gives, in accordance with a general law. the highest quality of the cereal. The flinty spring wheat of Manitoba, on account of its having a large percentage of gluten, sells for 15 or 20 per cent. more than any other wheat of the American continent. The yield of coarse grains, such as barley and oats, is prolific. In 1906 there were 2,722,386 acres devoted to wheat, as compared with 2,422,345 in 1905 and 1,965,-193 in 1901. Oats were cultivated in 931,373 acres in 1906, as compared with 779,279 acres in 1905 and 573,848 in 1901. Barley was grown in 343,412 acres in 1906, as compared with 253,942 in 1905 and 139,-

660 in 1901. The increase in wheat acreage during 1901-06 was 38 per cent.; of oats, 62 per cent.; of barley, 145 per cent. In 1905 Manitoba produced 47,626,586 bushels of wheat, as compared with 18,352,929 bushels in 1900, an increase of 159 per cent. During the same period the oat crop increased from 10,592,365 bushels to 31,408,692 bushels, or 196 per cent. Barley increased from 2,666,567 to 7,544,150 bushels, or 182 per cent. In 1905 the production of wheat was 19.66 bushels per acre; of oats, 40.30 bushels per acre; of barley, 29.70 bushels per acre. In 1906 the wheat crop was estimated at 54,637,120 bushels; oats, 44,742,301 bushels; barley, 12,254,030 bushels. Potatoes and root crops are unsurpassed for size and texture. The prairie flora reaches its fulness in August, when 60 per cent. of it belongs to the sunflower family. The number of plants belonging to the pea family is very great and it is an index of the fertility of the soil.

The raising of live stock is an important industry. During 1901-06 the number of horses increased from 163,867 to 215,819, or 31 per cent.; milch cows, from 141,481 to 170,143, or 20 per cent.; other horned cattle, from 208,405 to 350,969, or 68 per cent.; swine, from 126,459 to 200,509, or 58 per cent. During the same period the number of sheep and lambs declined from 29,464 to 28,975. Cheese factories and creameries are numerous, and a large export trade in cheese and butter has been built up.

While a large part of the province is covered with prairie, and so produces native grasses, which up to the present supply the food for cattle and horses, yet, the province being cultivated and occupied by settlement and the prairie fires becoming fewer, the growth of trees is increasing. In parts of the country, in swampy regions, on hills and ridges, and along the banks of lakes and streams, forests prevail. These are of poplar, Manitoba maple, oak, basswood, elm, and ash, as well as spruces and jack pines. The high-bush cranberry and saskatoon shrubs are very abundant with their berries. Raspberries, gooseberries, strawberries, cherries, and plums are indigenous, and a wild grape-vine is found. Hitherto apples, while successfully grown by a few experimenters, have not become generally so.

Game and Fisheries.—Formerly the bisons or buffaloes covered the whole prairie country, and in western Manitoba their skulls are found in abundance. A herd belonging to the city of Winnipeg is the sole remnant in Manitoba; but a magnificent herd of 500 was purchased by the Dominion government in Montana in 1907, and in June of that year was removed to an extensive park in Alberta. In remote and wooded parts of the province, the moose, red deer, antelope, and jumping deer are still found; bears are occasionally seen. The prairie wolf, or coyote, is not infrequent. Manitoba is the sportsman's paradise. Wild ducks, wild geese, and pelicans swarm on the lakes and swamps, while the prairie chicken and its relative, the prairie hen, as well as the wood partridge and the sand-hill crane, are abundant. Singing birds are very numerous in the belts of wood; among the birds of prey the eagle is somewhat scarce, but the owl and hawk are everywhere. Fish abound in the lakes and rivers, the chief being whitefish, pike, pickerel, sturgeon, and gold-eyes.

Manufactures and Transportation.—Manitoba is predominantly agricultural, but the rapid growth of cities and towns has created many manufacturing industries, and these have been vigorously developed during the last decade of the nineteenth and the opening years of the twentieth century. There is considerable water power capable of development, and an extensive plant on the Winnipeg river, fifty miles from Winnipeg, for the production of electrical power for manufacturing purposes, was nearing completion in 1907. The leading articles of manufacture are flour, lumber, foundry and machine-shop products, beer, leather, clothing, brick, cement for building purposes, soap, boots and shoes, and furniture. The Dominion census of manufactured products taken in 1906, for the calendar year 1905, for the four cities of Winnipeg, Brandon, Portage la Prairie, and Selkirk, showed a total value of $23,046,460, which was an increase of 128 per cent. over $10,078,665, the total value of manufactured products in the whole province in 1901. Of the value of manufactured products in 1906 Winnipeg contributed $18,983,290; Brandon, $2,097,995; and Portage la Prairie, $1,858,000.

Three transcontinental railway lines, one of which, the Canadian Pacific, was completed in 1885, traverse the province. The Canadian Northern and the Grand Trunk Pacific were in 1907 being rapidly pushed to completion. These, with their branches and extensions, and their connections with the trunk lines of the United States, give ample facilities for distribution of products.

Government.—The government of the Dominion appoints the lieutenant-governor, who lives in Winnipeg, and the Dominion influence is observable in the customs, Dominion land, post office, immigration, and other agencies in Winnipeg. Manitoba has 10 members in the Dominion House of Commons, and 4 senators. The provincial cabinet consists of 5 members, and the local legislature of one house contains 40 members.

Churches.—The membership of the leading religious bodies is given as follows by the census of 1901: Presbyterians, 65,310; Church of England, 44,874; Methodists, 49,909; Roman Catholics, 35,622; Baptists, 9,098; Lutherans, 16,478; Mennonites,

15,222; Greek Church, 7,898; other denominations, 9,903; not specified, 638.

Education.—The head of the educational system is the University of Manitoba, which is provincial, but has affiliated colleges, St. Boniface (Roman Catholic), St. John's (Church of England), Manitoba (Presbyterian), Wesley (Methodist), the Medical college, and the Pharmacy college. An agricultural college, maintained by the government and to be affiliated to the university, was established in 1906. Collegiate and intermediate schools are found in all the leading towns and centers of population, and an unsectarian system of public schools is in vogue throughout the province.

History.—To use a strong metaphor, Manitoba was cast in an Indian matrix. The Cree Indian was in the land from Hudson Bay (*q. v.*), inland around Lakes Winnipeg and Manitoba, and up the great Saskatchewan river (*q. v.*) even to the Rocky mountains. In 1670 the Hudson's Bay Company (*q. v.*) was incorporated by royal charter from Charles II. of England; and on his cousin, the well-known Prince Rupert (see RUPERT OF BAVARIA, PRINCE), as governor, and his fellow-adventurers, was bestowed the vast territory in North America whose streams and waters empty into Hudson Bay. To this great concession was given the name of Rupert's Land. On the shores of Hudson Bay for a hundred years the English traders lived in their forts, while down the streams came the Indians bringing their furs to yield enormous profits to the merchants. In 1731 Verendrye, a French captain, led a band of *voyageurs* from Lake Superior inland to Rainy Lake, and in succeeding years discovered Lakes Winnipeg and Manitoba. After the conquest of French Canada by the British in 1759, the Scottish traders of Montreal penetrated the Winnipeg basin, and in 1787 the Northwest Fur Company of Montreal had occupied the whole territory to the Rocky mountains. In 1772 the building of a fort on the Saskatchewan by the Northwest Company led the Hudson's Bay Company to penetrate the country from Hudson Bay, and they built in 1774 Fort Cumberland on the Saskatchewan, alongside their rivals. Both companies carried on their competitive trade for a quarter of a century with great vigor. In 1811, Lord Selkirk, a benevolent Scottish nobleman, bought a controlling interest in the Hudson's Bay Company, and in the four years following sent out to the Red river district, which is south of Lake Winnipeg, some 300 Scottish colonists to what he called his colony of Assiniboia. This colony was the nucleus of Manitoba. It grew by the retirement of the Hudson's Bay Company, officers and men, with their Indian families, from the fur trade, and their taking up land along the Red river. In 1869 Assiniboia contained 12,000 people, 5,000 French half-breeds (Métis), 5,000 English-speaking half-breeds (chiefly of Orkney descent), and 2,000 whites, mainly of Scottish descent. In 1870, after the suppression of a rising by the Métis, Rupert's Land was transferred by the imperial government to Canada, and in that year the province of Manitoba was constituted by act of the Canadian Parliament.

In 1906 the population of Manitoba was 365,688, exceeding by 110,477 that of 1901; March 31, 1910, it was 496,111. Winnipeg had a population of 90,153 in 1906 (according to the assessment commissioner's returns for 1907, the population on April 1 of that year was 111,300); Brandon, 10,408; Portage la Prairie, 5,106; St. Boniface, 5,119; Selkirk, 2,701; Morden, 1,437; Neepawa, 1,895; Dauphin, 1,670; Minnedosa, 1,299. GEORGE BRYCE.

Manitoba, Lake, a lake of Canada, province of Manitoba, 30 or 40 miles S. W. of Lake Winnipeg; length about 120 miles; breadth about 25 miles; area, 1,900 square miles. It receives the waters of several lakes at its N. extremity, and at its S. White Mud river. It discharges into Lake Winnipeg through the Dauphin river.

Manitou, a town of El Paso co., Colo., 6 miles N. W. of Colorado Springs, on the Denver and Rio Grande and Colorado Midland railways. It is situated 6,320 feet above the sea among the foothills of Pike's Peak (*q. v.*), to the summit of which a cog-railway runs from Manitou Iron Springs, 1 mile from Manitou proper. The mineral springs are highly valued; and these and the scenic interest of the surrounding region have made the place a well-known resort. Among the picturesque features near by are Ute Pass, Williams, Red, and Engleman's cañons, the Grand Caverns, Monument park, and the Garden of the Gods. Pop. (1890) 1,439; (1900) 1,303; in summer, 5,000 to 8,000.

Manitoulin (-tō'lin) **Islands,** a chain of islands in Lake Huron, separating it from Georgian bay. The principal are Grand Manitoulin (80 miles long and 28 wide), Cockburn Isle, and Drummond Isle; the last belongs to the State of Michigan, the rest to Ontario. All are irregular and striking in their natural features, and Grand Manitoulin and Cockburn are covered with large forests of pine. Pop. about 2,000.

Manitoulin, Lake. See GEORGIAN BAY.

Manitowoc, a city and county-seat of Manitowoc co., Wis.; on Lake Michigan, at the mouth of the Manitowoc river, and on the Wisconsin Central and the Chicago and Northwestern railroads; 77 miles N. of Milwaukee. Here are the County Insane Asylum, St. Mary's Hospital, the James Library, a high school, Holly system of

waterworks, electric light plant, National bank, and several daily and weekly newspapers. It has foundries, machine shops, furniture, edgetool, and agricultural implement works, and an assessed property valuation of over $5,000,000. There is an excellent harbor, with commodious docks, and quite an extensive lake commerce is carried on, cheese, flour, grain, leather, etc., being shipped. Pop. (1900), 11,786; (1910) 13,027.

Mankato, a city and county-seat of Blue Earth co., Minn.; at the junction of the Minnesota and Blue Earth rivers, and on the Minneapolis and St. Louis, the Chicago and Northwestern, the Chicago, Milwaukee and St. Paul, and the Chicago, St. Paul, Minneapolis and Omaha railroads; 86 miles S. W. of St. Paul. It is in an agricultural and timber region. Here are a State Normal School, the Tourtellate Hospital, a public library, National and savings banks, electric lights, and waterworks on the Holly system. The city has daily and weekly newspapers; manufactories of fiber, linseed oil, crackers, flour, hosiery, and candy; important marble, limestone, and lumber interests; and an assessed property valuation of nearly $4,000,000. Mankato was the scene of several battles during the Sioux Indian War, and here 38 Sioux were executed in 1862. Pop. (1890) 8,838; (1900) 10,599; (1910) 10,365.

Manlius, Marcus Capitolinus (man'lius), the savior of Rome during the invasion of the Gauls in 309 B. C. He was said, in the old stories, to have been wakened by the cackling of the sacred geese in the capitol just as the Gauls had scaled the wall, and rushing to the spot with a handful of men he drove them out and headlong down the hill. He afterward incurred the displeasure of the patricians, and was put to death in 384 B. C. by being thrown down the Tarpeian rock.

Manly, John, an American naval officer; born in Torquay, England, in 1733. He received a naval commission from Washington in 1775. Invested with the command of the schooner "Lee," he kept the hazardous station of Massachusetts Bay, during a most tempestuous season, and the captures which he made were of immense value at the moment. An ordnance brig, which fell into his hands supplied the Continental army with heavy pieces, mortars, and working tools, of which it was very destitute, and in the event led to the evacuation of Boston. Being raised to the command of the frigate "Hancock," of 32 guns, his capture of the "Fox" increased his high reputation for bravery and skill. But he was taken prisoner by the "Rainbow," July 8, 1777, and suffered a long and rigorous confinement on board that ship at Halifax and in Mill prison, precluded from further actual service till near the close of the war. He died in Boston, Mass., Feb. 12, 1793.

Mann, Horace, an American educator; born in Franklin, Mass., May 4, 1796. He was member of Congress from Massachusetts in 1848–1853; president of Antioch College in 1852–1859. He was one of the foremost men in educational reform; and published, besides his educational lectures and voluminous controversial writings, "A Few Thoughts for a Young Man" (1850); "Slavery: Letters and Speeches" (1851); and "Powers and Duties of Woman" (1853). He died in Yellow Springs, O., Aug. 2, 1859.

Mann, Mary Tyler (Peabody), an American writer, wife of Horace Mann; born in Cambridgeport, Mass., Nov. 16, 1806. Her published works are: "Flower People" (1838); "Culture in Infancy" (1863); "Life of Horace Mann" (1865); "Juanita, a Romance of Real Life in Cuba," published after her death. She died in Jamaica Plain, Mass., Feb. 11, 1887.

Manna, "a small, round thing, as small as the hoar frost," which lay on the face of the wilderness every morning except on the Sabbath (Exod. xvi: 14, 26, 27), sent by Jehovah as bread rained from heaven (ver. 4, 5), and continued during the whole 40 years of the Israelite wanderings in the wilderness (ver. 35). It melted when the sun became hot (ver. 21), and if left till next day bred worms and stank (ver. 20). An omer of it was preserved to show to future generations the nature of the food divinely provided in the dessert. Attempts have been made to identify it with some of the other substances now named manna. Some of these are purgatives rather than food; only two are esculents — viz., *Lecanora* (*Parmelia*) *esculenta* and *L. affinis*, two lichens. These are sometimes supposed to be manna. They are natives of Armenia, Asia Minor, the Sahara, and Algeria.

In botany, a concrete discharge from the bark of *Fraxinus rotundifolia* and some other species of the genus, including in the S. of Europe the common ash, *F. excelsior*. The sweetness is due to the presence not of sugar, but of mannite. A kind of manna is produced by a species of camel's-thorn, and is obtained by shaking the branches. It is found only in Persia and Bokhara, not in India, Arabia, or Egypt. *Eucalyptus mannifera*, an Australian tree, exudes a substance like manna, but less nauseous. manna of Briançon is an exudation from the common larch. Manna of Mount Sinai is an exudation produced by the puncture of an insect, *Coccus manniparus* on *Tamarix mannifera*. The sweetness arises not from mannite, but from sugar. In Persia a similar insect produces a kind of manna on

T. gallica. Poland manna is *Glyceria fluitans*.

In chemistry, a saccharine juice which exudes from certain species of ash, chiefly *Fraxinus ornus*, found growing in the S. of Europe and in Asia Minor. It has an odor resembling that of honey, and tastes nauseously sweet, with a slight acridity. It is soluble in water and alcohol, and its aqueous solution readily undergoes fermentation, yielding a liquid with a peculiar odor and containing butyric acid. The analysis of manna shows it to consist of manna-sugar, mucilage, a reddish-brown resin, a sweet gum, and not more than 4 per cent. of inorganic matter.

Manna, the exudation from the incised bark of *Fraxinus rotundifolia* and *F. ornus*, is a very mild laxative, suitable for children. It is mixed also with some purgatives like senna, but tends to produce flatulence and griping.

Manna Ash, a tree which grows on the skirts of mountains in Calabria. Between the middle of June and the end of July the manna gatherers make an incision in the bole of the tree, which they deepen the second day, inserting a maple leaf to receive the gum. Sometimes bits of reed or twigs are applied, on which the manna hardens in tubular pieces called canali; these being considered purer than the rest, fetch a higher price.

Manna Croup, a granular preparation of wheat flour deprived of bran. It consists of the large hard grains of wheat flour retained in the bolting machine after the fine flour has been passed through its meshes. It is used for making soups, puddings, etc.

Manna Grass, the *Poa* or *Glyceria fluitans*, a grass growing in wet places throughout the temperate regions of the globe. It affords food for cattle, and the seeds called Polish manna, manna seeds, and manna croup, are used in some countries in soups and gruels.

Manners, a noble English family of Northumbrian extraction, their ancestor, Henry de Maners, having in 1178 been lord of the manor of Ethale, or Etal, in that county. His descendant, Sir Robert de Manners, was governor of Norham Castle in 1327. In 1454 another Sir Robert de Manners was sheriff of Northumberland; in 1525 his grandson was raised to the earldom of Rutland; and in 1703 the 10th earl was raised to the dukedom. The eldest son of the 3d duke was the celebrated Marquis of Granby. The chief seat of the family is Belvoir Castle, 7 miles W. by S. of Grantham, a large castellated pile, reconstructed by Wyatt, and commanding a splendid view. Crabbe was chaplain here.

Mannheim. See MANHEIM.

Manning, Daniel, an American financier; born in Albany, N. Y., May 16, 1831; began life as a printer and a reporter on the Albany "Argus"; became president of the Argus Company, and a prominent Albany banker and politician. In 1885 he was chosen Secretary of the Treasury in the cabinet of President Cleveland, but resigned in 1887, and died in Albany, N. Y., Dec. 24, of that year.

Manning, Henry Edward, an English clergyman and writer; born in Totteridge, Hertfordshire, July 15, 1808. Originally a clergyman of the Church of England, in which he rose to be Archdeacon of Chichester (1840), he became a Roman Catholic priest in 1851; Archbishop of Westminster in 1865; cardinal in 1875. He founded the Roman Catholic University of Kensington in 1874. He was a friend of the laboring classes. He wrote: "Unity of the Church" (1842); "Temporal Mission of the Holy Ghost" (3d ed. 1877); "The Catholic Church and Modern Society" (1880); "The Eternal Priesthood" (1883); "Religio Viatoris" (A Traveler's Religion); etc. He died in Westminster, Jan. 14, 1892.

Manning, Jacob Merrill, an American clergyman; born in Greenwood, N. Y.; Dec. 31, 1824; was graduated at Amherst College in 1850, and at Andover Theological Seminary in 1853; ordained in the Congregational Church in 1854; became assistant pastor of the Old South Church, Boston, Mass., in 1857; and was its pastor in 1872–1882. He was the author of well-known orations, including one on Samuel Adams, one on the raising of the National flag on the steeple of the Old South Church, one on Henry Wilson, etc. He died in Portland, Me., Nov. 29, 1882.

Manning, Robert. See BRUNNE, ROBERT H.

Mannite, in chemistry, $C_6H_{14}O_6 = C_6H_8(OH)_6$. Mannitol, sugar of manna, sugar of mushrooms. A sugar very widely disseminated in the vegetable kingdom, occurring in the leaves of *Ligustrum vulgare*, in numerous bulbs, in fungi, in seaweeds, in the sap of the apple and cherry trees, limes, etc. It is most readily obtained from manna by treating it with boiling alcohol, filtering, and allowing the alcoholic solution to crystallize. From alcohol it crystallizes in fine silky needles; from water in large transparent rhombic prisms. It has an intensely sweet taste, is soluble in cold water, very soluble in boiling water, but insoluble in ether. It melts between 160° and 170°, and boils at 200°, distilling with very little decomposition. Mannite may be prepared artificially from grape sugar by the action of hydrogen evolved by sodium amalgam.

Manœuvres or **Maneuvers,** the movements and evolutions of any large body of troops or fleet of ships, for the purpose of testing the efficiency of the various bodies of the service under the conditions of actual warfare, and for the purpose of instructing officers in tactics, and officers and men in their various duties. For these purposes mimic warfare is carried on periodically under the name of military or naval manœuvres by several of the European powers.

Manometer, an instrument for measuring the elastic force of gases or steam. It consists of a graduated tube in which a body of confined air is compressed by the gas or steam under experimental test, a body of mercury intervening between the air in the tube and the gas or steam whose elastic force is to be ascertained. The tube containing the confined air, of a certain volume at a given temperature, is maintained at the said temperature by a bath, and is tested for the graduation of the tube by means of a column of mercury. It is then ready for the connection by a tube with the reservoir or boiler which contains the gas or steam whose elastic force is to be ascertained. A steam gauge. Called also a manoscope.

Manor, in English law, a lordship or barony held by a lord and subject to the jurisdiction of a court-baron held by him. In American law, a tract of land occupied by tenants who pay a fee-farm rent to the proprietor, sometimes in kind, and sometimes perform certain stipulated services.

Manresa (män-rā′sä), a town of Spain, on the Cardoner, 41 miles by rail N. W. of Barcelona. It has a fine church (1020–15th century), the cave of Ignatius Loyola, and manufactures of cotton, broadcloths, brandy, etc. In 1811 it was fired by Marshal Macdonald — an outrage avenged by the townsfolk.

Manrique, Jorge (män-rē′kā), a Spanish poet; flourished in the 15th century. He belonged to one of the oldest and most distinguished families in Spain. His chief work was an ode on his father's death (1492), now known as "Coplas de Manrique" (Manrique's Stanzas), one of the most touching poems in the Spanish language. It has often been reprinted, and was translated into English by Longfellow. Several of his love poems also have come down to us. He died in 1479.

Mans, Le (mo*ng*), a picturesque city of France, the capital formerly of the province of Maine, and now of the department of Sarthe, on the left bank of the Sarthe, 132 miles S. W. of Paris. Pop. (1906) 65,467. The Cenomanum of the Romans, and the birthplace of Henry II. of England, Le Mans witnessed in 1793 the dispersion and massacre of more than 10,000 Vendéans; and in January, 1871, the defeat, after a stubborn resistance, of 100,000 Frenchmen under Chanzy by Prince Frederick-Charles.

Mansard, a style of roof, also called the French curb, or hip-roof; named after a French architect, who invented it. (See below). It was designed to make the attics available for rooms, in consequence of a municipal law limiting the height of front walls in Paris.

Mansard, François (mo*ng*-sär′), a French architect; born in Paris, France, Jan. 23, 1598. He built several churches, and other public edifices at Paris. He died in Paris, Sept. 23, 1666. His nephew, Jules Hardouin Mansard; born in Paris, April 16, 1646, was also an excellent architect, and the superintendent of the royal edifices. He built the palaces of Versailles, Marly, and the Great Trianon, the Hospital of the Invalides, etc. He died in Marly, May 11, 1708.

Manse, in Scotch law, the designation of a dwelling house of the minister of the Established Church, and in popular use the term is often applied generally to the dwelling house of any minister of a dissenting congregation, though no legal right exists in the latter case. In the Established Church every first minister of a rural parish is entitled to a manse, which the heritors or landed proprietors in the parish are bound to build and uphold; and he is also entitled, as part of the manse or dwelling house, to a stable, barn, and byre. The manse must, by statute, be near to the church. When a manse has been built or repaired by the heritors it becomes a free manse, and all ordinary repairs have to be done at the charges of the minister. Decree to the effect that a manse is "free" may be given by the sheriff; and such decree stands good for 15 years, or till the appointment of a new minister.

Mansfeld (mäns′felt), **Counts of,** an old German noble family (founded about 1060), whose ancestral castle stood at the E. end of the Harz Mountains, 14 miles N. W. of Halle. Two members of the family have acquired historical reputation. Count Peter Ernest I., afterward elevated to the rank of a prince, was born July 15, 1517. Having taken part in Charles V.'s expedition against Tunis, and distinguished himself afterward at the siege of Landrecies, he was made by the emperor governor of the duchy of Luxemburg. But in 1552, while raiding in Champagne, he was taken prisoner by the French, and not ransomed till 1557. He fought against them again at St. Quentin. On the outbreak of the revolt in the Low Countries he made a name as one of the cleverest generals in the Spanish service. Having been sent by

Alva to the assistance of the French king against the Protestants, he covered himself with glory at Moncontour (1569). He subsequently took part in many sieges and military operations in the Netherlands, and acted for a while as governor of the Spanish Low Countries. In 1597 he retired to Luxemburg, where he had gathered a valuable collection of antique art, and died there May 22, 1604. His illegitimate son, PETER ERNEST II., usually called COUNT ERNEST VON MANSFELD, was one of the most prominent military leaders during the Thirty Years' War. Born at Luxemburg in 1580, he served his apprenticeship to war in the Austrian service in Hungary and in the Juliers dispute. As part of his reward he was promised his father's possessions; but finally they were refused to him. This con-

PETER ERNEST MANSFELD II.

verted Mansfeld into an implacable enemy, and he went over to the side of the Protestant princes. He assisted the Duke of Savoy against the Spaniards (1613–1617), and in 1618 was dispatched to Bohemia, to aid the Count-Palatine Frederick, and captured Pilsen and other strongholds. But the disaster of the Weissenberg compelled him to retreat to the Palatinate, from which he carried on for nearly two years a semi-predatory war on the imperialists, defeating Tilly at Wiesloch (April, 1622). When Frederick abandoned the struggle, Mansfeld, with a chosen ally, Christian of Brunswick, a swashbuckling adventurer like himself, fought his way through the Spanish-Austrian forces to take service for the United Netherlands, beating Cordova at Fleurus. At the bidding of his new masters Mansfeld chastised the Count of East Friesland, and then, dismissing his army, retired into private life at The Hague. But in 1624 he resumed active work again at the solicitation of Richelieu. With an army of 12,000 men, raised mostly in England, he renewed the struggle on the Lower Elbe, till in 1626 he was crushingly defeated by Wallenstein at the bridge at Dessau. Once more raising a force of 12,000 in Brandenburg, with these and 5,000 Danes he marched by way of Silesia to join hands in Moravia and Hungary with Bethlen Gabor of Transylvania. But the French and English subsidies failing, on which he relied for pay for his men, he was making his way to Venice with a few officers to raise fresh moneys when he fell sick and died, standing, clad in full panoply and supported by two attendants, at Racowitza, near Serajevo in Bosnia, Nov. 29, 1626.

Mansfield, a city and county-seat of Richland co., O.; on the Pennsylvania, the Erie, and the Baltimore and Ohio railroads; 54 miles S. of Sandusky, O. Here are the Ohio State Reformatory, Memorial Soldiers' and Sailors' Building, a high school, business colleges, National and State banks, waterworks, street railroad and electric light plants, and several daily and weekly newspapers. It has manufactories of boilers, threshing machines, engines, street cars, stoves, tubing, cigars, etc., and an assessed property valuation of over $7,000,000. Pop. (1900) 17,640; (1910) 20,768.

Mansfield, Edward Deering, an American journalist; born in New Haven, Conn., Aug. 17, 1801. He wrote: "Political Grammar" (1834); "Life of General Scott" (1846); "Legal Rights of Women" (1847); "History of the Mexican War" (1848); "American Education" (1850); "Personal Memoirs" (1879); "Utility of Mathematics"; etc. He was for many years a contributor to the New York press over the signature "Veteran Observer." He died in Morrow, O., Oct. 27, 1880.

Mansfield, Richard, an American actor; born on the Island of Heligoland, North Sea, in 1857; first studied art, but afterward prepared for the stage; came to the United States and appeared as Dromez in "Les Manteaux Noirs" at the Standard Theater, New York. He later created the parts of Prince Karl, Beau Brummel, and Baron Chevrial, and the titular rôles in "Dr. Jekyll and Mr. Hyde." In 1890 he appeared as Cyrano de Bergerac, and in 1901 as Monsieur Beaucaire. He died Sept. 30, 1907.

Mansfield, William Murray, Earl of, a Scotch jurist; born in Scone, Scotland, March 2, 1705. Educated at Westminster School and at Oxford, he entered Lincoln's Inn and was called to the bar in 1731. In 1742 he was appointed solicitor-general,

and obtained a seat in Parliament about the same time. In 1754 he was attorney-general, and in 1756 he was appointed chief justice of the King's Bench, and made Baron Mansfield. In 1776 he was advanced to the dignity of earl. He frequently refused high office, notably that of chancellor. On the trial of Woodfall for publishing Junius's letters, and on some other occasions, he showed himself the zealous supporter of the government and gave offense to the popular party. During the riots of 1780 his house in London was burned down by the mob. In 1788 he resigned his office of chief-justice; and the remainder of his life was spent in retirement. He was a great lawyer, not merely in a technical sense, but as one who could direct the practice of the courts toward broad principles of jurisprudence. He died in London, England, March 20, 1793.

Mansion House, the official residence of the Lord Mayor of London; built on the site of the Old Stock Market in 1739, at a cost of $213,190. It is an oblong building, and at its farthest end is the Egyptian Hall; 400 guests can dine in this grand banqueting room. Among its curiosities are a state bed, which cost about $15,000, and a kitchen and culinary utensils extraordinary for their vast size.

Mansilla de Garcia, Eduarda (män-sēl'yä dā gär-thē'ä), an Argentine novelist; born (Mansilla) in Buenos Ayres in 1838; married Manuel Garcia, a diplomatist, in 1855. She wrote: "The Physician of St. Louis"; "Lucia Miranda"; "Paul; or, Life on the Pampas" (translated into French); etc., all descriptive of Argentine customs or historical episodes.

Manslaughter, the slaughter or killing of a human being or beings; homicide.

"Manslaughter is therefore thus defined, the unlawful killing of another without malice either express or implied; which may be either voluntarily, upon a sudden heat, or involuntarily, but in the commission of some unlawful act."—Blackstone.

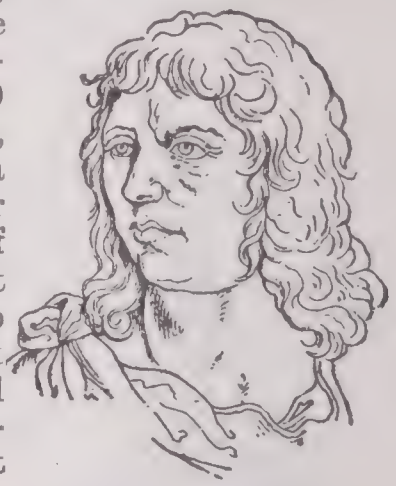
The judicial treatment of this crime, being regulated by statute, varies in the several States. The element of premeditation is not essential to conviction of this crime.

Manson, George, a Scotch painter; born in Edinburgh, Scotland, Dec. 3, 1850. He served five years as a wood-engraver in the establishment of W. & R. Chambers, studying art in his spare hours morning and evening. His first picture which attracted attention, "Milking Time," was painted at Craigmillar Castle near Edinburgh, between 4 and 8 o'clock of the mornings of a whole summer. In 1871 he devoted himself to painting altogether, but his youthful hard study had permanently injured his health, and he died in Lympstone, Devonshire, England, Feb. 27, 1876.

Mansourah (män-sö'rä), a town of Lower Egypt, on the Damietta branch of the Nile, 30 miles S. W. of Damietta. The place was founded in 1220, and here St. Louis of France was imprisoned in 1250.

Mant, Richard, an English clergyman; born in Southampton, England, Feb. 12, 1776. He was bishop in the Irish Church. He is best known as one of the authors of the "Annotated Bible" (3 vols. 1814), known as D'Oyly and Mant's, which had an immense circulation. He wrote also: "Ancient Hymns" (1837); "History of the Church of Ireland" (1840); etc. He died in Ballymoney, Ireland, Nov. 2, 1848.

Mantegna, Andrea (män-tān'yä), an Italian painter; born in Padua, Italy, in 1431. He was a pupil of Squarcione, who adopted him as a son, but this affectionate relation did not continue. About 1459 he went to Verona, where he painted a magnificent altar piece in the Church of St. Zeno. About 1466 he removed to Mantua, and the rest of his life was passed there, with the exception of two years at Rome. At Mantua, where he was patronized by the Marquis Gonzaga, he opened a school, and painted among other important works the "Triumph of Julius Cæsar," now at Hampton Court. One of the latest and best of this artist's works is the "Madonna della Vittoria," now in the Louvre at Paris. There are others of his works in the Louvre, in particular "Wisdom Vanquishing Vice," and a mythological work, "Parnassus." Mantegna excelled in perspective, which was then a rare merit; he also excelled in engraving, and introduced the art of engraving on copper into Upper Italy. He died in Mantua in 1506. His two sons, Francesco and Carlo, were also painters.



ANDREA MANTEGNA.

Mantelet, a sort of temporary fortification, intended to protect the men who work guns in embrasures, casemates, or portholes from the bullets of sharpshooters. the mantelet is usually made to be hoisted up while the gunner takes aim, and then lowered to cover the whole opening except a circular aperture for the muzzle of the cannon. With every increase in the range and precision of small arms, mantelets become more essential for the safety of gunners. Mantelets are made of thick fir, of solid oak planks, or of steel plates, the last being preferable, as the lightest.

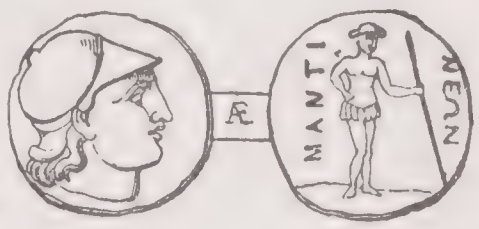
Mantell, Gideon Algernon, a British palæontologist; born in Lewes, Sussex, England, in 1790. He studied medicine, and practised successfully at Lewes, Brighton, and Clapham, London. Though long suffering from a distressing spinal disease, the result of an accident, he pursued his studies with unabated zeal. He bequeathed his geological drawings to Yale College. Mantell's principal works are "Fossils of the South Downs" (1822); "The Fossils of Tilgate Forest" (1826); "Wonders of Geology" (1833), perhaps the most popular geological work ever written by an Englishman; and "Medals of Creation, or First Lessons in Geology" (1844). He was a very voluminous writer, no less than 67 works and memoirs of his being enumerated in Agassiz and Strickland's "Bibliotheca Zoölogiæ et Geologiæ." His claims to a permanent place in the history of science rest mainly on his laborious investigations into the fossils of the Wealden beds. To him we owe the discovery and description of the four great Dinosaurian reptiles, the *Iguanodon*, *Hylæosaurus*, *Pelorosaurus*, and *Regnosaurus*. He died in London, Nov. 10, 1852.

Mantell, Robert Bruce, an American actor; born in Irvine, Scotland, Feb. 7, 1854; made his first professional appearance, Oct. 21, 1876, as Sergeant in "Arrah-na-Pogue." He came to the United States and created juvenile rôles in 1878, with Mme. Modjeska. Subsequently he appeared as Loris Ippanhoff in "Fedora" with Fanny Davenport in New York. He later became a star and organized a company of his own.

Mantes (mänt), a town in the French department of Seine-et-Oise, on the left bank of the Seine. It has a striking tower (1344) and a beautiful church, a reduced copy of Notre Dame at Paris. The ancient Medunta, a town of the Celts, Mantes in 1087 was sacked by William the Conqueror, who here received the injury that caused his death; and here too Henry IV. was converted from Protestantism.

Manteuffel (män'toif-fel), **Edwin Hans Karl, Freiherr von,** a Prussian soldier; born in Dresden, Feb. 24, 1809. Entering the Prussian guards in 1827, he rose to be colonel by 1854, and three years later was nominated head of the military bureau at Berlin, a post which he held till 1865. Having been appointed commander of the Prussian troops in Schleswig, he protested against the summoning of the Holstein estates by marching his men into that duchy (June 7, 1866). On the outbreak of hostilities Manteuffel commanded a division of the army of the Main, which was destined to act against the S. German allies of Austria. He took part in the battle of Langensalza, which brought about the capitulation of the Hanoverian army, succeeded Von Falckenstein as commander-in-chief of the Main army, and by winning the battles of Werbach, Tauberbischofsheim, Helmstädt, and Rossbrun over the Bavarians and others he brought that part of the campaign to a successful issue. He entered the war of 1870 as commander of the First Corps, but was soon promoted to the command of the First army, which fought successfully at Amiens and other places. Transferred in January, 1871, to the command of the army of the S., operating against Bourbaki, Manteuffel assailed the enemy's rear near Belfort, and drove 80,000 men across the frontier into Switzerland. When peace was proclaimed he was placed at the head of the army of occupation in France, and in 1879 was appointed imperial viceroy of the newly organized provinces, Alsace-Lorraine. His administration was not a happy one: his endeavors to help on the process of Germanization by direct efforts only incensed the clergy and upper classes, both French and German. He died in Carlsbad, Bohemia, June 17, 1885.

Mantinea (man-ti-nē'ä), an ancient city of Arcadia, in the Peloponnesus; on the Ophis river, in the midst of a broad plain. Here Epaminondas fell in the moment of a great victory over the Spartans, 362 B. C.



COIN OF MANTINEA.

Mantis, the so-called soothsayer, or praying insect; the typical genus of the family *Mantidæ*. Two species occur in Southern Europe: *M. religiosa*, from two to two and a half inches in length, and *M. oratoria*, a smaller species. Others are found in the warmer regions of the world. The popular names by which they are known in different countries have reference to their supposed power of indicating the way to a lost traveler, and derive their force from the religious significance attributed to the slow and solemn motions of the insect. But the seemingly devotional attitude of the mantis is that in which it watches for its prey, seizing unfortunate insects between its femur and tibia, thus maiming, and then devouring them. They are very pugnacious; the Chinese are said to keep them in cages and match them against each other, as W. nations used to do with game cocks.

Mantis Crab, a name given to crustacea of the genus *Squilla*, from the second pair of jaw feet being very large, and formed very like the fore legs of insects of the genus *Mantis*.

Mantle, the soft skin or integument of molluscous animals, technically known as the pallium. This structure secretes the shell when present, and where the shell is absent the mantle forms an investing sac or integument containing and protecting the viscera and other organs. The mantle lines the shell when that structure is developed; and through the agency of the lime-secreting glands of the mantle the shell is enlarged, or repaired in case of injury. In those *Mollusca* which possess shells the mantle may at certain points of its substance exhibit a thickening due to its being functionally more active at these points. This is exemplified in the "collar" or "hood" of some mollusks (*e. g.*, gasteropods), on which the formation and extension of the shell devolves. The form of the mantle varies greatly throughout the molluscan subkingdom. In the *Lamellibranchiata* (oysters, mussels, cockles, etc.) the mantle is disposed in two equal folds which inclose the viscera and line the shell. In the *Gasteropoda,* on the contrary, the mantle forms an oblique asymmetrical fold which contains the greater proportion of the internal organs. In the shells of lamellibranchiates the attachment of the mantle to the shell is indicated by a line recognizable in the dried shell, called the pallial line.

Mantling, or **Lambrequin** (-bur-kin), in heraldry, an ornament depicted as hanging down from the helmet and behind the escutcheon. It is considered to represent either the cointise, an ornamental scarf which passed around the body and over the shoulder; or the military mantle, or robe of estate. When intended for the cointise, it is cut into irregular strips and curls of the most capricious forms, whose contortions are supposed to indicate that it has been torn into that ragged condition in the field of battle. When the mantling is treated as a robe of estate, the bearings of the shield are sometimes embroidered on it. A mantling adjusted so as to form a background for the shield and its accessories, constitutes an "achievement of arms."

Man-traps, contrivances once employed for terrifying trespassers and poachers (formerly often indicated by the warning notice "man-traps and spring-guns set here"), resembled gigantic rat-traps four feet long. Their use is no longer permitted.

Mantua (man'tū-ä), a town of Northern Italy, capital of a province of same name, on the Mincio, 21 miles S. W. of Verona, and 37 N. E. of Cremona. It is partly on two islands formed by the waters of the Mincio, and partly on the mainland. Mantua is both by nature and art one of the strongest places in Europe; it is entered by bridges flanked with redoubts, and is built on a plain of tolerable regularity, divided by a canal into two nearly equal parts. Most of the streets are broad, regular, and well paved; the houses are of stone, and in general well built; and the public squares both spacious and elegant. Of the latter, the most noted is the Piazza di Virgilio, used as a promenade. In its center stands Vergil's monument, a column of marble. The principal public edifices at Mantua are the cathedral; the Corte, with its hall; the Palazzo della Giustizia; the palace of the Gonzaga family, and the one which, from its shape, bears the singular name of the Palazzo di T; the university buildings, the arsenal, the Jewish synagogue, and the public library, containing over 80,000 volumes. Mantua contains likewise several valuable collections of paintings, and a gallery of antiquities belonging to the Academy of Arts and Sciences. Manufactures silk, woolen and linen fabrics, etc. Mantua claims an antiquity equal to that of Rome. It passed under the Roman power 197 B. C., and was the birthplace of Vergil, 70 B. C. After numerous reverses of fortune Mantua passed into the hands of Louis I., Duke of Gonzaga, in 1328, and under his rule attained great importance. It continued in the Gonzaga family till 1708, when it was taken by the Austrians. It was taken by Napoleon I. in 1796, and erected into the chief town of the department of the Mincio, but was restored to Austria in 1814. By the treaty of Zurich, in 1859, Mantua and Peschiera were the only towns of Lombardy left to the house of Austria, and these were surrendered in October, 1866. Pop. (1901) about 30,000.

Manu (ma'nö), an early Sanskrit writer, author of a book of laws, civil and religious, called "Dharma-Shastra," still extant.

Manual Training, in modern education, the training of the hand and eye in the use of typical tools, suitable materials, and mechanical methods, as well as in practical drafting, including the best methods of both freehand and accurate instrumental drawing of objects already constructed and of objects to be constructed. In practice the materials specially used are wood, iron, steel and brass; lead, tin, zinc, paper, leather, sand, textiles, plaster, and clay are taken chiefly as substitutes for more intractable and expensive materials. Draftings include plans, elevations, sections, line and brush tinting and shading, lettering, methods of surface ornamentation, sketching, etc., with both pencil and pen. Manual training may be regarded either as a part of a person's general education or as a definite step in the acquisition of a livelihood. As introduced into the curriculum of common schools it may subserve both

ends Manual training schools are broader in their scope than the technical or trade school, though they are the logical outgrowth of them.

The idea of introducing tool instruction in the curriculum with science, mathematics and language in such a way that no one feature should be subordinate to another, was early undertaken at the Massachusetts Institute of Technology, at Worcester, and at the Washington University at St. Louis. Three shops were organized in St. Louis in 1877 where special students in the mechanical arts could have some training, and in 1879 the St. Louis Manual Training School was established and the school was opened in 1880. It had a great success. The building was enlarged in 1882 and so much interest was attracted by it that the "Record" of the alumni of the St. Louis school is still published every year. In 1882–1883 the National Educational Association took up the matter and almost simultaneously manual training schools were organized in Chicago, Baltimore, Toledo, and Philadelphia. In Baltimore and Philadelphia the schools were made part of the system of the public schools. All of them have been extremely successful. At the present time manual training schools have been founded and manual training courses have been introduced into high schools in most of the large cities of the United States, and it has been made also an important part of the curriculum of every agricultural and mechanical college in the country. Still more recently manual training schools of high character have been founded in Louisville, Providence, Denver, Boston, Philadelphia (the Drexel Institute), Chicago (the Armour Institute), New York city (the Teachers' Institute), and Cambridge (the Rindge School). Manual training has been under discussion in every convention of educators and in every community. Prof. C. M. Woodward, the organizer and director of the St. Louis school, presented the claims of this new feature in education in nearly every large city of the Northern States. He wrote numerous addresses and magazine articles, and published a book on "The Manual Training School, Its Aims, Methods, and Results." A very valuable work on manual training by Charles H. Ham, of Chicago, was published in 1886, and one by Judge McArthur, of Washington, D. C. The manual training school teaches no trade, prepares for no calling or profession. It gives as wide a training in the practical arts as it does in literary and commercial fields. It stimulates and develops all minds and opens all the windows by which youth looks out on the activities of life, and it unbars every entrance thereto. It incorporates positive manual elements into its course of study, but it is far removed from trade schools on the one hand, being much broader and aiming not so much at dexterity in special work and actual shop products as at intelligence and general culture in more than one direction; and on the other hand it falls far below the mathematical theories, elaborate researches and professional details of the technical schools. In manual training schools which are for general training no moderate literary or scientific work can be out of place; on the contrary, a large share of the time must be given to literature, mathematics, and science. Shop instruction is given. The instructor at the bench, machine or anvil explains the principles to be used or illustrated and executes in the presence of the whole class the day's lesson, giving all needed information and freely using the blackboard. When it is possible the pupils make working drawings of the piece or model to be executed, and questions are asked and answered, that all obscurities may be removed. The class then proceeds to the execution of the task, each at a separate bench and with his own tools, while the instructor gives additional help to such as need it. At a specified time the lesson ceases and the work is brought in, commented on and marked. It is not necessary that all the work assigned should be finished; the essential thing is that it should be well begun and carried on with reasonable speed and accuracy. In a manual training school, no mere sleight-of-hand is aimed at, nor is muscular exercise of itself held to be of educational value.

Manuel II., former king of Portugal; born in Lisbon, Nov. 15, 1889; second son of King Carlos I. and Queen Marie Amelie; succeeded to the throne on the assassination of his father and elder brother, Crown Prince Luiz Philippe, while riding in Lisbon, Feb. 1, 1908. On Oct. 5, 1910, there was an uprising in Lisbon; a republic was proclaimed; the royal family fled to Gibraltar and thence to London; and subsequently the Braganza dynasty was banished and peers, titles, and the Council of State abolished.

Manuel Comnenus (man'ū-el kom-nē'-nus), Emperor of Constantinople; born in 1120. He was the younger son of the Emperor John Comnenus, whom he succeeded, to the prejudice of his brother Isaac, in 1143. His long reign was almost a continual succession of wars. He obtained several victories over the Sultan of Iconium in the year of his accession; the next year carried on war with Raymond, Prince of Antioch; and in 1147, on the arrival of the crusaders at Constantinople, under the Emperor Conrad and Louis VII. of France, he is charged with having flattered the Germans with

promises, and by treacherous guides led them on to destruction. The French were received with great honors. Roger II., King of Sicily, having invaded Greece and carried off immense spoil, Manuel made war on him and took Corfu. Revolts of the Servians and Hungarians afterward occupied him and in 1168 he made an unsuccessful expedition to Egypt. In 1175 he was again at war with the Turks, with alternate defeat and victory. He died Sept. 24, 1180.

Manuel, Don Juan (mä-nö-el′), a Spanish prince and writer; born in Escalona, Spain, May 5, 1282. Holding the highest offices in the state — being joint regent of Spain in 1320 — and twice in arms against his king, as well as commander-in-chief against the Moors, his life was a stormy one. He was one of the first and best of Spanish prose writers. He is best known by "El Conde Lucanor" (Count Lucanor: 1575), a collection of 50 tales in the Eastern style. He died in 1347 or 1349.

Manuel, Jean Antoine (mä-nü-el′), a French statesman; born in Barcelonette, Dec. 10, 1775. After serving with distinction in the republican armies raised by levy *en masse*, he adopted the profession of the bar. He was a member of the Chamber convoked by Napoleon during the Hundred Days, 1815, and with all his eloquence and power resisted the reëstablishment of the Bourbons by the allied armies. Returning to the Chamber in 1818, his patriotic fervor in the tribune, his high spirit, and his brilliant oratory, marked him out as the champion of French liberty, and kept the party of the ministers in continual terror. He died in Maisons, Aug. 20, 1827.

Manuel Palæologus (man′ū-el pal-ē-ol′-o-gus), Emperor of Constantinople; born in 1348. He was the son and successor of John Palæologus. The Turks having invaded his dominions, he applied to the Latins for succor, but without effect, on which he resigned his scepter to John Palæologus II., his son, and took a religious habit. He died in 1425.

Manufactures, United States. The statistics of the manufacturing industries of the United States, issued by the permanent Census Bureau in 1905, were the first in which the canvass was confined to establishments conducted under what is known as the factory system, thus excluding the neighborhood industries and hand trades. The omission of statistics of the small mechanical trades confines the data to a presentation of the true manufacturing industries of the country. This change should be kept in mind when comparing statistics of different census periods. The 1905 report showed: Establishments, 216,262; capital, $12,686,-265,673; wage-earners, 5,470,321; wages, $2,611,540,532; cost of materials, $8,503,-949,756; other expenses, $1,455,019,473; and value of products, $14,802,147,-087.

Manumission, in ancient Rome, the form by which slaves were released from their condition; so called because they were sent, as it were, out of the hand or power of their master. There were three ways in which slaves were manumitted — by *vindicta*, census, or will. The first of these was the most ancient, and in it the slave was brought before the magistrate, who laid his wand, *vindicta*, on his head, and declared him to be free. The manumission by census was effected by the name of the slave, with his master's consent, being inserted in the census or public register of the citizens. By will, a slave could be made free conditionally or unconditionally, or free and an heir of the testator. By manumission the relationship of patron and freedman was established between the parties.

Manure, a term applicable to any material which may be used for accelerating vegetation or increasing the production of plants. The cultivation of plants, year after year, tends to exhaust the soil of its air food and ash constituents. It becomes, therefore, necessary to replace these by addition of manure. This, to some extent, proceeds naturally by the absorption of air food by the soil in the form of ammonia and carbonic acid, and also by the decomposition of the mineral matter of the soil under the influence of time and tillage. The air food is supplied by nitrogenous matters, chiefly in the form of ammoniacal salts, and the ash constituents by the use of salts of phosphoric acid and potash, in the form of preparations from bone or in the use of a mineral phosphate, such as coprolites. Those substances which furnish both classes of food comprise guano, stable manure, fish, seaweed, refuse of towns, and artificial saline mixtures, etc. Generally speaking, phosphates are held to favor the production of a large root crop, and nitrogenous manures to increase the production of corn.

Manuscripts, literally, writings of any kind, whether on paper or any other material, in contradistinction to printed matter. Previous to the introduction of printing all literature was contained in manuscripts, and the deciphering and proper use of these form an important part in the science of palæography. All the existing ancient manuscripts are written on parchment or on paper. The paper is sometimes Egyptian (prepared from the real papyrus shrub),

sometimes cotton or silk paper (*charta bombycina*). The most common ink is the black, which is very old. Red ink of a dazzling beauty is also found in ancient times in manuscripts. With it were written the initial letters, the first lines, and the titles, which were thence called "rubrics." Blue, green, and yellow inks were more rarely used. On rare occasions gold and silver were the mediums, though from their cost they are oftenest confined to initial letters. With respect to external form, manuscripts are divided into rolls (*volumina*), and into stitched books or volumes (properly *codices*). Among the ancients the writers of manuscripts were mainly freedmen or slaves (*scribæ librarii*). At a later period the monks were largely engaged in the production of manuscripts. In all the principal monasteries was a *scriptorium*, in which the *scriptor* or scribe could pursue his work in quiet, generally assisted by a dictator, who read aloud the text to be copied; the manuscript was then revised by a corrector, and afterward handed to the miniator, who added the ornamental capitals and artistic designs.

The most ancient manuscripts still preserved are those written on papyrus which have been found in Egyptian tombs. Several of these are of date considerably before the Christian era: notably fragments of the "Iliad" and a papyrus containing the orations of Lycophron and Euxenippus, 11 feet in length and containing 49 columns of writing. Next to them in point of age are the Latin manuscripts found at Herculaneum. Then there are the manuscripts of the imperial era of Rome, among which are the Vatican Terence and Septuagint, and the Alexandrine codex of the British Museum. Numerous manuscripts of the Old and New Testaments of the 2d and 3d centuries exist; and among those of profane authors may be noted that of Vergil (4th century), in the Laurentian Library at Florence; a Livy (5th century), in the Imperial Library of Vienna; the Jewish Antiquities of Josephus, in the Ambrosian Library, Milan, etc. It was a common custom in the Middle Ages to obliterate and erase writings on parchment, for the purpose of writing on the materials anew, manuscripts thus treated being called "palimpsests."

The art of illuminating manuscripts dates from the remotest antiquity. The Egyptian papyri were ornamented with vignettes or miniatures attached to the chapters, either designed in black outlines or painted in primary colors in distemper. The oldest ornamented Greek and Roman manuscripts that have survived are the Dioscorides of Vienna and the Vergil of the Vatican, both of the 4th century, and having vignettes or pictures in a Byzantine style of art. From the 8th to the 11th century the initial letters in use were composed of figures of men, quadrupeds, fishes, birds, etc. The initials of the 12th century are made up of masses of conventional foliage interspersed with the animal figures of the preceding centuries. Continuous borders, with vignettes, tailpieces, etc., were also prevalent in later times, and some manuscripts are ornamented with very artistic designs. In the 16th century the art of illumination became extinct. Some attempts have been made to revive it by adorning paper, parchment, and vellum with designs in color or metals.

Manuscripts, Illumination of. See ILLUMINATION OF MANUSCRIPTS.

Manutius, Aldus (ma-nū′shi-us), or **Aldo Manuzio** (äl′dō mā-nöt′sē-ō), an Italian printer; born in Sermonetta, Italy, about 1447. In 1488 he established himself as a printer at Venice, but the first work which he finished was not published till 1494. In the course of the ensuing 20 years he printed the works of the most ancient Latin and Greek authors extant, as well as many productions of his contemporaries, and some treatises of his own composition. He was the inventor of the italic or cursive character, hence called "Aldine." He died in Venice, Feb. 6, 1515. His business was continued by his son PAOLO MANUZIO, born in Venice, June 12, 1512, died in Rome, April 6, 1574, a man distinguished as a classical scholar no less than as a printer; and by his grandson ALDO, born in Venice, Feb. 13, 1547, died in Rome, Oct. 28, 1597.

Manzanillo (män-thä-nel′yō), a port of Mexico, on a fine bay opening to the Pacific, 31 miles W. S. W. of Colima. The country around is equally fertile and unhealthy, and the trade is largely in the hands of Germans.

Manzanillo, a port on the S. coast of Cuba, about three-quarters of a mile from the mouth of the Yara, which affords at least a portion of the water supply, has a good harbor and export trade in valuable woods, sugar, etc. The sanitation is defective. Pop. (American census, 1907, with Campechuelo and Niquero added since 1899) 54,900.

Manzano, Juan Francisco (män-thä′-nō), a Cuban poet; born in Havana, Cuba, in 1797. A negro, born in slavery, and remaining in servitude for 40 years he obtained his education with great difficulty. While still a slave he succeeded in publishing a small volume of poems entitled "Passing Flowers." His drama "Zafira" was published in 1842. Some of his poems have been translated into French and German. He died in 1854.

Manzoni, Alessandro (män-zō′nē), an Italian poet and novelist; born in Milan, March 7, 1784. He was the son of Count Pietro Manzoni and the Marchioness Giulia Beccaria, daughter of the Marquis Cesare Beccaria, author of the well-known treatise on "Crimes and their Punishment." After his father's death in 1805 he lived for some time in Paris with his mother, and in 1808 he married the daughter of a Genoese banker, under whose influence he settled down into the fervent Catholicism which colored all the rest of his life. His chief works are "Sacred Hymns," a series of lyrics; "The Fifth of May," a powerful ode on the death of Napoleon; the tragedies "Carmagnola," and "Adelchi," and his greatest novel "The Betrothed." He died in Milan, May 22, 1873.

ALESSANDRO MANZONI.

Map, a representation of a portion of the earth's surface, or of a portion of the heavens on a plane. There are, therefore, two kinds of maps, terrestrial and celestial. Terrestrial maps are of two kinds, those which represent portions of land and water together, which are properly called "maps," and those which represent portions of the ocean, only indicating the directions of currents, soundings, anchorages, rocks, shoals, buoys, lighthouses, etc., these are called hydrographical maps or charts. A map of the earth, or of a portion of the earth, generally shows the physical features of the country, as rivers, mountains, lakes, etc., the situation of towns, cities, etc., relatively to each other, and by means of the lines of latitude and longitude relatively to every other point on the earth's surface. Maps are also prepared for special purposes, as geological, statistical, ethnological, or historical maps. It being impossible to represent a spherical surface on a plane so that the parts shall have to each other their proper relative positions, the representation is, in all cases, conventional. Various devices have been resorted to, each of which has its own peculiar advantages and disadvantages. A representation of the meridians and circles of latitude forms, in all cases, the skeleton or basis of every map of an extensive portion of the earth's surface, and it is on a correct delineation of these that the accuracy of any map depends. The principal methods of projection are the orthographic, the stereographic, the globular, the conical, and the cylindrical or Mercator's projection, besides various combinations and modifications. In the first three cases the plane upon which the map is to be drawn is called the primitive plane, and is supposed to be passed through the center of the earth. The various lines are projected upon this plane, by lines drawn through their different points and some fixed point, called the point of sight. On the location of the point of sight depends the peculiarities of the three methods of projection.

Map, or **Mapes, Walter,** a British scholar; born in the Welsh Marches, probably about 1150. He studied at the University of Paris and made an important figure in the court of Henry II. He became Archdeacon of Oxford in 1199; contributed to the Arthurian cycle of romance the romances of the "Quest of the Holy Grail," "Launcelot of the Lake," and the "Death of Arthur"; was the author of "On the Trifles of the Court," a notebook of the events of the day and of court gossip; and to him is attributed a collection of rhymed Latin verse in which the abuses of the Church are hit off with vigor and humor. Among the most remarkable of these are the satirical "Apocalypse" and the "Confession of Bishop Golias." He died about 1210.

Maple, a name for trees of the genus *Acer,* order *Accraceæ* or *Sapindaceæ,* peculiar to the N. and temperate parts of the globe. About 50 species are known, distributed through Europe, North America, and different parts of Asia. They are small or large trees, with a sweetish, rarely milky, sap, opposite deciduous, simple, usually lobed leaves, and axillary and terminal racemes or corymbs or small greenish flowers. The wood of the great maple (*A. Pseudo-platanus*) is valuable for various purposes, as for carving, turnery, musical instruments, wooden dishes, etc. Another well-known species is the Norway maple (*A. plantanoides*), often planted as an ornamental tree. The wood of several other species is also applied to various uses. The sugar or rock maple (*A. saccharinum*) is the most important American species; this yields maple sugar, which in many parts of North America is an important article of manufacture. A tree of ordinary size will yield from 15 to 30 gallons of sap yearly, from which are made from 2 to 4 pounds of sugar. The knotted parts of the sugar-maple furnish the pretty bird's-eye maple of cabinet-makers. Some other American species are the white maple (*A. dasycarpum*); the red or swamp maple (*A. rubrum*); the striped maple or moose wood (*A. pennsylvanicum*); the mountain maple (*A. spicatum*); the vine

maple (*A. circinatum*); and the large-leaved maple (*A. macrophyllum*).

Maquet, Auguste (mä-kā′), a French novelist and playwright; born in Paris, France, Sept. 13, 1813. He was professor at the Collège Charlemagne in 1831. He collaborated with the elder Dumas in some of his novels. He wrote alone (most of them in both novel and play form): "Beautiful Gabrielle" (1853), with its sequel "The Bather's House" (1856); "The White Rose" (1859); "Journey to the Country of the Blue" (1859); the play "The Bercheny Hussar" (1865), which was very successful; etc. He died in Ste. Mesme, Jan. 8, 1888.

Maqui (mak′wē) (*Aristotelia Maqui*), the only known species of the genus, which belongs to the natural order *Tiliaceæ*, and has been made the type of a proposed order. It is an evergreen or sub-evergreen shrub, of considerable size, a native of Chile. The Chileans make a wine from its

MARABOU.

berry, which they administer in malignant fevers. The wood is used for making musical instruments, and the tough bark for their strings. The maqui sometimes ripens fruit against a wall in temperate climates, and is frequently cultivated as an ornamental shrub.

Mar, an ancient district of Scotland between the Dee and the Don, comprising nearly the S. half of Aberdeenshire, and subdivided into Braemar, Midmar, and Cromar.

Mara (mä′rä), in old Runic, a goblin that seized on men asleep in their beds, and took from them all speech and motion.

Marabou (mar-a-bö′), the popular name for at least two species of storks of the genus *Leptoptilus*, the vent feathers of which were formerly much esteemed as ornaments and for ladies' headdresses. *L. argala* is the Asiatic marabou or adjutant. *L. marabou*, a smaller species, is from tropical Africa, where it assists the vultures in consuming the filth of the negro villages. It is, if possible, uglier than its Asiatic congener, but its delicate vent feathers are equally valued.

Marabouts, or **Marabuts** (mar′a-böts), among the Berbers of Northern Africa a sort of saints or sorcerers, who are held in high estimation, and who exercise in some villages a despotic authority. They distribute amulets, affect to work miracles, and are thought to exercise the gift of prophecy. Through the credulity of their people they are enabled to live in great luxury.

Maracaibo, or **Maracaybo** (mä-rä-kī′-bō), a city of Venezuela, on the W. shore of the strait which connects the lake and gulf of Maracaibo. It is a handsome town, with many gardens and squares, a college, hospitals, a theater, a German club-house, the usual government buildings, a custom house, wharves, and a number of manufactories. The climate is hot, the soil sandy, and the place unhealthy, owing mainly to the unsanitary domestic arrangements. The trade is chiefly in the hands of Germans, Danes, and North Americans. The staple export is coffee; boxwood, lignum vitæ, cedar, and other woods, besides divi-divi, hides and skins, and some cocoa, gums, and fish sounds, are the other exports. Pop. (1901) 42,500.

Maracaibo, Gulf of, or **Gulf of Venezuela,** a wide inlet of the Caribbean Sea, extending from the peninsulas of Paraguana and Guajira to the strait by which it is connected with the lake. The latter forms the floor of a great valley, shut in by lofty mountains. Its waters are sweet, and deep enough for the largest vessels; but the bar at the mouth, where a swift current runs, makes entrance difficult. The gulf and lake were discovered in 1499 by Ojeda, who found here houses built on piles, and so gave the district the name Venezuela ("Little Venice"), which was afterward extended to the entire country.

Maragha (mä′rä-gä), a town of Western Persia, 55 miles S. of Tabriz and 20 miles E. of Lake Urmia. It is celebrated as the capital of Hulagu Khan, grandson of Genghis Khan, and as the site of the observatory which Hulagu built for the astronomer Nasr ed-Din. Pop. about 13,000.

Marajó (mä′rä-zhō′), an island between the estuaries of the Amazon and Para; area, nearly 18,000 square miles. It is for the most part low and covered with grass and bush, but in the E. and S. with dense forest. The soil is fertile, and large herds of cattle are reared in the N. E.

Maranham, (mä-rän-ya*ng*′), or **Maranhao,** a maritime State of Brazil, bounded on the N. by the Atlantic Ocean; area, over 177,550 square miles; pop. (1901) 499,308. The chief city is Maranham, or San Luiz de Maranham, on an island between the mouths of the Mearim and the Itapicurû. It is a well-built town, clean, gay, and hospitable and has a cathedral and bishop's palace, a hospital, a technical school, some sugar and spinning and weaving factories, and docks that admit ships drawing 14 feet. Pop. (1901) est. 41,000.

Marat, Jean Paul (mä-rä′), a French revolutionist; born in Baudry, Neufchâtel, Switzerland, May 24, 1744. In his youth he applied himself to the study of medicine and anatomy; and settling in Paris, attracted notice as an empiric and vender of medicines. But his ambition led him to desire a more extensive popularity, and he wrote a work in 1775 which had for its title, "Man, or the Principles and Laws of the Influence of the Soul and the Body on Each Other." When the Revolution began, he supported it, denouncing aristocrats and preaching massacre. He joined Danton's Club of the Cordeliers, and published a daily paper, called "The People's Friend," in which he disseminated his hatred toward royalty, and criticized the nobility and the most distinguished members of the National Assembly. He was chosen deputy to the National Convention, where his violence and extravagance led to his arrest, but he was acquitted. He was also president of the Jacobin Club, and first suggested the creation of the Committee of Public Safety and the passage of the law of the "suspects." He denounced the generals of the French army as traitors to their country, and put the members of the Convention under arrest. The fall of the Girondists was a triumph for him and his friends, but it led quickly to his own end. It was at this time that Charlotte Corday resolved to rid the world of him, and he was stabbed by her in Paris July 13, 1793.

Marathi (mä-rat′hē), or **Mahratta,** the language of a people of Southern India, the MAHRATTAS (*q. v.*).

Marathon (mar′a-thon), a village on the E. coast of ancient Attica, 22 miles from Athens, long supposed to be the modern Marathona. It stood in a plain 6 miles long and from 3 to 1½ miles broad, with a background of mountains in the W., and a marsh both on the N. and S.; it reached the sea — "The mountains look on Marathon, and Marathon looks on the sea." Investigations by Prussian officers identify the historic village with that of Brana, nearly 2½ miles to the S., and locate the battle in the plain between the mountain Stavrokoraki and the sea, nearly 3 miles N. E. of Brana. The name of Marathon is gloriously memorable as the scene of the great defeat of the Persian hordes of Darius by the Greeks under Miltiades (490 B. C.) — one of the decisive battles of the world.

Maratti, Carlo (mä-rat′tē), an Italian painter and engraver; born in Camerano, Italy, May 13, 1625. Louis XIV. employed him to paint his celebrated picture of Daphne. Clement IX. whose portrait he painted appointed him overseer of the Vatican gallery. He has been styled the last painter of the Roman school. His Madonnas were particularly admired. He died in Rome Dec. 15, 1713.

Maravedi, an old Spanish copper coin in use from 1474 to 1848, was worth about 1-13th of a penny. There were also, at an earlier period, maravedis of gold and of silver.

Marble, a popular name for any limestone which is sufficiently hard to take a fine polish; any calcareous or even any other rock which takes a good polish and is suitable for decorative or architectural purposes. Arranged by color, as Da Costa does, there are: (1) Marbles of one plain color, which may be black, white, ash, gray, brown, red, yellow, blue or green; (2) marbles of two colors, which are simply the foregoing marbles variegated with other colors; (3) marbles variegated with many colors; and (4) marbles containing shells, corals, and other extraneous bodies. Some of the fossiliferous limestones furnish excellent marbles. For instance, the encrinital limestones of the Carboniferous formation have the fossils white in a dark gray or black matrix. Non-fossiliferous crystalline marbles consisting of sedimentary calcareous strata, altered by metamorphism, also furnish good marbles. The statuary marble of Italy may be of this character. The purest kinds are used for statues, those less pure as building material. The Carrara and Parian marbles are of this type. Other marbles are the verd antique, the fire marble or lumachella, the giallo antico, madreporic marble, etc. The Grand Cañon of the Colorado is lined in many places with magnificent marble of various colors.

Elgin marbles, a collection of *bassi-rilievi* and fragments of statuary brought from the Parthenon at Athens to England by Lord Elgin in 1814. They were afterward

purchased by the British government and are now in the British Museum. They consist chiefly of the metopes, representing for the most part the combats of the Centaurs and Lapithæ, and the statues or fragments of statues which ornamented the tympana of the pediments of the Parthenon, or Temple of Minerva. To these were added the frieze from the Temple of Nikê Apteros, a series of casts from the Temple of Theseus, and the choragic monument of Lysicrates.

The value of the production of marble in the United States in the year 1900 was $4,267,253, Vermont, Georgia and Tennessee furnishing the largest amount.

Marblehead, a town and port of entry in Essex co., Mass.; on Massachusetts bay and on the Boston and Maine railroad; 17 miles N. E. of Boston. It contains Abbot Hall with a public library and art gallery, a high school, improved waterworks, National banks, and weekly newspapers. There are 30 shoe factories, seed-growing and fisheries industries, and an assessed property valuation of over $5,000,000. Pop. (1900) 7,583; (1910) 7,338.

Marblehead, The, a twin-screw, steel, unprotected cruiser of the United States navy; 2,089 tons displacement; length 257 feet; breadth, 37 feet; mean draft, 14 feet, 7 inches; armament, main battery, nine 5-inch rapid-fire guns; secondary battery, six 6-pounder rapid-fire guns, two 1-pounder rapid-fire cannon and two Gatlings; speed, 18.4 knots an hour; crew 20 officers and 254 men; cost, $674,000. She performed a conspicuous part in the destruction of the Spanish fleet off Santiago, Cuba, in 1898.

Marbling, in bookbinding, a process of ornamenting the edges of books by dipping them, when cut, in a trough about two inches deep and filled with gum water on the surface of which colored pigments have been thrown and disposed in various forms with a quill and comb. The colors adhering to the edge of the book are set by dashing cold water over them. Marbled papers for the sides of books are made in the same manner.

Marburg (mär'börg), a quaint old town in the Prussian province of Hesse-Nassau, situated on the Lahn, 50 miles N. of Frankfort; built on a terraced hill crowned by a castle dating from 1065. In its Rittersaal (1277–1312) was held in 1529 the conference between the Wittenberg and the Swiss reformers regarding the Lord's Supper. The fine Gothic Church of Elizabeth, with two towers 243 feet high, was built in 1235–1283 by the Teutonic Knights over the splendid shrine of St. Elizabeth and was thoroughly restored in 1850–1867. The university occupies new Gothic buildings of 1879; in 1899–1900 had 93 professors and teachers and 1,222 students in theology, jurisprudence, medicine, and philosophy. It was founded in 1527 in the Reformed interest by Philip the Magnanimous, Landgrave of Hesse. Pop. (1900) 17,587.

Marcanda. See SAMARCAND.

Marcantonio. See RAIMONDI.

Marcasite, a bisulphide of iron. The term includes several varieties of iron pyrites, which have been named after the form they present: viz., cellular pyrites, cockscomb pyrites, hepatic pyrites, or leberkies, etc. It is used in the manufacture of sulphur, sulphuric acid, and sulphate of iron; but not to so great an extent as the ordinary sulphide.

Marceau, François Séverin Desgraviers (mär-sō'), a French general; born in Chartres, France, March 1, 1769. On the outbreak of the Revolution he was appointed inspector of the national guard in his native town, and in 1792 helped to defend Verdun with a body of volunteers till its surrender. Sent in the following year to join the republican army in La Vendée, he was, for his services in the engagements before Saumur and Le Mans, promoted to the rank of General of Division. Then, proceeding to the N. E. frontier, he commanded the right wing at Fleurus, and after the allies retreated occupied Coblenz. During the campaign of 1796 he was given command of the first division of Jourdan's army, and sat down to invest Mainz, Mannheim, and Coblenz. But while covering the retreat of the French at Altenkirchen he was shot, Sept. 19, and died four days later.

Marcellinus (-sel-lī'nus), a Pope and Saint, succeeded Caius in 296. He signalized himself by his courage in a severe persecution. The Donatists charged him with having sacrificed to idols; from which accusation he was vindicated by Augustine. He died in 304.

Marcello, Benedetto (mär-chel'lō), an Italian composer; born in Venice, Italy, Aug. 1, 1686; was a judge of the republic, and a member of the Council of Forty; and afterward held important administrative offices at Pola and Brescia, where he died July 24, 1739. He is remembered as the composer of music for Giustiniani's version of the Psalms (8 vols. 1724–1727), of numerous concertos, canzonis, cantatas, a pastoral, an oratorio, and other pieces, distinguished for their simple yet elevated style.

Marcellus (-sel'lus), **I.,** Pope, succeeded Marcellinus in 304. The Emperor Manentius banished him from Rome for excommunicating an apostate. He died in 310.

Marcellus II., succeeded Julius III. in 1555, but died a few weeks after his election.

Marcellus, M. Claudius, a Roman general and member of one of the most eminent plebeian families. In his first consulship (222 B. C.) he defeated the Insubrian Gauls and slew with his own hand their king, Britomartus or Viridomarus, whose spoils he dedicated as *spolia opima* to Jupiter — the third and last occasion in Roman history. In the second Punic war Marcellus took command after the disaster of Cannæ, and put a check on the victorious Hannibal at Nola, in Campania (216 B. C.). Again consul in 214 B. C., he gave a fresh impulse to the war in Sicily, but all his efforts to take Syracuse were rendered unavailing by the skill of Archimedes, and he was compelled to regularly blockade the city. Famine, pestilence, and ultimately treachery on the part of the Spanish auxiliaries of the Syracusans opened its gates (212 B. C.), after which the remainder of Sicily was soon brought under the dominion of the Romans. In his fifth consulship, 208 B. C., he fell in a skirmish against Hannibal.

Marcet, Jane, an English writer; born in Geneva, Switzerland, in 1769; married Alexander Mercet, a Genevan, who settled in London as a physician in the last years of the 18th century, and later in life devoted himself to experimental chemistry. Besides "Conversations on Chemistry," which reached the 16th edition in 1853, she wrote "Conversations on Political Economy" (1817; 7th ed. 1839), "Conversations on Natural Philosophy" (1819; 13th ed. 1858), and similar books on botany (9th ed. 1840), vegetable physiology, etc., besides numerous charming "Stories for very Little Children," in the estimation of many her best work. She died in London, England, June 28, 1858.

March, a frontier or boundary of a territory; especially applied to the boundaries or confines of political divisions, or to the country lying near and about such; as, for example, the frontiers between England and Scotland, and England and Wales. Geneva is situated in the Marches of France, Savoy and Switzerland. Riding of the marches, a practice still observed in some parts of Scotland, for the purpose of preserving in the memory of the inhabitants the boundaries of a parish, town, etc., for which purpose the magistrates of the burgh and chief men ride in procession along the boundaries of the property belonging to the burgh, and perform certain ceremonies.

March, a musical composition, chiefly for military bands, with wind instruments, intended to accompany the marching of troops. There are slow and quick marches, and marches peculiar to different countries. Marches are also introduced into oratorios, the best-known examples being the "Dead March" from the oratorio of "Saul" and Mendelssohn's "Wedding March."

March, the first month of the Roman year, and the third according to our present calendar, consisting of 31 days. It was considered as the first month of the year in England till the change of style in 1752, and the legal year was reckoned from March 25. Its last three days (old style) were once popularly supposed to have been "borrowed" by March from April, and are proverbially stormy.

March (märh), the principal river of Moravia, rising on the boundary between that country and Prussian Silesia, and flowing 214 miles S. to the Danube, which it joins 6 miles above Presburg. It receives on the right the Thaya. In its lower course it forms the boundary between Austria and Hungary. It is navigable for small boats from Göding, 50 miles from its mouth.

March, Earl of. See MORTIMER, ROGER.

March, Ausias or **Augustin** (märch), a Spanish poet; born in 1390 (?). He is the best of all the Catalan poets. Of his works now extant are 93 "Love Songs"; 8 "Laments"; 14 "Moral Poems"; a fine "Song of Devotion"; etc. He has been called "the Petrarch of Catalonia." He died about 1460.

Marchand, Jean (mär-sho*ng'*), a French military officer; born in Thoissey, Aine, France, Nov. 22, 1863. After a brief experience as clerk to a notary he entered the army in 1883. He spent some time in a military school, and was then sent to Africa, where later he so much distinguished himself. His first service was in Senegambia, and as early as 1890 he was dispatched on exploring expeditions to the sources of the Niger and other districts, where he did useful work. When France obtained control of French Kongo she sent Colonel Liotard to the Upper Ubangi, region to look after French interests in the N. E.; and Captain Marchand, as he then was, was afterward appointed one of his subordinates, with special instructions apparently to push on toward the Nile. These instructions he carried out with the utmost gallantry and success, and in 1898 arrived at his goal, Fashoda, after having established French posts along his route through the Bahr-el-Ghazal province. He held Fashoda till, at the demand of England, his government ordered him to withdraw from it. In 1899 he received a tremendous popular ovation in Paris. He was made major in 1898.

Marchand, Félix Gabriel, a Canadian statesman; born in St. John's, P. Q., Jan. 9, 1832. He was for years prominent in public life, and leader of the Liberals in

the Provincial Assembly of Quebec. Among his publications are the prose comedies "Fatenville" and "Mistakes Don't Count"; the comedies in verse "One Good Fortune Brings Another" and "The Paste Diamond"; also a comic opera, "The University Laureate."

Marches, The, a territory of Italy, comprising a region lying between the Apennines and the Adriatic, and divided into four provinces — Urbino and Pesaro, Ancona, Macerata, and Ascoli; total area, 3,673 square miles; pop. (1900) 983,670.

Marchesi, Blanche (Baronne A. Caccarnisi); born in Paris; a teacher of singing who has trained many well-known prima donnas; she has also sung at concerts in the principal cities of Europe, and received the Diamond Jubilee commemoration from Queen Victoria.

Marchetti, Filippo (-ket'tē), an Italian composer; born in Balagnola, Italy, Feb. 26, 1831; became president of St. Cecilia Academy in Rome; chief operas: "Romeo and Juliet" (1865) and "Ruy Blas" (1869). He died Jan. 18, 1902.

Marchiali, or **Marchialy** (-kē-ä'lē), **(The Man in the Iron Mask),** a mysterious state prisoner in France, who always wore a black velvet mask which completely concealed his face. He was at first confined at Pignerol in 1679; thence removed to Exilles in 1681; to the island of St. Marguerite in 1687; and finally, Sept. 18, 1698, to the Bastille, where he died Nov. 19, 1703. He was everywhere attended by M. de St. Mars; and though the slightest attempt on his part to reveal his real name would have met with instant death, he was uniformly treated with the greatest courtesy and indulgence. Various attempts have been made to ascertain the identity of the Man in the Iron Mask. Some affirm that he was the Duke of Vermandois (who died in camp in 1683), a natural brother of the dauphin. Voltaire published an account of him in 1751. In 1759 it was announced that he was the Duke of Beaufort; and in 1768 St. Foix suggested that he was the Duke of Monmouth, who had been executed in England. He was also reported to be an illegitimate son of Anne of Austria, by Cardinal Mazarin, or the Duke of Buckingham. He is again said to have been an elder and also a twin brother of Louis XIV. Another theory suggested that he was the statesman Fouquet, whose death was believed to have occurred just before the mysterious prisoner arrived at Pignerol. It is now generally admitted, though without very satisfactory evidence, that the mysterious prisoner was, as announced in a letter by a Baron d'Heiss in 1770, Count Matthioli, minister of the Duke of Mantua. Having broken faith with Louis XIV., Count Matthioli was lured to the French frontier, arrested, May 2, 1679, and imprisoned at Pignerol. This opinion is sustained by Marius Topin in his book, "The Man in the Iron Mask."

Marcianus (mar-shi-ā'nus), Emperor of Rome after the death of Theodosius II., in 450. He was a Thracian of obscure origin. His reign, which lasted but six months, was marked by peaceful and energetic measures. He died in 457.

Marcion (mar'shyon), a Gnostic teacher of the 2d century; born in Sinope, Pontus. His father, according to some reports, not, however, well authenticated, was a bishop of the Church in that place. His belief in Oriental and dualistic gnosticism, incrusted with other and similar speculations, was deemed by him compatible with belief in Christianity, and he attempted to form a heterogeneous theology out of both materials. He assumed as articles of his creed the eternity of matter — the existence of a benign and holy Deity — and of a Demiurge little less than God in might, but dark and malignant, and having his appropriate sphere in an attempted dominion over matter, for he created man was the actual God of the Jewish race, and was to be finally overcome by the Messiah. Jesus, according to Marcion, had not, and could not have a real humanity, for all matter is essentially sinful. These notions are the crude effects of an earnest, mystic mind to resolve inscrutable mysteries by the creation of figments not only incomprehensible, but inconsistent and baseless. Marcion received as canonical only the writings of the Apostle Paul, though he had a Gospel which appears to have been an interpolated copy of that of Luke. To this heresy was joined an austere and vigorous asceticism by which victory over appetite was to be finally secured.

Marcionists, a branch of the Euchiles, or Massalians, and a distinct sect from the Marcionites, thus named from Marcianus Trapezita, who, in the time of Justinian I. (527–565), observed the Sabbath as a fast.

Marcomanni (-man'nī), a name meaning Men of the Marches, or Frontiers, or Borderers, and given by the Romans to various tribes on the confines of Germany. Some hordes under this name were driven out of Gaul by Julius Cæsar, 58 B. C. Marobodnus formed a league against these tribes, and concluded a treaty with Tiberius (afterward emperor), in the year 6. The Cherusci defeated the Marcomanni in 17, and a peace was mediated between them by Drusus. Domitian made war on them, and was defeated in 90. In alliance with other tribes they invaded the Roman empire in 166, when a war commenced which was not

brought to a close till 180. They ravaged Italy in 270. The last notice of the Marcomanni is in 451, when they formed a contingent of the army with which Attila invaded Gaul and Italy.

Marconi, William (-kō'nē), an Anglo-Italian electrician; born in Griffone, near Bologne, Italy, April 25, 1874. His mother was an Englishwoman. He became a student of electrical science at 14, and began experimenting in wireless telegraphy in 1895. His first English exhibition was given in 1896, and was private. After that public interest was aroused and experiments were tried with varying degrees of success. He visited the United States to induce the government to buy the right to use his system, but did not succeed, as what was regarded as a superior system had been perfected by the Signal Service. Various European navies, however, adopted it, successful communications between vessels 280 miles apart being made. In 1901 the yacht races for the America's cup were reported by the Marconi system, and at the close of the year he announced that he had received messages by wireless telegraphy from Europe at his experimental station in St. John's, N. F. See WIRELESS TELEGRAPHY.

WILLIAM MARCONI.

Marcou, Jules, an American geologist; born in Salins, France, April 20, 1824; received a collegiate education; traveled in Switzerland, where he met Jules Thurmann, with whom he was afterward associated in the geological survey of the Jura Mountains. While in this work he made the acquaintance of Louis Agassiz, who invited him to the United States, and whom he assisted on his survey of the Lake Superior region in 1848. He then studied the geology of New Jersey, Pennsylvania, the Mammoth Cave, Virginia, and the Canadian provinces. In 1853 he entered the service of the United States government; was the first geologist to cross the American continent; and on this trip drew a section map of the 35th parallel from the Mississippi river to the Pacific Coast. He was Professor of Geology at the Zurich Polytechnic School in 1855–1859; and was again in the employ of the United States in 1864–1875. His publications include "Geological Map of the United States and British Provinces of North America" (2 vols. 1853); "Geology of North America" (1858); "Geological Map of the World" (1861); "Origin of the Name America" (1875); "First Discoveries of California, and the Origin of Its Name"; "A Catalogue of Geological Maps of America" (1884); etc. He died in Cambridge, Mass., April 17, 1898.

Marcus Aurelius. See AURELIUS.

Marcy, Randolph Barnes, an American military officer; born in Greenwich, Mass., April 9, 1812; was graduated at the United States Military Academy in 1832; and was assigned to the frontier, where he served in the Black Hawk War. During the Mexican War he took part in the actions of Palo Alto and Resaca de la Palma; was promoted captain in May, 1846, and assigned to the recruiting service; made inspector-general, U. S. A., with the rank of colonel, in August, 1861; and served as chief of staff to Gen. George B. McClellan (his son-in-law) throughout the Civil War. He was appointed Brigadier-General of volunteers, Sept. 23, 1861; inspected the departments of the Northwest, Arkansas, Missouri, Mississippi, and the Gulf till 1865; was inspector-general, U. S. A., with the rank of Brigadier-General, from December, 1878, to January, 1881, when he was retired. His publications include "Exploration of the Red River in 1852" (1853); "The Prairie Traveler, a Handbook for Overland Emigrants" (1859); "Thirty Years of Army Life on the Border" (1866); and "Border Reminiscences" (1871). He died in Orange, N. J., Nov. 22, 1887.

Mardi Gras (mär'dē grä), Shrove Tuesday, the last day before Lent. In the United States the day is observed with great ceremonies, especially in New Orleans and Memphis. These include brilliant processions, masquerade balls, and other gay entertainments, which are participated in by thousands of visitors from all parts of the country.

Mardin (mär-dēn'), a town of Asiatic Turkey, strikingly situated on the S. slopes of the Mardin Hills. Pop. 12,000, of whom half are Moslem Kurds.

Mardonius (dō'ni-us), a Persian general, son of the satrap Gobryas, and cousin of Xerxes. He commanded the first Persian armament sent against Greece, 492 B. C., when a storm at Mount Athos destroyed

his fleet, and his army was beaten in Macedonia. He accompanied Xerxes in his invasion of Greece, of which he had been the chief promoter; and after the battle of Salamis, and the return of Xerxes to Asia, Mardonius was left in occupation at Athens, which he held for 10 months. He was defeated by Pausanias, and killed at the battle of Platæa, 479 B. C.

Maréchal, Pierre Sylvain (mä-rā-shäl′), a French atheist; born in Paris, France, Aug. 15, 1750; was originally a lawyer. He published "Fragments of a Moral Poem on God" (1781), modeled upon Lucretius. A parody on the Psalms (1784) cost him his place as sub-librarian of the Collège Mazarin. He wrote an "Almanac of Honest People" (1788), substituting a list of names of his own invention for the usual calendar of saints; with the astronomer Lalande a "Dictionary of Atheists" (1800); etc. He died in Montrouge, near Paris, Jan. 18, 1803.

Mareia, Lake, See MAREOTIS, LAKE.

Mare Island, an island in San Pablo Bay, Cal., 28 miles N. of San Francisco. Here are located a United States naval arsenal and dockyard. These include wet and dry docks, marine barracks, ordnance yards, a hospital, and extensive repair shops. The vessels for conveying troops and materials to the Philippines were fitted out at this station, which is popularly known as the San Francisco navy yard.

Maremma (mä-rem′mä), a marshy region of Italy, extending along the sea coast of Tuscany from the Cecina river to Orbitello; area of about 1,000 square miles. In Roman times and earlier the Maremma was a fruitful and populous plain; but the decay of agriculture fostered malaria, which now reigns supreme in great part of this district. Leopold II. of Tuscany directed especial attention (1824–1844) to the drainage and amelioration of the Maremma, and his efforts and subsequent measures have been attended with considerable success. Crops are now grown in the summer on the fertile soil of the infected area by the inhabitants of the adjoining hill country, who go down only to sow and to reap their crops. During winter the Maremma is healthier and yields good pasture.

Marek, Jan Jindric (mä′rek), a Bohemian novelist and poet; born in Liblin, Nov. 4, 1801. He became a priest in 1826. He wrote "Poems" (1823); "Lilies of the Valley" (2 vols. 1824 and 1826), novels. His works were published in 10 volumes at Prague, 1843–1847. The first two volumes contain ballads, legends, and short poems; the other eight are novels, including "The Harper," "The Bohemians in Prussia," "A Night at Kacerov," "The Quack," etc. He died in Kralovice, Nov. 3, 1853.

Marenco, Carlo (mä-ren′kō), an Italian tragic poet; born in Cassolnuovo, Piedmont, May 1, 1800. He was originally a law student. Among his best-known works are "La Pia de' Tolomei," his best production (translated into English by Williams. London, 1856); "Corso Donati"; "Arnold of Brescia"; etc. He died in Savona, Italy, Sept. 20, 1843.

Marenco, Leopoldo, Count, an Italian dramatist; born in Ceva, Nov. 8, 1831; son of Carlo. He was for a time employed in the ministry of finance (1851); and as Professor of Italian Literature at Bologna, 1860–1864, and Milan, 1864–1871. He wrote the tragedies "Piccarda Donati" (1869); "Sappho" (1880); "Rosalinda" (1884); etc.; the comedies "George Gandi" (4th ed. 1882), "A Bad Example in the Family"; etc.

Marengo (mä-ren′gō), a village of Northern Italy, in a marshy district, near the Bormida, 3 miles S. E. of Alessandria. Here on June 14, 1800, Napoleon, with 33,000 French, defeated 30,500 Austrians under Melas. It was the cavalry charge of the younger Kellermann that turned what looked like certain defeat into a decisive victory, though the French lost 7,000 in killed and wounded, the Austrians only 6,400 (besides 3,000 prisoners).

Mareotis (mä-re-ō′tis), or **Mareia** (ma-rē′yä) **Lake,** (the modern El Mariut), a salt lake or marsh in the N. of Egypt, extends S. from Alexandria, and separated from the Mediterranean, on its N. W. side, by a narrow isthmus of sand. In the 15th and 16th centuries it was a navigable lake; in 1798 it was found by the French to be a dry, sandy plain; but in 1801 the English army cut the dikes of the canal that separated the Lake of Aboukir from Mareotis, to cut off the water supply of the French, and Mareotis became once more a marsh. The like happened again in 1803, in 1807, and in 1882; on the last occasion the sea was introduced directly through a cutting 15 feet wide and half a mile long.

Maret, Hugues Bernard. See BASSANO, DUKE DE.

Maretzek, Max, an American operatic manager; born in Brunn, Austria, June 28, 1821; was graduated at the University of Vienna. He early turned his attention to music and by 1843 was a skillful orchestral conductor; came to the United States in 1848 and for a year was musical director of the Astor Place Opera House. He then entered upon his career as an impressario. On Oct. 2, 1854, in conjunction with Grisi and Mario, he produced for the first time in the United States "Semiramide"; and

in 1855, also for the first time in the United States, "Il Trovatore." In 1858 he introduced Adelina Patti to the American public; in 1872 brought out Pauline Lucca, and in 1878 produced "Sleepy Hollow," a new American opera. He died in Staten Island, N. Y., May 14, 1897.

Margaret, Queen of Scotland; born in Hungary, about 1047. From 1057 she was brought up at the court of her great-uncle, Edward the Confessor, with Lanfranc for her spiritual instructor. In 1068, with her mother and sister and her boy brother, Edgar the Atheling, she fled from Northumberland to Scotland. Young, lovely, learned, and pious, she won the heart of the rude Scotch king, Malcolm Canmore, who next year wedded her at Dunfermline. She did much to civilize the N. realm, and still more to assimilate the old Celtic Church to the rest of Christendom on such points as the due commencement of Lent, the Easter communion, the observance of Sunday, and marriage within the prohibited degrees. She built, too, a stately church at Dunfermline, and refounded Iona. She bore her husband six sons and two daughters, and died three days after him, in Edinburgh Castle, Nov. 16, 1093.

Margaret, Queen of Norway, Denmark, and Sweden, often called "the Semiramis of the North," daughter of Waldemar III., King of Denmark; born in Copenhagen, in 1353. In 1363 she was married to Haco, King of Norway, youngest son of Magnus Ericson, in whose person the governments of Sweden, Norway, and Scania had been invested many years before. The marriage of Haco with Margaret took place under circumstances of great political difficulty, and it occasioned the banishment of 24 of the most powerful of the Swedish barons, by whom Magnus and his son were afterward deposed, and Albert of Mecklenburg placed on the throne. While the country was suffering from the oppression of this foreign government, Margaret lost, in 1375, her father, Waldemar; in 1380, her husband, Haco; and in 1387, her son, Olave — events which left her queen regnant in Norway, regent in Denmark, and in a situation to receive overtures from the Swedes. With a spirit and ambition natural to her, Margaret at once furnished her adherents with troops and supplies of war, and the victory of Felkoiping, won by the high marshal of Sweden, Eric Kielson, Sept. 21, 1389, threw open the kingdom to her. The union of the three kingdoms was concluded by the treaty of Calmar, where the spiritual and temporal barons assembled for that purpose, July 20, 1397; Eric of Pomerania, the grand-nephew of Margaret, being elected her successor as the future sovereign of Sweden. She died in the port of Flensburg, on board a vessel in which she had embarked for Denmark, Oct. 28, 1412.

Margaret of Anjou (*ong*-zhö′), daughter of René, King of Sicily, and wife of Henry VI., King of England; born in Nancy, France, March 23, 1430. She was married in 1445 to the imbecile Henry VI. of England. By the marriage articles Maine was given up to her uncle Charles of Anjou, and this cession facilitated the conquest of Normandy by the French. The loss of this important province was attributed to Margaret, and the House of Commons accused Suffolk, the author of her marriage and the favorite minister of the queen, of high treason. He was banished the kingdom. In the War of the Roses, which soon began to desolate England, Margaret played a conspicuous and important part. She was for a long time the life of the Lancastrian party. She defeated the Duke of York, and placing a paper crown on his head, exposed him at the gates of the city of York. In 1461 the princess defeated Warwick at St. Alban's, and her victories were always stained with numerous executions. The son of the late Duke of York, the gallant young Edward, soon appeared at the head of the Yorkists, who now became victorious. Margaret's army was annihilated at Towton, and Edward was declared king. The queen succeeded in obtaining assistance from Louis XI. of France, but was again defeated. After concealing herself in the wildest parts of the country, where she was often compelled to suffer the greatest privations, and even endured the greatest indignities from the lawless bands with which the distracted kingdom was then infested, the queen finally took refuge in France. It was not long before Warwick became embroiled with the young king, and determined to replace Henry on the throne. Edward was in turn obliged to escape to the Continent, but having obtained assistance from the Duke of Burgundy, reappeared in England after a few months and defeated Warwick at Barnet on the very day that Margaret landed in England with her son, then 18 years of age. On hearing of the defeat and death of her champion Margaret took refuge in the monastery of Beaulieu. But her undaunted and masculine spirit again led her to the field. Having collected her partisans, the hostile forces met at Tewkesbury, and the Lancastrians were totally defeated. The queen and her son were made prisoners, and the latter, when led into the presence of the royal victor, was killed. Henry soon after died, or more probably was murdered, in the Tower, and Margaret remained in prison four years. Louis XI. ransomed her for 50,000 crowns, and she died Aug. 25, 1482.

Margaret of Navarre (nä-vär′), or **of Valois** (vä-lwä), or **of France,** daughter of

Henri II. of France; born in St. Germain-en-Laye, France, May 14, 1553. She ranked as one of the greatest beauties of her age, with talents and accomplishments corresponding to the charms of her person. She married in 1572 Henri, then Prince of Béarn, but afterward Henri IV. of France. It was at the time of the celebration of this marriage at Paris that the massacre of St. Bartholomew was perpetrated, and Margaret narrowly escaped. It was a marriage of policy, and not of affection; Margaret was gay and fond of dissipation, and on Henri's accession to the throne, he proposed to dissolve their marriage, to which she consented, on condition of receiving a suitable pension; and, having returned to Paris, lived in great splendor and dissipation till her death in Paris March 27, 1615, at the age of 63. Some very agreeable poems by her are extant, and her "Memoirs" are extremely curious.

Margaret of Valois, Queen of Navarre, and sister of Francis I., King of France; born in Angoulême April 11, 1492. She was the daughter of Charles of Orleans, Duke d'Angoulême. In 1509 she married Charles, Duke d'Alençon, two years after whose death she became the wife of Henri d'Albret, King of Navarre, by whom she had Jeanne d'Albret, mother of Henri IV. Margaret assisted her husband in improving his dominions, and she greatly encouraged the Protestants, protected from persecution refugees of that faith and was accused of being a heretic. Literature and art were cultivated at her court and scholars were made welcome. Besides other works, she wrote the "Heptameron," a collection of tales after the manner and with more than the license of Boccaccio. She died in Bigone, France Sept. 21, 1549.

Margaret Sidney. See LOTHROP, HARRIET MULFORD.

Margaric (-gar'-) **Acid,** in chemistry, $C_{17}H_{34}O_2 = C_{15}H_{31}\cdot CH_2\cdot CO\cdot OH$. Cetyl carbonic acid. The name formerly given to an acid supposed to exist in natural fats, but now only applied to an acid obtained by boiling cetylic cyanide with potassic hydrate solution. It resembles palmytic acid, forming white crystals which melt at 59.9°, and boil at 277° under a pressure of 100 mm. Very few of the salts of margaric acid have been prepared. The sodium salt, obtained by adding a boiling aqueous solution of pure sodic carbonate to a boiling alcoholic solution of margaric acid, forms a jelly-like mass. The barium and silver salts, prepared from the sodium salt, are white amorphous powders.

Margarine. See OLEOMARGARINE.

Margarita (mär-gä-rē'tä), an island in the Caribbean Sea, belonging to Venezuela; area, 380 square miles; forms the great part (the small Blanquilla, Los Hermanos, etc., make the rest) of the Nueva Esparta section of the State of Guzman Blanco. Discovered by Columbus in 1498, Margarita was long famous for its pearl fisheries. Chief export, salted fish.

Margary, Augustus Raymond, an English traveler; born May 26, 1846, in Belgaum, in the presidency of Bombay, the son of an English officer. Educated in England at Brighton College and University College, London, he qualified for a student-interpretership in China and went out in 1867. During the next six years he served at Peking, in Formosa, at Chefoo, and at Shanghai. In August, 1874, he was ordered to cross Southwest China to Burma to meet a British mission under Colonel Browne, the object of which was to open the overland route between Burma and China. Margary was to act as interpreter and guide to the mission. He successfully accomplished the perilous journey, and set out back again with Colonel Browne, but was murdered by the Chinese at a place called Manwyne, Feb. 21, 1875.

Margate, a municipal borough of England, in the Isle of Thanet, Kent. It has for many years been a favorite seaside resort.

Margay, a feline from Brazil and Guiana, where it is known as the tiger cat. It is smaller than the ocelot (*Felis pardalis*), to which it has a general resemblance, though it is not so handsome. It is capable of domestication, and is a capital ratter.

Marginal Credits, a term applied, especially in England, to business operations in which bankers lend the credit of their names, as it were, to their customers, and thus enable them to carry out important commercial transactions which otherwise could not be so conveniently undertaken.

Margrave (German, *markgraf,* count of the mark), originally a commander intrusted with the protection of a mark, or country on the frontier. The margraves acquired the rank of princes, and stood between counts and dukes in the German empire.

Margry, Pierre (mär-grē'), a French historian; born in Paris, Dec. 8, 1818; became adjunct curator of the archives of the ministry of marine and the colonies; and wrote "Democracy in France" (1849); "Navigation of the Mississippi" (1859); "French Navigation from the 14th to the 15th Century" (1867); "Conquest of the Canary Isles" (1880); etc. Died in 1894.

Maria Christina (mä-rē'ä krēs-tē'nä), a Queen-Dowager of Spain, daughter of Francis I., King of the Two Sicilies; born in Naples, April 27, 1806. She was married

to Ferdinand VII. of Spain in 1829. Ferdinand died in 1833, and by his testament his widow was appointed guardian of her children — the young Queen Isabella and the Infanta Maria Louisa, afterward Duchesse de Montpensier — and also regent, till the young queen should attain the age of 18 years. A civil war broke out, the adherents of Don Carlos seeking to place him on the throne. The event of this war, which continued till 1840, was long doubtful, and Spain was fearfully desolated by contending armies; but the queen-mother seemed indifferent to everything except the company of Don Fernando Muñoz, one of the royal bodyguard, whom she made her chamberlain, and with whom she was united, in 1833, in a morganatic marriage, which, however, was kept hidden, while her connection with him was no secret. She had 10 children by him. A conspiracy, which broke out on the night of Aug. 13, 1836, exposed Muñoz to great danger, and led the queen-mother to concede a constitution to Spain. Her practice as regent was to adopt the course agreeable to the minister of the day, and thus her government was despotic under one ministry and liberal under another. A popular commotion, caused by the law respecting the Ayuntamientos, obliged her to give to the prime minister Espartero, Oct. 10, 1840, a renunciation of the regency, and then to retire to France; but she continued to interfere from her place of retirement in the affairs of Spain. After the fall of Espartero she returned to Madrid in 1843, and in October, 1844, her marriage with Muñoz, who was now made Duke of Rianzares, was publicly solemnized. In July, 1864, a new revolution expelled her from the country, and she again took refuge in France, but returned to Spain some time after, was again expelled, and died in exile in Havre, France, Aug. 22, 1878.

Maria da Gloria (dä glō′rē-ä), Queen of Portugal, daughter of the Emperor of Brazil, Dom Pedro I., by his first consort, the Archduchess Leopoldine of Austria; born in Rio de Janeiro, April 4, 1819. On the death of her grandfather, John VI., she was designated successor to the crown of Portugal. When Dom Miguel had accepted this arrangement, and received the regency, the young queen left Brazil, in 1828, to sail for Europe. Miguel had, meanwhile (June 30, 1828), declared himself absolute King of Portugal, and forbade the queen to land. On April 9, 1836, she was married to Duke Ferdinand, son of Ferdinand of Saxe-Coburg, who, on the birth of a crown-prince, was named king. She never secured the affections of her people, and her troubled career was an unremitting scene of paltry intrigues at court, and of discontent rising into rebellion throughout the country. She died in Lisbon, Nov. 15, 1853.

Maria del Occidente. See Brooks, Maria Gowan.

Maria Louisa, Empress of the French, second wife of Napoleon I.; born in Vienna, Austria, Dec. 12, 1791. She was the eldest daughter of Francis I., Emperor of Austria, and of his second wife, Maria Theresa of Naples. In 1810 she was married to the emperor, then in the zenith of his power; in 1811 she presented her husband with a son — afterward called King of Rome — to the great joy of the French nation; and, in 1813, on his departure to the army, she was nominated regent. In 1814 she refused coldly to accompany Napoleon to Elba, on the plea of ill-health; and having obtained, by treaty with the allied powers, the duchies of Parma and Placentia, etc., she repaired thither with her chamberlain, Count Neipperg, for whom she had conceived an attachment, and whom she subsequently married. She died in Parma, Italy, Dec. 17, 1847.

Mariamne (-am′nē), an unfortunate Jewish princess, granddaughter of Aristobulus and of Hyrcanus the high-priest, and wife of Herod the Great. Her history is related by Josephus in his "Antiquities," commencing at Book XV., from which it appears that Herod was excessively fond of her. She was condemned to death by the machinations of Salome, her husband's sister, on a false charge of adultery, 28 B. C. She met her fate with an air of grandeur and intrepidity worthy of her noble ancestry, and was bitterly lamented by the king after her decease. Another Mariamne, wife of Herod, was the daughter of Simon, the high-priest, and mother of Herod-Philip, who married Herodias.

Mariana, Juan (mä-rē-ä′nä), a Spanish historian; born in Talavera, Spain, in 1536. He entered the order of the Jesuits, and afterward taught in the Jesuit colleges at Rome (where Bellarmine was one of his scholars), in Sicily, and finally in Paris. After seven years of labor in Paris he was driven by ill health to Toledo, and there he lived in unbroken literary labors till his death. His "Spanish History" first appeared in 20 books in 1592, and was supplemented by 10 additional books, carrying the narrative down to the accession of Charles V. in 1605. Mariana himself published a Spanish translation (1601–1609), which still remains one of the classics of the language. His "Theological and Historical Treatises" (1609) roused the suspicion of the Inquisition. But the most celebrated of the works of Mariana is his well-known treatise "The King and Kingly Institutions" (1599), which raises the question whether it be lawful to overthrow

a tyrant, and answers it in the affirmative, even where the tyrant is not a usurper but a lawful king. This tyrannicide doctrine drew much odium on the order of Jesuits, especially after the murder of Henry IV. of France by Ravaillac in 1610; but it is only just to observe that while on the one hand precisely the same doctrines were taught in almost the same words by several of the Protestant contemporaries of Mariana, on the other, Mariana's book itself was formally condemned by the general Acquaviva, and the doctrine forbidden to be taught by members of the order. He died in Madrid, Feb. 17, 1623.

Marianne Islands. See GUAM: LADRONES.

Mariano, Raffaele (mä-rē-ä′nō), an Italian philosopher; born in Capua, Italy, Sept. 5, 1840. He studied law in Naples, but later turned to philosophy, becoming a pupil of Vera and rising to distinction as a thinker of the Hegelian school. In 1885 he accepted the chair of ecclesiastical history in the University of Naples. He wrote: "Lassalle and His Heraclitus" (1865); "The Italian Revival" (1866); "Contemporary Philosophy in Italy" (1868); "The Religious Problem in Italy" (1872); "Strauss and Vera" (1874); "Liberty of Conscience" (1875); "The Individual and the State" (1876); "Christianity, Catholicism and Citizenship" (1879); "Giordano Bruno" (1882); "Critical Studies in the Philosophy of Religion" (1887); "Buddhism and Christianity" (1892); "Is Catholic Italy Christian or Pagan?" (1892); "The Gospel of John" (1892); "The Synoptic Gospels" (1896); "The Present Papacy and Socialism"; etc.

Maria Theresa, Queen of Hungary and Bohemia, Archduchess of Austria, and Empress of Germany, daughter of the Emperor Charles VI.; born in Vienna, May 13, 1717. In 1736 she married Duke Francis Stephen of Lorraine, who in 1737 became Grand-Duke of Tuscany. The day after her father's death, in 1740, she ascended the throne of Hungary, Bohemia, and Austria, and declared her husband joint ruler. The elector, Charles Albert of Bavaria, supported by France, laid claim to the Austrian hereditary territories, and the Elector of Cologne and the Elector-Palatine would likewise not acknowledge her succession. Her States were invaded at the same time by Frederick the Great and by the Elector of Bavaria; and being compelled to fly to Presburg, she convoked the Diet, and there threw herself on the sympathy of her Hungarian subjects. In the meantime the allies quarreled among themselves, and the King of Prussia made a separate peace with the empress. The general opinion that the balance of power in Europe depended on the continuance of the house of Austria, induced England to arm for Maria Theresa; Holland paid her subsidies; and after the death of Cardinal Fleury, in 1743, the cause of Austria triumphed throughout Europe. Reverses, however, followed; and all the belligerents becoming desirous of peace, the treaty of Aix-la-Chapelle was concluded in 1748, by which Maria Theresa was secured in her rights. In 1756 this claim was disturbed by the King of Prussia, who, having discovered that secret plans were being formed for a combined attack on him, resolved to be beforehand with his foes, and marched into Saxony and Bohemia and began the Seven Years' War. In 1765 the Emperor Francis died, which caused the empress deep and lasting distress. In 1772 she joined the King of Prussia and the Empress Catharine in the dismemberment of Poland. By the death of Maximilian Joseph, Elector of Bavaria, in 1777, war was rekindled between Austria and Prussia, but was terminated in 1779 by the peace of Teschen, which added to the former State a small portion of Bavaria. Maria Theresa founded and improved schools, universities, and academies, and granted prizes to the students. She rewarded, also, those who made any important improvements in the arts, and turned her attention particularly to agriculture. She also reformed many abuses in the Church; suppressed the Inquisition at Milan, abolished the order of Jesuits, and prohibited the admission of individuals of both sexes as members of convents before the age of 25 years. She also abolished the rack in all her States. She died in Vienna, Nov. 29, 1780.

Mariazell (mä-rē-ä-tsel′), the most famous place of pilgrimage in Austria, in the extreme N. of Styria, 60 miles from Vienna. It is visited by thousands of pilgrims annually, besides numerous visitors attracted by its romantic scenery. The image of the Virgin (brought here in 1157), the object of the pilgrimages, is enshrined in a magnificent church, built in 1644 on the site of an older one.

Marica. See FAUNA.

Marie, Alexandre Thomas (mä-rē′), a French advocate; born in Auxerre-sur-Yonne, France, Feb. 15, 1797. After the revolution of 1848, Marie, who was a member of the Chamber of Deputies since 1842, was the first to declare, in the sitting of Feb. 24, the illegality of the proposed regency, and to suggest a provisional government, in which he took part, becoming Minister of Public Works and organizing the national workshops. After the insurrection of June he was chosen president of the National Assembly. He died in Paris, April 27, 1870.

Marie Antoinette (*ong*-twä-net′), Queen of France; born in Vienna, Austria, Nov. 2, 1755. She was the daughter of the Emperor Francis I. and the celebrated Maria Theresa. She left Vienna for Versailles, in 1770, when only 15 years of age, to give her hand to the young Duke of Berri, afterward Louis XVI. of France. When her husband ascended the throne in 1774, she gained the affections of the people by repeated acts of generosity. It was, however, soon observed that her natural liveliness and freedom of manner brought on her the criticism of her enemies about the court. An extraordinary occurrence added fresh force to calumny and tarnished the fair name of the queen. This was the affair of the "Diamond Necklace," in which the Cardinal Louis de Rohan, the great quack Cagliostro, and a certain Countess de Lamotte were the chief actors. It was certain that she had great influence over the king, and that she constantly opposed such measures of reform as had been proposed. Her unpopularity increased, and the general indignation was raised to the highest pitch by the enthusiastic reception given her at the guards' ball, on Oct. 1, 1789, where the white Bourbon cockades were worn, and the national cockade was trampled under foot. The insurrection of women and the attack on Versailles followed in a few days. To put a stop to the scene of outrage, the king and queen showed themselves, with both their children, in the balcony. This spectacle made a momentary impression; but soon the cry resounded, "No children! the queen — the queen alone!" She instantly put her son and daughter into the arms of the king, and returned to the balcony alone. This unexpected courage pacified the mob; and their threats were followed by shouts of "*Vive la Reine.*" It was the queen who advised the flight of the royal family from Paris in June, 1791, which ended in their capture and return.

At length came the fatal 10th of August, 1792. Prepared for the worst, the queen exerted all her power to induce the king to meet death sword in hand; but he thought resistance was in vain, and was led with his consort before the Legislative Assembly, where she heard his deposition announced, and then accompanied him to the prison of the Temple. There, deprived of every semblance of royalty, and bereft of every comfort, she displayed the magnanimity of a heroine and the patient endurance of a martyr. In January, 1793, she had a parting interview with her husband, on whom sentence of death had been passed by the Convention. In August following she was removed to the Conciergerie, and in October she was brought before the revolutionary tribunal. She was charged with having dissipated the finances, exhausted the public treasury, corresponded with foreign enemies of France, and favored its domestic foes. She replied with firmness and decision and a just indignation; and she heard her sentence pronounced with perfect calmness. On the following morning, when she ascended the cart which conveyed her to the scaffold, it was observed that grief had distorted her features, and in the damp, unwholesome prison she had almost lost one of her eyes. Troops lined the road, a priest accompanied her, but she spoke little. There were shouts, but she was unmoved. A glimpse of the Tuileries, however, keenly touched her. Her head was quickly severed by the guillotine, and shown to the people, who redoubled their diabolical shouts of exultation. Thus perished Marie Antoinette in the 38th year of her age, Oct. 16, 1793.

Marie de France (duh fro*ng*s), the earliest French poetess; lived probably in the latter half of the 12th century. She spent her life in England. She wrote "Lais" (Lays), a collection of narrative poems, descriptive especially of love, and belonging to the finest specimens of the Old French ballad; "Ysopet," fables; and a poem on the purgatory of St. Patrick.

Marie de Médicis (duh mā-di-sē′), Queen of France; born in Florence, Italy, April 26, 1573. She was daughter of Francis I., Grand-Duke of Tuscany, and married Henry IV. of France in 1600. The union was rendered unhappy in consequence of the jealous, obstinate, and violent character of the queen; but though she was constantly quarreling with Henry the most reliable historians acquit her of the odious charge with which some writers have sought to brand her — that of being privy to the king's murder. On the death of Henry IV., in 1610, she was named regent; but her administration was disgraced by the countenance she afforded to unworthy favorites. She even quarreled with her son, afterward Louis XIII., who was compelled to quit the court. A reconciliation was, however, effected between them by Richelieu. That minister subsequently forced her to leave France. The remainder of her life was spent in exile. Her death took place in Cologne, where she had resided almost without the common necessaries of life, July 3, 1642.

Marie Galante (gä-lo*ngt*′), a French island in the West Indies, 17 miles S. E. of Guadeloupe; area, 58 square miles; pop. about 15,000; it is covered for the most part with wood and surrounded by coral reefs; sugar, coffee, cocoa, and cotton are exported. Discovered by Columbus in 1493. Chief town, Grandbourg, or Marigot, on the S. W. coast.

Marie Lipsius. See La Mara.

Marienbad (mä-rē'en-bäd), one of the most frequented of the Bohemian spas, 47 miles N. W. of Pilsen, at an elevation of 2,057 feet above sea-level. The springs have long been used by the people of the vicinity, but it is only since 1807–1808 that it has become a place of resort for persons from distant parts of the world. The springs are numerous, varying in temperature from 48° to 54° F. They are saline, containing sulphate of soda and various alkaline ingredients, but differing considerably in their composition and qualities. They are used both internally and in the form of baths. Great quantities of the waters of some of the springs are exported to distant places.

Marienburg (mä-rē'en-börg), a town of Prussia, on the Nogat, 30 miles S. S. E. of Danzig. It was long the seat of the Grand Masters of the Teutonic Order, who removed from Venice hither in 1309. The fortress of the knights, however, was founded here about 1274 Marienburg remained in their hands till 1457, when it was taken by the Poles, and by them it was held till 1772. The castle, in which 17 grand masters resided, a noble edifice in a style of Gothic peculiar to the vicinity of the Baltic, was thoroughly restored in 1817–1842.

Marienwerder, a town of West Prussia, 3 miles E. of the Vistula and 55 S. of Danzig; was founded in 1233 by the Teutonic Knights and has an old castle.

Marietta, a city and county-seat of Washington co., O.; on the Ohio river, at the mouth of the Muskingum river, and on the Baltimore and Ohio Southwestern, the Cleveland and Marietta, the Zanesville and Ohio, and the Toledo and Ohio Central Extension railroads; 80 miles S. E. of Zanesville. It was settled by Gen. Rufus Putnam and a colony from New England in 1788. It is the seat of Marietta College and is situated near a series of prehistoric mounds. It contains electric light and street railroad plants, waterworks, a high school, National and State banks, and daily and weekly newspapers. It has an extensive river commerce and manufactories of flour, cars, tanned leather, carriages, boats, furniture, refined petroleum, etc., and an assessed property valuation of over $5,000,000. Pop. (1900) 13,346; (1910) 12,923.

Marietta College, a coeducational nonsectarian institution in Marietta, O.; founded in 1835; has grounds and buildings valued at over $880,000; endowment, $275,000; volumes in the library, 60,000; scientific apparatus, etc., $10,000; ordinary income, about $27,000; average number of faculty, 30; average students, including summer schools, 775; graduates, over 960.

Mariette, Auguste Edouard (märyet'), a French Egyptologist; born in Boulogne, France, Feb. 11, 1821. He was the principal promoter of the Egyptian museum at Boulak (afterward at Gizeh), the French School of Egyptology, and the Egyptian Institute; and was inspector-general and guardian of the Egyptian national monuments. He wrote: "Karnak" (1875); "Denderah" (4 vols. 1869–1880); "Monuments of Upper Egypt" (Boston, 1890); etc. He died in Cairo, Egypt, Jan. 18, 1881.

Marignano. See Melegnano.

Marigold, a name of several composite plants. The common marigold (*Calendula officinalis*) is a native of France and of the more S. parts of Europe. It is an annual, from one to two feet high, with large deep-yellow flowers. It is as prolific as any weed, and was formerly used in broths and soups, partly to give color, and partly as an aromatic seasoning. It had also many medicinal virtues assigned to it. A number of species of this genus are indigenous to the Cape of Good Hope. The so-called African marigold and French marigold, common in flower borders, are both Mexican species, and have brilliant flowers. They belong to the genus *Tagetes.* The corn marigold is *Chrysanthemum segetum;* the fig marigold is a *Mesembryanthemum;* the marsh marigold is *Caltha palustris.*

Marine Insurance. See Insurance, Marine.

Marines, troops serving on a war-vessel or at shore stations. They maintain the guards, man guns, form part of the armed crews of the various boats when called away for service, and form a permanent force for landing with the seamen if necessary. In all these matters they are commanded by their own officers. The marines of the European continental nations are not designed for service permanently on board ship; the American navy is the only one besides that of England in which the marine forms a necessary and definite fraction of a ship's company. United States marines distinguished themselves greatly in the operations in Cuban waters in 1898 and in those which led to the rescue of the foreign legations in Peking in 1900. Tell that to the marines: An expression signifying utter disbelief in a statement made or story told; it arose from the fact that marines, being ignorant of seamanship, were made butts of by the sailors.

Marine Brake, an invention of a Hungarian engineer named Svetkovich for bringing vessels to a stop while at full speed. It consists of large curved plates of steel, in the form of a parachute, attached to the stern of a steamer, which can be lowered at will and instantaneously into the water. When not in use it is shut up and hangs

above the water. The idea is very simple. It is well known that the screw of a steamship when working ahead causes a stream of water of terrific force to flow back in the direction from which the ship has come. By lowering the plate of steel into this stream the power is obtained necessary to check the ship's way and bring it to a standstill independent of the engines.

Marinette, a city and county-seat of Marinette co., Wis.; on Green Bay, at the mouth of the Menominee river, and on the Chicago and Northwestern, the Wisconsin and Michigan, and the Chicago, Milwaukee, and St. Paul railroads; 49 miles N. by E. of Green Bay. Here are the Marinette and Menominee Hospitals, public library, electric light and street railroad plants, waterworks, National banks, more than 20 churches, and daily and weekly newspapers. It has iron works, numerous lumber and paper mills, and an assessed property valuation of nearly $4,000,000. Pop. (1890) 11,523; (1900) 15,286; (1910) 14,610.

Marini, Giambattista (mä-rē′nē), an Italian poet; born in Naples, Italy, Oct. 18, 1569. Abandoning jurisprudence for poetry

GIAMBATTISTA MARINI.

against his father's will, he was befriended by various noble patrons and was carried by Cardinal Pietro Aldobrandini to Turin, where a poem procured him the office of ducal secretary. At Paris he enjoyed the patronage of Catharine of Valois, and after her death of Marie de' Medici. Here he wrote his best work, the "Adonis" (1622), and after its publication revisited Italy. His imitators form the so-called Marinist school, of which the essential features are florid hyperbole and false overstrained imagery. He died in Naples, March 25, 1625.

Marino (mä-rē′nō), a town on the Alban Hills, 12 miles S. E. of Rome; has a castle belonging to the Colonnas, who took it from their rivals, the Orsinis, in 1424, and a cathedral and churches with pictures by Guido, Domenichino, and Guercino. Pop. about 6,000.

Mario, Giuseppe (mä′rē-ō), an Italian tenor; born in Cagliari, Sardinia. A youthful escapade led to his forsaking Italy for Paris, where he quickly won his way into the most exclusive circles both by the charm of his manners and his exquisite voice, and was appointed first tenor of the opera, changing his name at the same time from De Candia to Mario. After two years' study at the Conservatoire Mario made his début, Dec. 2, 1838, as Robert in "Robert the Devil," and achieved the first of a long series of operatic triumphs in Paris, London, St. Petersburg, and the United States. His répertoire embraced all the great works of Rossini, Bellini, Donizetti, and Verdi. By the famous singer Giulia Grisi he was the father of six daughters. In private he was esteemed for his large-handed liberality and for his noble assistance to struggling artists. In his later years after his retirement from the stage he lost his fortune through disastrous speculations. He died in Rome, Dec. 11, 1883.

Mariolatry (-ol′-), a term used by Protestants to express what they consider undue honor paid to the Virgin Mary by Christians of the Greek and Roman communions, and by a certain section of Anglicans. It is considered that such devotion began in the 4th century and received a fresh impulse in the 10th.

Marion, a city and county-seat of Grant co., Ind.; on the Mississinewa river and on the Cleveland, Cincinnati, Chicago, and St. Louis, the Pittsburg, Cincinnati, Chicago, and St. Louis, and the Toledo, St. Louis, and Kansas City railroads; 68 miles N. E. of Indianapolis. There are a normal college, a National Home for Disabled Veteran Soldiers, gold-cure hospitals, a public library, waterworks, National banks, street railroad and electric light plants, and several daily and weekly newspapers. It has rolling and malleable iron mills, manufactories of glass in many varieties, etc., and an assessed property valuation of $6,500,000. Pop. (1900) 17,337; (1910) 19,359.

Marion, a city and county-seat of Marion co., O.; on the Cleveland, Cincinnati, Chicago, and St. Louis, the Columbus, Hocking Valley, and Toledo, the Erie, and the Columbus, Sandusky, and Hocking railroads; 45 miles N. of Columbus. It contains a public library, Sawyer Sanitarium, St. Mary's School, waterworks, electric light and street railroad plants, normal school, business college, and daily and weekly papers. It has manufactories of carriages, steam engines, dredges, mattresses, etc., and an assessed property valuation of

nearly $5,000,000. Pop. (1890) 8,327; (1900) 11,862; (1910) 18,232.

Marion, Francis, an American military officer; born near Georgetown, S. C., in 1732. His education was very limited, and he was brought up as a farmer. At the outbreak of the Revolutionary War, in 1775, he was elected to Congress, but shortly afterward obtained the command of a company in the regiment of Col. William Moultrie, taking a conspicuous part in the capture of Fort Johnson and in the defense of the forts at Dorchester and Sullivan's Island. In 1777 he was dispatched with 600 men to the defense of Georgia, where he served till that State was overrun by the British. During the time that elapsed after the ill-advised attack of the American forces on Savannah, and the subsequent capture of Charleston, S. C., by the British, Marion, now an invalid, owing to the accidental breaking of a leg, was conveyed from place to place to avoid capture. But when he grew able for service, he gathered a band of young patriots about him, and formed that brigade which afterward became famous for its exploits. He disbanded his brigade in 1782, and taking leave of his followers, by whom he was beloved, returned in almost a state of poverty to his original vocation of a farmer. He died in Pond Bluff, S. C., Feb. 27, 1795.

Mariotte, Edme (mä-ryot'), a French physicist; born in Burgundy, France, about 1620. He was prior of St. Martin-sous-Beaune, one of the earliest members of the Academy of Sciences at Paris, and wrote original papers on percussion, the nature of air and its pressure, the movements of fluid bodies and of pendulums, on colors, etc. He died in Paris, May 12, 1684.

Maris, Jakob (mä'ris), a Dutch painter; born in The Hague, Aug. 25, 1837. He studied in France, and was one of the greatest modern Dutch painters of landscape and genre. He died in Carlsbad, Aug. 8, 1899. Less famous was his brother MATTHIJS (born 1835; settled in London), a genre painter; and a younger brother WILLEM was a landscapist.

Marists, a modern French Catholic Congregation. The Marist Fathers date from 1815; the Marist Brothers from 1817; and the Marist Sisters from 1834.

Maritime Alps. See ALPES MARITIMES.

Maritime Province, a part of Eastern Siberia, extending along the Pacific from Korea to the Arctic Ocean, and including Kamchatka and Saghalien. It has a length of 2,300 miles, and the enormous area of 730,000 square miles (nearly four times the size of Germany).

Maritza (mä-rēt'sä) (ancient Hebrus), a river of European Turkey, rising in the Balkans, and flowing E. by S. past Philippopolis to Adrianople, where it bends and flows S. by W. to the Gulf of Enos in the Ægean; length 270 miles; it is navigable for small boats to Adrianople.

Maritzburg. See PIETERMARITZBURG.

Mariupol (mä-rē-ö'pol), the seaport for the S. Russian coalfield, on the Sea of Azov, 65 miles W. of Taganrog; it was founded in 1779 by Greek emigrants from the Crimea, and exports coal, wheat, linseed, etc. Pop. (1897) 21,772.

Marius, Caius (mā'ri-us), a Roman soldier; born near Arpinum, Italy, about 155 B. C. Having entered the army, he became known to Scipio Africanus, and acquired so much repute that he was elected tribune 119 or 120 B. C., prætor 116, and governor of Spain, 115. In 109 he joined Metellus as one of his lieutenants in the Jugurthine War, and two years afterward supplanted him in the command of the army. He brought the war to a close in 106, when Jugurtha, King of Numidia, was treacherously delivered into his hands by his ally, Bocchus. Marius remained in Africa a year longer, and was then recalled to take the field against the Cimbri and Teutones, at that time menacing the Roman empire. These barbarians numbered 300,000 men in arms, and had defeated the consul Manilius, and the proconsul Cæpio, at a cost to the Romans of 80,000 soldiers and 40,000 camp-followers. Marius had been appointed consul in 107, when the conduct of the Jugurthine War was intrusted to him, and in sight of this new danger was not only re elected, but continued in the consulate four successive years, though contrary to law, 104–100 B. C. In 102 he defeated the combined forces of the Ambrones and Teutones, near Aix; and in 101, having joined his forces with those of Catulus, he obtained an equally decisive victory over the Cimbri, in the neighborhood of Vercellæ. He was now hailed "The Third Founder of Rome" and rewarded with a fifth consulate — followed by a sixth, which, it is said, was gained by corrupt practices. Marius was the avowed chief of the plebeians, and Sylla became chief of the patricians. The latter, flushed with his recent success against the army of Mithridates, refused to yield the command to Marius, but marched against his party in the capital and disputed the city street by street. Marius was defeated, and finally lodged in prison, where a Cimbrian soldier was sent to behead him, but let the sword fall from his hand on meeting the stern glance of the captive, who demanded of him "how he dared to kill Caius Marius!" The magistrates of Minturnæ, where this occurred, impressed by the strange circumstance, favored the flight of Marius, and he sought refuge in Africa, from whence, in 87 B. C., he was recalled by Cinna, at that time consul, to take arms

against his old adversary. The combined forces of Marius, Cinna, Sertorius, and Carbo soon entered Rome, and the bloody proscriptions which have consigned the name of Marius to infamy now took place, exceeding all that was previously recorded in Roman history. Caius Marius now served as consul for the seventh time, with his new ally; and the same year, 86 B. C., on hearing that Sylla was approaching, he endeavored to drown care in wine, and is supposed to have killed himself with excess.

Marivaux, Pierre Carlet de Chamblain de (mä-rē-vō′), a French dramatist; born in Paris, France, Feb. 4, 1688. After writing three or four novels and a series of articles of the "Spectator" type from 1720 onward he produced a large number of plays, the best being the "Surprise of Love" (1722), "The Game of Love and Chance" (1730), and "The False Confidences" (1737). They were characterized by a certain skillfully embroidered phrasing which gave rise to the term *marivaudage*, but they have also no little charm of feeling as well as of intellectual finesse. Two uncompleted novels, "Marianne" and "The Newly Rich Peasant," contain much excellent work. He was made an academician in 1736. He died in Paris, Feb. 12, 1763.

Marjoram, the genus *Origanum*. Common marjoram is *Origanum vulgare*. It has broadly-ovate, obtuse entire, or toothed leaves, and roundish panicled heads of purple, odoriferous flowers. It is found in Europe, the N. of Africa, and Asia. The dried leaves are used instead of tea and in fomentations; the essential oil is caustic and is used by farriers; a little cotton-wool moistened with it and placed in the cavity of an aching tooth will often give relief. Country people use it to dye woolen cloth purple, and linen reddish-brown. Goats and sheep eat it, horses do so to a less extent, but cattle will not feed on it.

Mark, a term formerly used in England for a money of account, and in some other countries for a coin. The English mark was two-thirds of £1 sterling, or 13s. 4d.; and the Scotch mark, or merk, was two-thirds of £1 Scots, or 13 1-3d. sterling. In the coinage of the German empire the mark is a coin of nearly the same value as the English shilling. A mark banco used to be a money of account in Hamburg equal to 37 cents, nearly.

Mark, a Pope and Saint, succeeded Sylvester I. in 336, and died the same year. There passed under his name an epistle addressed to St. Athanasius.

Mark, the evangelist whose name is prefixed to the second Gospel. He was almost certainly the same as the "John whose surname was Mark," mentioned in Acts xii: 12, 25. The name John was Jewish; Mark (Marcus) was Roman. John Mark's mother lived at Jerusalem, her house being a resort of Christians (Acts xii: 12). He was nephew, cousin, or other relative of Barnabas (Col. iv: 10). He seems to have been converted by Peter (I Pet. v: 13), and also to have been the young man so nearly captured on the evening of our Lord's betrayal (Mark xiv: 51, 52). On the first missionary journey of Paul and Barnabas he went as their minister, but, while they were at Perga, left them and returned to Jerusalem (Acts xii: 25; xiii: 13). Paul considering him fickle would not accept him as an attendant; while Barnabas, his relative, believed him thoroughly trustworthy. In consequence of this difference of opinion, Paul and Barnabas separated, Paul going in one direction on a mission tour, and Barnabas, accompanied by Mark, on another. Ultimately Mark gained anew the good opinion of Paul, and attended on him during his final imprisonment (Col. iv: 10; Phil. 24). We read of him as being with Peter "at Babylon" (I Pet. v: 13): Afterward Paul desired his return to Rome (II Tim. iv: 11). Tradition is scanty and contradictory as to his subsequent career.

The Gospel according to St. Mark: The second of the Gospels, almost universally attributed to the John Mark of this article. Papias, Irenæus, Clement of Alexandria, Tertullian, Origen, Eusebius, and other Christian fathers, allege that a connection existed between Peter and Mark, the latter probably deriving from the former the chief materials for his work. This view is probable when it is observed that more prominence is given to censures upon Peter than on commendatory statements regarding him (see Mark. viii: 33, and Matt. xvi: 17–20). The writer was evidently a Jew, or at least familiar with Judea; but his Gospel was specially designed for the Gentiles. Except in recording the discourses of Jesus, he nowhere shows that any incident narrated fulfilled Old Testament prophecy, and the term "law," in the sense of the Mosaic law, nowhere occurs. Statements likely to give offense to the Gentiles are also omitted (see Matt. x: 5, 6, and Mark vi: 7–11). His Gospel seems to have been written at Rome, though there are a few suffrages in favor of Alexandria. If addressed especially to any Gentile nationality, it was to the Romans. While there are Aramæisms, in the Greek there are Latin expressions too, as *kensos* = Latin *census*, and *kenturion* = Latin *centurio*. Mark records the miracles more than the discourses of Jesus. His style is more precise and graphic than that of the other evangelists. The language approaches more closely to that of Matthew than to that of Luke. The general opinion of the Christian Church for many centuries was, as it still is, that it was the second Gospel

in point of time; though the opinion is gaining strength that it was the first instead of the second. Till the question be settled it is useless to attempt to fix its date. The last 12 verses of Mark (xvi: 9–20) are of doubtful authenticity. External testimony is perhaps slightly in their favor, but internal evidence is strongly against them; hence, in the Revised Version, they are separated by an interval from the rest of the book. Mark writes as an independent witness, and not as a compiler.

Markham, Sir Clements Robert, an English geographer; born in Stillingfleet, England, July 20, 1830. He accompanied an Arctic expedition in 1851; visited Peru in 1852–1854; visited Peru and India as commissioner to introduce cinchona plants into the latter country in 1860; was secretary of the Royal Geographical Society in 1863–1868; accompanied the Abyssinian expedition in 1867–1868. He wrote: "Travels in Peru and India" (1862); "History of the Abyssinian Expedition" (1869); "History of Peru" (1892); etc. He edited a number of reprints of works on South America for the Hakluyt Society, and, for several years, the "Geographical Magazine." He was president of the Royal Geographical Society and of the International Geographical Congress (1894–1899), and was created a K. C. B. in 1896.

Markham, Edwin, an American poet; born in Oregon City, Or., April 23, 1852; settled in California in 1857, and worked there during boyhood principally as a blacksmith. He worked his way through the San José Normal School and Santa Rosa College; became a writer of verse and stories for papers and magazines, and principal and superintendent of California schools. He was the author of "The Man With the Hoe, and Other Poems" (1899); "The Man with the Hoe, with Notes by the Author" (1900); "The End of the Century" (poem 1899); "Lincoln, the Great Commoner" (1900); "The Mighty Hundred Years"; "Lincoln and Other Poems" (1901); etc. His "Man with the Hoe" was extensively republished and gave him wide fame.

Marks, Henry Stacey, an English artist; born in London, England, Sept. 13, 1829. He studied drawing at Leigh's Academy, and gained admission as a student to the Royal Academy in 1851. He was elected an associate of the Royal Academy in 1871; an associate of the Water-Color Society in the same year; and a Royal Academician Dec. 19, 1878. His principal pictures are "Toothache in the Middle Ages," 1856; "Dogberry's Charge to the Watch," 1859; "The Franciscan Sculptor," 1861; "Experimental Gunnery in the Middle Ages," 1868; "St. Francis Preaching to the Birds," 1870; "Bookworm," 1871; "Ornithologist" and "What is It?" 1873; "Capital and Labor," 1874; "Jolly Post-Boys," 1875; "The Apothecary," 1876; "The Spider and the Fly," 1877; "Convocation," 1878; "Old Friends" and "Science in Measurement," 1879; "Author and Critics," 1881; "Jack Cade and Lord Say," 1882; "The Old Clock," "The Gentle Craft," and "The Professor," 1883; also several decorative works, both for private houses and public buildings. He died in London, Jan. 9, 1898.

Markoe, Peter, pen name A NATIVE OF ALGIERS, an American poet; born in Santa Cruz, W. I., about 1753. He published a tragedy, "The Patriot Chief" (1783); "Miscellaneous Poems" (1787); a poem called "The Times" (1788); and "Reconciliation," a comic opera (1790). He died in Philadelphia, Pa., about 1792.

Mark's Mills, a locality of Washita co., Ark.; near Camden, where, on April 23, 1864, Lieutenant-Colonel Drake, in command of a brigade of infantry, four guns, and a small number of cavalry, was attacked and defeated by a Confederate force under General Fagan. Drake was wounded, and 250 of his men killed. The Confederate loss was estimated at 600.

Mark Twain. See CLEMENS, SAMUEL LANGHORNE.

Marl, a mixture, naturally existing, of clay, and carbonate of lime. Marls are found in very different geological formations, but everywhere seem to owe their origin to deposition by water. The name is sometimes applied to friable clays, or mixtures of clay and sand, in which there is almost no trace of lime; but the presence of a notable proportion of carbonate of lime is essential to marls, properly so called. This proportion varies from 6 to 20 per cent. Marly soils are in general of great natural fertility. Marl is very advantageously used as a manure, acting both chemically and mechanically; but different kinds of marl are of very different value in this respect. The use of marl as a manure has been practised from ancient times.

Marlboro, a city in Middlesex co., Mass.; on the New York, New Haven, and Hartford, and the Fitchburg railroads; 30 miles W. of Boston. It contains a city hospital, public library, St. Ann's convent and school, high school, soldiers' monument, Grand Army of the Republic Building, waterworks, National banks, and street railroad and electric light plants; and has extensive boot and shoe factories, and electrical supply works, and an assessed property valuation of over $9,000,000. Pop. (1900) 13,609; (1910) 14,579.

Marlborough, a provincial district of New Zealand, in the N. E. corner of the South Island, 130 miles long by 30 broad;

area, 3,000,000 acres, of which 200,000 are agricultural land and 1,300,000 suitable for pastoral occupation. Among the minerals are gold, antimony, copper, and coal.

Marlborough, John Churchill, Duke of, an English soldier and statesman; born in Ashe, Devonshire, England, June 24, 1650. He was the son of Sir Winston Churchill, a devoted adherent of Charles I. After receiving a defective education he was placed, at the age of 12, as page in the household of the Duke of York. His passion for the life of a soldier was not long in showing itself. The Duchess of Cleveland is said to have conceived a passion for him, and to have presented him with $25,000. Continuing in the service of the Duke of York, Churchill married, about 1680, the beautiful and accomplished Sarah Jennings, favorite of the Princess (afterward Queen) Anne. He contributed greatly by his vigilance and skill to the suppression of the insurrection in favor of Monmouth. At the revolution Churchill entered the service of

DUKE OF MARLBOROUGH.

the Prince of Orange. He was created Earl of Marlborough and privy councillor, and assisted at the coronation of William III. In 1689 he received the command of the English forces in the Netherlands, and after a brief service in Ireland was recalled to Flanders in 1691. Suspected of a traitorous correspondence with James II., he was deprived of his command and imprisoned in the Tower; and though shortly released was not restored to the favor of the king till 1697. On the breaking out of the War of the Spanish Succession, in 1700, he received the chief command of the forces in the United Provinces, and was named ambassador to France. Marlborough was now to enter upon that career of military achievement which established his reputation as a general. As commander-in-chief of the allied forces he took several places in the Netherlands in 1702; with the Imperialists, under Prince Eugene, gained the victory of Blenheim (or Hochstädt) in 1704, for which he was made a duke and a sum voted to build the palace of Blenheim on the demesne of Woodstock, which had been bestowed on him by Queen Anne. Marlborough afterward defeated Marshal Villeroi at Ramillies in 1706, and closed the brilliant series of his victories by those of Oudenarde in 1708, and Malplaquet in 1709. The popular discontent occasioned by heavy taxation, the belief that the war was prolonged chiefly by Marlborough's influence and for selfish ends, and the increasing power of the Tory party, led to his dismissal from all his offices at the beginning of 1712. An unfavorable report had been given by the commission appointed to examine the charge of peculation brought against him, and to escape the disquietude of a life at home he went abroad with his duchess, who had also been displaced at court. Returning in 1714, George I. restored him to his offices, but he was soon after compelled by an attack of apoplexy to withdraw from public life, and he died at Windsor Lodge, June 16, 1722.

Marlitt, Eugenie, the pseudonym of E. John, a German novelist; born in Arnstedt, Thuringia, Dec. 5, 1825. Her beautiful voice and musical talent gained her the favor of the Princess of Schwarzburg-Sondershausen, who sent her to Vienna, where, after three years of study, she appeared on the stage. But a successfully begun career was cut short by an affection of the ear, and Fräulein John acted as reader to her patroness till 1863. Retiring in that year into private life, she spent her time in writing romances, interesting enough, but with strong didactic tendencies and somewhat unreal. Of these the most successful was "Goldelse" (1866); others, such as "The Old Maid's Secret" (1867); "Princess of the Moor" (1871); "Second Wife" (1873); "Countess Gisela" (1869), and "Thuringian Stories" (1869), have also passed through many editions. She died in Arnstadt June 22, 1887.

Marlowe, Christopher, an English dramatist; born in Canterbury about 1564. Soon after graduating at Cambridge (1583), he became dramatist to the "Lord Admiral's Company," London, which produced most of his plays. Among them were the tragedies "Life and Death of Dr. Faustus" (1601); "The Jew of Malta"; and "Edward II." (1593), his best work. Many believe him to have been the author of the second and third parts of Shakespeare's "Henry VI." He wrote also the first part of a narrative poem, "Hero and Leander,"

completed afterward by George Chapman. He died June 1, 1593.

Marlowe, Julia, an American actress; born in Caldbeck, near Keswick, England, Aug. 17, 1870; came with her parents to the United States in 1875; joined the Juvenile Opera Company in 1882, and played in "Pinafore," "Chimes of Normandy," etc., in which she was known as Frances Brough; subsequently she took a child's part in "Rip Van Winkle." Afterward she studied in New York for three years and then appeared on the metropolitan stage as Parthenia in "Ingomar." In 1888 she began to star in Shakespearean and other romantic and tragic rôles in the United States.

Marly, or **Marly-le-Roi** (-luh-rwä), a village of France, on the Seine, 10 miles W. of Paris. It contained a royal castle, built by Louis XIV. and destroyed during the Revolution.

Marmalade, a semi-liquid preserve, made by boiling the pulp of thick-rinded fruits, such as oranges, pineapples, quinces, etc., with portions of the rind. The most common kind of marmalade is made from the bitter or Seville oranges, the common or sweet sorts being considered inferior for this purpose, though also occasionally used. The woolly coating on the interior being removed, the rind is cut up into thin strips, and boiled along with the expressed juice of the pulp and a quantity of sugar equal in weight to the other ingredients.

Marmalade Tree (*Lucuma mammosa*), a tree of the order *Sapotaceæ*, a native of the West Indies and tropical America, valued for its fruit, the pulp of which resembles marmalade. It is also called *Mammee-sapota.*

Marmala Water, a fragrant liquid distilled in Ceylon from the flowers of the Bengal quince (*Ægle Marmelos*), and much used by the natives as a perfume for sprinkling.

Marmara. See MARMORA.

Marmette, Joseph, a Canadian author; born in Montmargny, P. Q., Oct. 25, 1844. His published works include: "Charles and Eva" (1868); "Francis de Bienville" (1870); "Chevalier de Momac" (1873); and "The Maccabees of New France" (1878); etc.

Marmier, Xavier (mar-myā), a French author; born in Pontarlier, France, June 24, 1809. He was appointed librarian of the Library of St. Geneviève, Paris, in 1846. He was a great traveler. His works include: "History of Iceland" (1838); "Letters on Russia," etc. (2 vols. 1843); "From the Rhine to the Nile" (1846); "The United States and Canada" (1874); the novels "The Spitzbergen Lovers" (1858), "The Dramas of the Heart" (1868), "A Russian Great Lady" (1876); in verse, "Poetical Sketches" (1830); "Poems of a Traveler" (1841); etc. He died in Paris, Oct. 11, 1892.

Marmol, José (mar′mōl), an Argentine poet; born in Buenos Ayres, Dec. 5, 1818. His principal works are: "The Pilgrim" and "Harmonies," descriptive poems of travels (1856); the dramas "El Cruzado" (1860) and "El Poeta" (1862); and "La Amalia," a historical romance based upon the War of the Roses in England (1866)—considered his best work, and which has been translated into French and German. He died in Buenos Ayres, Aug. 12, 1871.

Marmont, Auguste Frédéric Louis Viesse de (märr-mô*ng*′), a French military officer; born in Châtillon-sur-Seine, France, July 20, 1774. He entered the army at an early age and made the acquaintance of Napoleon at Toulon. His courage at Lodi, Castiglione, and San Giorgio, earned him the rank of general of brigade. He was sent to Dalmatia in 1805 to defend the Ragusan territory against the Russians, defeated them at Castelnuovo, and was made Duke of Ragusa. Hence he was summoned to join the great army in 1809, the day before the battle of Wagram, was intrusted with the pursuit of the enemy, won the battle of Znaim, and earned a marshal's baton. A severe wound, received at the defeat of Salamanca, compelled him to retire to France. In 1813 he commanded a corps d'armée, fought at Lützen, Bautzen, and Dresden, and maintained the contest with great spirit in France in the beginning of 1814, till further resistance was hopeless, when he concluded a truce with Barclay de Tolly, which compelled Napoleon to abdicate, and earned himself from the Bonapartists the title of the traitor. The Bourbons loaded Marmont with honors. On the return of Napoleon from Elba he was obliged to flee. After the second restoration he lived in retirement till the revolution of 1830, when, at the head of a body of troops, he endeavored to reduce Paris to submission, and finally retreating with 6,000 Swiss, and a few battalions that had continued faithful to Charles X., conducted him across the frontier. From that time he traveled much and resided chiefly in Vienna and Venice, where he died, March 2, 1852. He was the last survivor of the marshals of the first French Empire.

Marmontel, Jean François (märmô*ng*-tel′), a French writer; born in Bort, Limousin, France, July 11, 1723. In "Le Mercure" he commenced the publication of his finished and oft-translated "Moral Tales" (1761). Marmontel was elected to the Academy in 1763, and became its secretary in 1783, as well as historiographer of France. After the Revolution he retired to the village of Abbeville. His most cele-

brated work was the well-known "Belisarius," a dull and wordy political romance, containing a chapter on toleration which excited the most furious hostility on the part of the theologians of the Sorbonne, to which Marmontel replied in "The Incas" by ascribing the cruelties in Spanish America to religious fanaticism. In 1787 appeared his interesting and valuable "Elements of Literature." He died in Abbeville, Eure, France, Dec. 31, 1799.

Marmora, or **Marmara** (mär'-) (ancient Propontis), a small sea between European and Asiatic Turkey, communicating with the Ægean Sea by the Strait of the Dardanelles (anciently Hellespont), and with the Black Sea by the Strait of Constantinople (anciently Bosporus). It is of an oval form, and about 135 miles in length, by 45 in breadth, but has, besides, a large gulf, the Gulf of Isnikmid, or Ismid, which extends about 30 miles E. into Asia. Its depth is great. There is a current from the Bosporus through it and the Hellespont to the archipelago; but its navigation is by no means difficult. It contains many islands, of which the largest is Marmora, or Marmara, famous for its quarries of marble and alabaster, and which gives its name to the sea.

Marmoset (-set'), the platyrhine genus *Hapale*, from the tropical region of South America. *H. Jacchus* is the common marmoset, which is readily tamed, and becomes an amusing pet. The fur of the body is darkish-brown, with different shades of color for each hair, which is dusky at the root, reddish in the middle, and gray at tip. The head is small, the nose flat, the face black, with a long tuft of white hair sticking out from each side. The tail is long and bushy, marked with alternate rings of ash-color and black. *H. humeralifer* is the cloaked marmoset. The fore part of the body is white; the hands gray; the rump and under side deadish-tawny; tail banded with gray and black. Called also ouistiti.

Marmot (*Arctomys*), a genus of rodent *Mammalia* of small size, included in the family of the *Sciuridæ* or squirrels. The dentition agrees essentially with that typically found in the *Rodentia*, and from the peculiarities of which the order derives its chief characteristics. There are four toes and a rudimentary thumb on the fore feet, and five developed toes on the hind members. The marmots differ greatly in habits from the true squirrels, being terrestrial in habits, and living in burrows which they excavate in the ground. But certain nearly allied forms appear to form connecting links between the marmots and squirrels. Such are the European earth or ground squirrels (*Tamias*), which are also found in Siberia and North America, and which are almost wholly terrestrial in habits and live in burrows. The marmots inhabit Europe, Northern Asia, and North America, extending in the latter continent as far S. as Mexico. They do not possess cheek pouches like the nearly allied *Tamias* and *Spermophiles*. The burrows are excavated generally, though not invariably, in mountainous situations, and consist of a series of galleries in which whole communities are resident. The winter is passed in a state of hibernation, and the entrances to the burrows are said to be closed by bundles of dry grass which the marmots bring in with them at the close of the autumn season. Many species and varieties of marmots are known. The Alpine or European marmot (*A. Alpinus*) is found in plenty on the Alpine range, and averages a rabbit in size, being of a lightish brown color. It lives immediately below the snow line, and subsists on vegetables, insects, and roots. They come forth from their burrows during the month of April, and are said to be readily tamed. The bobac, another European species (*A. bobac*), inhabits Russia and Poland. The prairie dog of North America (*Cynomys Ludovicianus*), or wistonwish, is the most familiar American species. The entrance to the burrows of these latter forms is marked by a conical hillock composed of the earth which has been thrown out in the process of excavation; and immense numbers congregate to form these societies, or "villages," as they are termed. The cry of the prairie dog resembles a shrill bark, whence the popular name of these animals has been derived. A species of owl (*Athene cunicularia*) is alleged to be co-tenant of the burrows with the prairie dogs; and the rattlesnake has also been credited with forming part of a curious social community. The owls form a species of burrowing owl, and their presence in the prairie dog community is thus readily explicable from a consideration of their habits and from their taking possession of an empty burrow in which to reside. The presence of rattlesnakes, though described by some travelers as an invariable occurrence, does not appear to be anything more than a mere occasional and accidental circumstance. Other species found in America and which may be regarded as belonging to either the marmot or *Spermophile* genus, are the Quebec marmot (*A. Empetra*) and the woodchuck of the Middle American States (*A. morax*).

Marne, a river of France, the most considerable tributary of the Seine, rising in the plateau of Longres, flowing N. W. past Châlons to Epernay, thence W. and joining the Seine at Charenton, a few miles above Paris; length, 326 miles; is navigable for 126 miles up to St. Dizier. It is connected by canals with the Rhine, the Aisne, and the Seine.

Marne, a department in the N. E. of France, formed out of the old province of Champagne, traversed by the river Marne, and to a less extent by the Seine and the Aisne; area, 3,159 square miles; pop. (1906) 434,157. It is in the dry and chalky soil of the N. that the best varieties of champagne are grown, of which two-fifths are exported. The rearing of sheep is an important industry, and extensive woolen manufactures are carried on; cereals, beet root, and potatoes are grown; honey and wax are produced; building stone is quarried; and metal works, tanneries, etc., are in operation.

Marne, Haute (hōt märn), a department in the N. E. of France, formed chiefly out of the old province of Champagne, and embracing the land in the upper basins of the Marne and the Meuse; rises in the S. into the plateau of Langres and the Monts Faucilles (1,500 to 1,600 feet); area, 2,402 square miles; pop. (1906) 221,724. Cereals, wine (12,000,000 gallons annually), fruits and potatoes are the principal products; the department yields 200,000 tons of iron ore annually, and there are numerous furnaces; the cutlery is in high repute.

Marnix, Philipp van (mar'niks), **Baron of Saint-Aldegonde.** a Dutch statesman and writer; born in Brussels in 1538. He was prominent in the liberation of the Netherlands; formulated the treaty of Breda (1566); was governor of Delft and Rotterdam; defended Antwerp (1584–1585). His chief work was "De Byencorf der h. Roomscher Kercke" (Beehive of the Holy Church of Rome: 1569), a satire on Catholicism (published under the pseudonym "Isaac Rabbotenus"); which has become a Dutch prose classic. He wrote the ballad "William of Nassau," officially recognized as one of the two national songs of Holland; and a fine poetical version of the Psalms. He died in Leyden, Dec. 15, 1598.

Maro, a name of VERGIL (*q. v.*).

Marocco. See MOROCCO.

Marochetti (mä-rō-ket'tē), **Baron Charles,** an Italian sculptor; born in Turin in 1805. In 1827 he exhibited a "Young Girl Playing with a Dog," and gained a medal; and in 1831 exhibited his "Fallen Angel," for the Academy of Arts of Turin. Soon after the revolution of 1848 he took up his residence in England. His best works, besides those already named, are "The Tomb of Bellini," in Père la Chaise, and the "Altar," in the Church of the Madeleine at Paris. He died in Passy, Jan. 4, 1868.

Maronites (mär'on-īts), a body of Eastern Christians of Mount Lebanon, probably deriving their name from one Maro, a Syrian monk contemporary with Chrysostom. They adopted Monothelite errors, but were united to the Roman Church in 1182, though they soon fell away through Greek influence. In 1216 they again submitted, and the connection has subsisted ever since. They have excited more attention in Europe than other Oriental Christians, on account of the persecutions they have suffered at the hands of the Druses. In 1860, 1,300 Maronites were killed and 100,000 driven from their homes. Since then the governor of the Lebanon has been nominated by the Sultan of Turkey. In 1865 the Maronites numbered about 150,000. Arabic is the vulgar, and Syriac the liturgical language.

Maroon (-rön'), the name given to negroes in the West Indies. In many cases by taking to the forests and mountains they rendered themselves formidable to the colonists and sustained a long and brave resistance against the whites. When Jamaica was conquered by the English in 1655, about 1,500 slaves retreated to the mountains and were called Maroons. They continued to harass the island till the end of the 18th century, when bloodhounds were employed to track them to their hiding places.

Maros-Vasarhely (mor'ōsh-vä'shärhely), capital of the Szekler districts in Transylvania, on the Maros 20 miles S. E. of Klausenburg; contains a fortified castle, an old Gothic church (Reformed), a library of 70,000 volumes, and a collection of minerals and antiquities, and has a trade in timber, tobacco, wine, corn, and fruits (particularly melons). Pop. (1900) 19,091.

Marotse. See BAROTSE.

Marozia (-rō'zi-ä), a patrician lady of Rome, who married, about 906, Alberic, Count of Tusculum and Marquis of Camerino. Becoming a widow while still young she exercised, by her beauty and intriguing spirit, great influence over the most powerful nobles of Rome, and during many years set up or deposed Popes almost at her mere whim. She made herself mistress of the city, and caused, in succession, the election of Sergius III. in 904, Anastasius III. in 911, and Lande in 913. In 928 she deposed John X., who had been elected through the influence of Theodora, her sister and rival, and put him to death, with the assistance of Guido, Duke of Tuscany, her second husband. In 931 she seated in the pontifical chair her son, under the title of John XI. In the following year she married her third husband, Hugh of Provence, who became King of Italy; but that monarch having struck Alberic, eldest son of Marozia, he, out of revenge, roused the Roman youths and massacred the guards of his father-in-law, who sought safety in flight. Marozia was imprisoned in the castle of St. Angelo, where she died before 945.

Marphisa (in "Orlando Furioso"), sister of Rogere, and a female knight of amazing prowess. She was brought up by a magician, but being stolen at the age of seven she was sold to the King of Persia. The king assailed her virtue when she was 18, but she slew him and seized the crown. She came to Gaul to join the army of Agramant, but hearing that Agramant's father had murdered her mother, Galacella, she entered the camp of Charlemagne and was baptized.

Marque (mark), a license to make reprisals on the belongings of a public enemy, generally in the phrase "letters of marque" or "letters of marque and reprisal," which meant originally a license or commission to pass over the boundary or frontier, into an enemy's country and capture or destroy the persons or goods of the enemy in reprisal for goods or persons captured or destroyed by him. The meaning now is an extraordinary license or commission granted by the government of one country to its subjects to make reprisals at sea on the subjects of another country in return for injuries it has received or suffered; a license to engage in privateering; a private vessel commissioned to attack and capture the vessels of an enemy; a privateer.

Marquesas (mär-kā'säs) **Islands,** a group in Polynesia, N. of Tuamotu or Low Archipelago; area, about 480 square miles; pop. about 4,280. The name strictly applies to four or five islands discovered by Mendaña in 1595, but usually includes now the Washington group of seven islands, to the N. W., which were discovered by the American Ingraham in 1797. The whole archipelago is volcanic. Hiva-oa and Nuka-hiva are the largest islands. Nearly all are shaped into several narrow valleys, in which the bulk of the population live. In Cook's time there were 100,000 inhabitants. They are perhaps the finest race of the brown Polynesian stock, and, though courteous, are cruel and revengeful. Since 1842 the islands have been a French protectorate.

Marquetry (mär'ket-ri), inlaid work. It includes parquetry, reisner work, buhl, mosaic. The manner of executing this work consists in cutting the designs out of pieces of wood or plates of metal and inserting pieces of different color. When the inlays are inserted, the work is leveled with the toothing plane, and then scraped with the joiner's scraper applied obliquely at the joints of the wood.

Marquette (mär-ket'), a city and county-seat of Marquette co., Mich.; on Lake Superior and on the Duluth, South Shore, and Atlantic railroad; 53 miles E. S. E. of L'Anse. It has a beautiful harbor, with a 3,000-foot breakwater finished in 1894 by the United States government. The city contains the Protestant Episcopal Cathedral of St. Paul, the Roman Catholic Cathedral of St. Peter, a United States government building, public high school, the Peter White Public Library, a branch of the State prison, the Upper Michigan Children's Home, waterworks, electric street railroads, National banks, and daily and weekly newspapers. Marquette has a celebrated brownstone quarry, iron works, brick plants, railroad machine shops, flour and lumber mills, several of the largest iron ore docks in the world, etc., and an assessed property valuation of nearly $3,500,000. Pop. (1890) 9,093; (1900) 10,058; (1910) 11,503.

Marquette, James (mär-ket'), a French missionary and explorer; born in Laon, France, in 1637. He became a Jesuit priest in 1666 and went to Canada as a missionary. In 1673–1674 he made an extensive missionary journey through the Lake Superior and Green Bay region, traveling, exploring, and preaching, being in this way one of the early voyagers down the Mississippi river, of which he wrote an interesting account. He died near Marquette River, Mich., May 18, 1675.

Marquez, José Arnaldo (mar'keth), a Peruvian poet; born about 1825. He published "Lost Notes" (1862), "Flor de Abel," etc.; and a book of travels in the United States. He was editor of several journals. He lost his life in the defense of Lima against the Chileans, Jan. 15, 1881.

Marquis, or **Marquess,** a title of nobility in England, ranking next below a duke, and above an earl. It is also a title of dignity in France, Italy, and Germany. The eldest son of a marquis in Great Britain is usually styled by courtesy an earl, and the younger sons and daughters lords and ladies. The wife of a marquis is called a marchioness. The title of marquis is often attached as a second title to a dukedom, and is held by the eldest son of a duke during his father's lifetime. The coronet of a marquis consists of a richly-chased circle of gold, with four strawberry leaves and four balls of pearls set on short points on its edge; the cap, crimson velvet with a gold tassel on the top, and turned up with ermine.

Marquoi's (-kwäz) **Rulers,** a set of rulers devised by an artist named Marquoi, for the purpose of facilitating the operations of plotting and plan drawing. The set consists of a triangular ruler, whose hypothenuse is three times as long as the shorter side of the triangle, and several rectangular rulers, graduated into equal parts according to different scales. The rulers are made of hard wood, ivory, or metal, and the graduation lines are cut

close to the edges of the rectangular rulers for facility of application.

Marriage, the legal union of a man and woman for life; the state or condition of being married; wedlock. In law marriage is regarded in no other light than a civil contract. The law allows it to be valid where the parties were willing to contract, able to contract, and did contract in the form required by law. In England, whence our laws are derived, disabilities to contract were formerly considered as either canonical or civil. Consanguinity, affinity, and corporal infirmity were canonical disabilities, making the marriage voidable, but not *ipso facto* void till sentence of nullity had been obtained. The last of these is now, however, the only canonical disability on which marriages otherwise regular can be declared void. The others have by statute been declared civil disabilities which make the contract void *ab initio.* In the United States the marriage laws are as diverse as the statutes of the commonwealths are in other features, and there are various impediments unknown to the English law. In some States the law is founded on the English statutes and embraces features of both canonical and civil law prohibiting marriage for all of the causes heretofore enumerated. In others consanguinity of less degree than that of sister and brother forms no bar to the marriage of persons, while in yet others a difference of race will inhibit an alliance. The absence of a recognized status of the Church in the United States necessarily places all obstacles to marriage in the catalogue of civil disability, and in many of the States a ceremonial celebration is not necessary to render a marriage valid, mutual consent before witnesses (or subsequent acknowledgment before witnesses) constituting what is known as a common law marriage. The lack of uniformity of the marriage laws of the various States has given rise to some curious complications, an individual being indictable upon removing into one State for an action performed in another in which said action was perfectly legal. In all of the States, besides the reasons here adverted to there are three other civil disabilities: (1) A prior marriage (without legal release), in which case, besides the penalties consequent upon it as a felony, the second marriage is void. (2) Want of age, which is sufficient to avoid all other contracts, *a fortiori* it ought to avoid this, the most important contract of any. (3) Want of reason. Marriages are dissolved by death or divorce.

Communal marriage, a name for the condition which is sometimes called hetairism or promiscuity.

"The primitive condition of man, socially, was one in which marriage did not exist, or, as we may perhaps for convenience call it, of communal marriage, where all the men and women in a small community were regarded as equally married to one another."— Lubbock, "Origin of Civilization" (1882), p. 98.

Complex marriage, the domestic relationship between the sexes existing in the American sect calling themselves Perfectionists.

"The central domestic fact of the household is the complex marriage of its members to each other and to all: a rite which is to be understood as taking place on the entrance of every new member, whether male or female, into association; and which is said to convert the whole body into one marriage circle; every man becoming the husband and brother of every woman; every woman becoming the wife and sister of every man."— Hepworth Dixon, "Spiritual Wives."

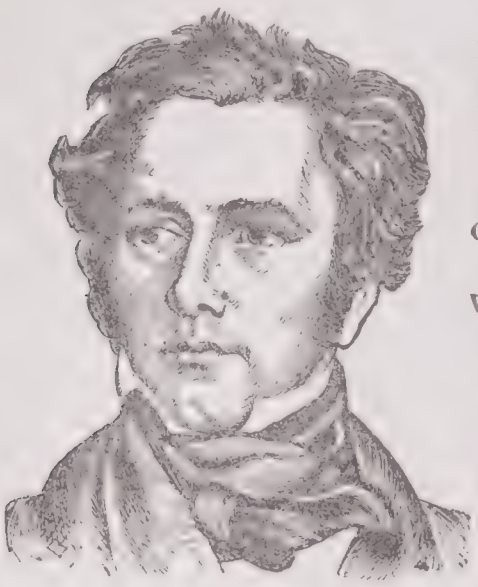
Marriage by capture, the practice of getting wives by theft or force. Two notable cases are the rape of the Sabines and the abduction of the daughters of Shiloh by the sons of Benjamin (Judges xx, xxi.).

Marriages, Mixed. See Mixed Marriages.

Marrow, a substance of low specific gravity filling the cells and cavities of the bones of mammals. There are two varieties, which are known as red or watery marrow and yellow or oily marrow. In some of the short bones, as the bodies of the vertebræ and the sternum, the marrow has a reddish color, due to the presence of cells which have this color and are supposed to be transition forms between the proper marrow cells and red blood corpuscles. On analysis it is found to contain 75 per cent. of water, the remainder consisting of albuminous and fibrinous matter, with salts and a trace of oil. In the long bones of a healthy adult mammal the marrow occurs as a yellow, oily fluid, contained in vesicles like those of common fat, which are imbedded in the interspaces of the medullary membrane — *i. e.*, a highly vascular membrane lining the interior of the bones. This marrow consists of 96 per cent. of oil and 4 of water, connective tissue, and vessels.

Marryat, Florence (Mrs. Francis Lean), an English novelist, daughter of Capt. Frederick Marryat; born in Brighton, England, July 9, 1837. She married first Col. Ross Church, and then Col. Francis Lean. She became well-known as a dramatic reader and singer; was editor of "London Society" (1872–1876); and acted in London in a play of her own, "Her World." Among her works are: "Too Good for Him," "Woman Against Woman," "Confessions of Gerald Escourt," "Veronique" "Fighting the Air," "A Daughter of the Tropics." She published "Life and Letters of Captain Marryat." (2 vols.) in 1872. Her latest books were of a spiritualistic tendency. She died in London, Oct. 27, 1899.

Marryat, Frederick, an English novelist and distinguished naval officer; born in London July 10, 1792; the son of an eminent West India merchant; entered the navy as midshipman on board the "Impérieuse," commanded by Admiral Cochrane, afterward Lord Dundonald, in 1806. During his service under this illustrious officer he was concerned in more than 50 engagements, and for his gallantry in the Mediterranean and afterward in the defense of the Castle of Trinidad he was honorably noticed and recommended by Lord Cochrane. In 1812 he received his promotion to the rank of lieutenant, in 1814 took part in an expedition to New Orleans, and the following year was made commander. For some time subsequent to 1820 he was actively engaged in the preventive service. In the first Burmese war he led the attack on Rangoon as commander of the "Arachne" and senior officer of the naval force. The decoration of C. B. was conferred on him in 1826. From 1828 to 1830 he commanded the "Ariadne" in the Channel and Western Islands. That he was not raised to higher professional rank is said to have resulted from the free expression of his opinions against the practice of impressment. His first attempt in literature was made in 1829 by the publication of "Frank Mildmay or the Naval Officer." Its success stimulated him to further exertions of the like kind, and the "King's Own," "Peter Simple," and "Jacob Faithful" followed each other in rapid succession. Subsequent works of fiction were "Japhet in Search of a Father," "Newton Forster," "Midshipman Easy," "The Pacha of Many Tales," "The Poacher," "The Phantom Ship," "Snarley-Yow or The Dog Fiend," "Percival Keene," "Masterman Ready," "Poor Jack," and others. He also made a tour in the United States, and published an account of it in 1839 under the title of "A Diary in America," in two series, which, like Mrs. Trollope's similar work, gave not a little offense to the people of the United States. He was also the author of a "Code of Signals for the Use of Vessels Employed in the Merchant Service" (1837), a highly useful publication, for which he received the thanks of the Shipowners' Society and the gold cross of the Legion of Honor from King Louis Philippe. Captain Marryat's novels are remarkable for the fun and broad humor pervading them, provoking laughter from the most stolid or melancholy temperament. For fidelity of description, likewise, as regards sailors and sea life, they are unrivaled; but he cannot be said to be a great master of plot, and his incidents and characters frequently transgress all limits of probability. The loss of his eldest son in 1847 pressed heavily on his system which had already sustained a severe shock by the rupture of a blood-vessel, and he died in Langham, Norfolk, on Aug. 9, 1848.



FREDERICK MARRYAT.

Mars, the Roman god of war, at an early period identified with the Greek Ares, a deity of similar attributes. Like Jupiter he was designated "father," and was regarded in particular as the father of the Roman people, Romulus and Remus being the fruit of his intercourse with Rhea Sylvia. Several temples at Rome were dedicated to him. His service was celebrated not only by particular flamines devoted to him, but by the College of the Salii, or priests of Mars. The month of March, the first month of the Roman year, was sacred to him. As the tutelary deity of Rome he was called Quirinus, in his character as the god of war Gradivus (the striding). Ares, the Greek god of war, was the son of Zeus (Jupiter) and Hera (Juno). He is represented as terrible in battle, but not as invulnerable, since he was wounded at various times by Heracles, Diomedes, and Athena. He is represented as a youthful warrior of strong frame, either naked or clothed with the chlamys.

Mars, one of the superior planets, fourth from the sun, at a mean distance of 141,500,000 miles, and moving around it, in a decidedly eccentric orbit, in a fraction less than 687 days. Its diurnal rotation, at the rate of 15 miles a second, has been accurately ascertained to be 24 hours, 37 minutes, and 22.67 seconds. The equatorial diameter of Mars is about 4,230 miles, and its mass about one-eighth that of the earth. When at its greatest distance from the earth, *i.e.*, in conjunction (*q. v.*), its telescopic diameter is not more than four seconds of an arc (*q. v.*), but when nearest us, *i.e.*, in favorable opposition (*q. v.*), this is increased to twenty-five seconds; hence the great variations in brightness. At favorable oppositions, which usually occur every two years, particularly during midnight, and when within about 38,000,000 miles of the earth, Mars shines as an exceedingly brilliant red star. Its axis of rotation is inclined 24° 50′ to the orbital plane, which accounts for the phenomena of seasons observed and tabulated by astronomers, and

thought to resemble those of the earth, though the Martian atmosphere is believed to be more transparent, and to possess less aqueous vapor. Edwin Dunkin, the English astronomer, mentions that in the northern hemisphere of Mars spring lasts 191 of its days, summer 181 days, autumn 149 days, and winter 147 days, while in the southern hemisphere spring and summer taken together are 76 days shorter. Owing to the favorable circumstances in which it has been possible to study Mars, its surface is more familiar to us than that of other planets. Viewed by the naked eye, Mars appears of fiery tint, an aspect long held to be the result of atmospheric absorption, until the telescopic investigations and the deductions of Sir John F. W. Herschel ascribed it to the nature of the soil. Looked at through a powerful telescope, the ruddy or reddish-orange patches of color are found to be confined to certain definite areas, supposedly land; about three-eighths of the surface is covered by bluish-green or gray-green tracts, long assumed to be seas, but later researches favor the theory that these are regions of vegetation. They are seemingly connected by a network of "canals," observed by Schiaparelli (*q. v.*) in Milan in September, 1877, during an opposition when the planet was unusually close to the earth. These "canals" have been the subject of much interest, speculation, and opposite opinion. Percival Lowell (*q. v.*), of Boston, who erected an observatory at Flagstaff, Ariz., for the purpose of devoting himself to the solution of Martian mysteries, originated the view that these "canals" are nothing less than a gigantic system of irrigation, constructed by a highly civilized race of beings for the purpose of carrying water, obtained from the melting snow of the polar regions, over the otherwise arid surface of the planet. Around the poles are "brilliant white spots," which have been conjectured to be accumulations of ice and snow, as these deposits change with the Martian seasons, increasing during winter, decreasing with the approach of spring, and fairly disappearing in the summer season, when they are supposed to melt and irrigate the land by means of the "canals." On the other hand, many astronomers refer the phenomena of the "canals" to optical illusion, inasmuch as the maps of Mars made by various scientific observers radically differ in tracing the "canal system." In 1905 Lowell issued a bulletin in which were photographs of Mars, presumably corroborating his views of the objective existence of the "canals"; but when compared with Schiaparelli's map of 1888, they showed considerable variance. In 1907 Prof. David P. Todd, of Amherst College, went to Chile to make observations of the planet. He used the largest telescope ever set up in the southern hemisphere and took about 7,000 photographs, in some of which both single and double or parallel "canals" were shown. As a result of his observations, which tended to confirm the views of Lowell, a new and greatly improved globe of Mars was made.

In August, 1877, when Mars was nearer the earth than it had been for thirty-two years, Asaph Hall (*q. v.*), of the observatory at Washington, discovered two very small satellites, only visible with most powerful telescopes. Neither of them is calculated to be over 20 miles in diameter. Phobos, the inner moon, is but 3,700 miles from the planet, and completes its revolution in 7 hours 39 minutes. This is much less than the period of rotation of Mars itself, and constitutes a unique fact in the solar system. Deimos, the outer moon, revolves about its primary at a distance of 12,500 miles in 30 hours and 18 minutes. Consult Lowell, "Mars" (1895).

Mars (märs), **Mademoiselle (Anne Françoise Boutet-Monvel)**, a French actress; born in Paris, Feb. 5, 1779. She began to act before she was thirteen, and joined the Théâtre Français in 1799. Her "Mémoires" were published in two volumes in 1849, and her "Confidences" in three volumes in 1855. She died in Paris, March 20, 1847.

Marsala (-sä'lä), a fortified seaport city of Sicily, on its W. coast. It is enclosed by walls, and has a cathedral, several convents and abbeys, a gymnasium, cavalry barracks, a curious vibrating bell tower, and a famous grotto and well. It is on the site of the ancient Lilybæum, which was long the capital of the Carthaginian possessions in Sicily.

Marschner, Heinrich, a German composer; born in Zittau, Saxony, Aug. 16, 1795. In 1813 he studied law at the University of Leipsic, but soon turned to music, which he studied and then taught. In 1823 he became codirector with Weber and Morlacchi of German and Italian opera at Dresden. Three years later he was made conductor of the Leipsic Theater, where he produced his own operas "Der Vampyr" (1828) and "Der Templer und die Jüdin" (1829), at once establishing his fame. He was kapellmeister to the king of Hanover (1831-59). Besides the operas above mentioned, he produced nine others, some of which are still heard in Germany, and pianoforte pieces, chamber music, songs, choruses, etc. The influence of both Weber and Wagner is apparent in his work. He died in Hanover, Dec. 14, 1861.

Marsden, Samuel, an English missionary; born in Horsforth, near Leeds, July 28, 1764. He began life as a tradesman at Leeds, joined the Methodist Church, but left it for the Church of England, in which, after studying at St. John's College, Cambridge,

he took orders in 1793. The next year he went as chaplain to the penal colony at Parramatta, Australia. In that country and New Zealand he labored many years, with great success, in the cause of religion and of civilization. He died May 12, 1838.

Marsden, William, an English Orientalist; born in Dublin in 1754; was sent out early in life to Sumatra, and returned to England in 1779. In 1795 he became chief secretary to the admiralty, retiring in 1807. Among his works are: The "History of Sumatra"; a "Dictionary of the Malayan Language"; a "Grammar of the Malayan Language"; "Translation of the Travels of Marco Polo," with a commentary; and "Numismata Orientalia." He died in 1836.

Marseillaise (mär-sā-yāz′), a song written by Rouget de Lisle, an officer of artillery in the garrison of Strassburg in 1792. It received its title from having been sung by a party of the Marseillaise Club as they entered Paris on the invitation of Madame Roland; the song, though less sanguinary in sentiment than most of the songs of the Revolution, was employed as accompaniment to many of the horrible deeds of that, and of later periods, and by association became dangerous enough to be included among the songs prohibited to be sung in France under the Bourbons and the Bonapartes. The tune to which it is set by the author of the words contains progressions so unusual in popular songs that it is difficult to account for its general adoption.

Marseilles (mär-sālz′), French **Marseille** (mär-sāy′), a city of France, principal seaport of the country, and capital of the department of Bouches-du-Rhône; on the N. E. shore of the Gulf of Lyons, 516 miles by rail S. E. of Paris. It lies in the form of an amphitheater round a natural harbor of moderate size now known as the Old Harbor. The new harbor, with its system of docks, extends along the shore to the N. W. and is protected by a breakwater. The harbor defenses are works of great strength. From the Old Harbor runs inland in a straight line one of the finest of the city thoroughfares, called the Cannebière, next the harbor, while at right angles to this another great thoroughfare traverses through the city. Though a handsome city as a whole, Marseilles is not rich in public edifices. The most deserving of notice are the large cathedral, in the Byzantine style, consecrated in 1893; the Church of Notre Dame de la Garde, a modern Romanesque building, on a hill of the same name whence a splendid view is obtained; the Church of St. Victor; the Hôtel de Ville; the Prefecture; the Palais des Arts de Longchamp, with picture gallery and natural history museum; the exchange; public library; and the triumphal arch through which the town is entered on the side of Aix.

In recent times Marseilles has made great progress in extent, street improvements, population, and commerce, largely owing to the conquest of Algeria and the opening of the Suez Canal. The public works are of an excellent character. From the river Durance an abundant water supply is obtained. A canal from the summit level irrigates the neighboring slopes and plains, and has transformed them from arid tracts into fruitful fields. An extensive drainage system was completed in 1898, carrying sewage far out to sea.

The important manufactures are soap, soda, and other chemical products, olive and other oils, sugar, machinery, iron and brass work, candles, glass, earthenware, etc. The trade is chiefly in soap, olive oil, wine, brandy, corn, flour, dried fruits, oranges, and other products of the S. departments; salt provisions, tobacco, wool, skins and hides, iron, raw cotton, cotton twist, dyewoods, and other articles of colonial production.

Marseilles was founded by a colony of Greeks from Asia Minor about 600 B. C., the original name being Massilia. It attained great prosperity as a Greek colonial center, and the Greek language is said to have been spoken here till several centuries after Christ. It was taken by Cæsar in 49 B. C. On the decline of the Roman Empire it became a prey to the Goths, Burgundians, and Franks. Later it fell into the hands of the Saracens, and finally it came under the dominion of the counts of Provence, and it followed the fortunes of that house till 1481, when with Provence it was united with the French crown. Pop. (1901) 491,161; (1906) 517,498.

Marsh, Anne Caldwell, an English novelist; born in Lindley Wood, Staffordshire, about 1798. She published most of her works anonymously. Among them were: "Two Old Men's Tales" (1846); "Emilia Wyndham" (1846); and "Norman's Bridge" (1847). She died in Lindley Wood, Oct. 5, 1874.

Marsh, Charles Dwight, an American biologist and educator; born in Hadley, Mass., Dec. 20, 1855; was graduated at Amherst College in 1877; taught in schools and academies till 1883; and in 1883-89 was professor of chemistry and biology at Ripon College, Ripon, Wis. He continued as professor of biology there till 1904, and in 1900-04 was dean of the faculty, then became professor of biology at Earlham College, Richmond, Ind. He has published: "Limnetic Crustacea of Green Lake"; "The Plankton of Lake Winnebago and Green Lake"; and many biological papers.

Marsh, George Perkins, an American diplomatist and philologist; born in Wood-

stock, Vt., March 15, 1801. A graduate of Dartmouth in 1820, he practised law in Burlington, Vt.; was member of Congress 1842–1849; minister to Turkey 1849–1853; and became the first minister to the new kingdom of Italy 1861, holding the post till his death, a period of over 20 years. As a diplomatist he had great ability. His services to the study of language, especially the history of his own tongue, give him a distinguished place among American scholars. The "Origin and History of the English Language" remains a standard work. He translated Rask's "Icelandic Grammar" (1838); and also published "Lectures on the English Language" (1861); an edition of Wedgwood's "Etymology"; and "The Earth as Modified by Human Action" (1874). A revised edition of his complete works appeared in 1885; his "Life and Letters" compiled by his widow in 1888. A part of his fine library of Scandinavian literature was acquired by the University of Vermont. He died in Vallombrosa, Italy, July 23, 1882.

Marsh, Othniel Charles, an American palæontologist; born in Lockport, N. Y., Oct. 29, 1831. A Yale graduate, he studied at Berlin, Heidelberg, and Breslau; and was Professor of Palæontology at Yale from 1866 till his death. He was an authority on the extinct vertebrates of the Rocky Mountains, having conducted many scientific expeditions thither and discovered more than 1,000 new specimens, many of which he described in the "American Journal of Science," and which he presented to Yale University. He prepared a series of government reports containing an illustrated account of his discoveries. Three of these — on the "Odontornithes," the "Dinocerata," and "Lauropoda" — have appeared. He was president of the American Association for the Advancement of Science, vertebrate palæontologist of the United States Geological Survey, president of the National Academy of Sciences, and fellow of the Geological Society of London. He died in New Haven, Conn., March 18, 1899.

Marshal, a civil officer appointed by the President in each judicial district, and answering to the sheriff of a county. His duty is to execute all precepts directed to him, issued under the authority of the United States. Sometimes police officers in American cities are known as marshals. In some European countries the title of marshal confers the highest military distinction, that of Marshal of France being especially prized. Earl Marshal of England, the eighth officer of state; the title is hereditary, being held by the Duke of Norfolk. The Earl Marshal has jurisdiction in the court of chivalry during a vacancy in the office of High Constable. Earl Marshal (or Mariscal) of Scotland, an officer of state who had command of the cavalry under the constable. The office was held by the family of Keith, but was forfeited by rebellion in 1715. Knight Marshal, Marshal of the King's (or Queen's) Household, an officer whose duties were to hear and determine pleas of the crown, and suits between those of the royal household and others within the verge, that is, within a circle of 12 miles round the royal palace. Marshal of the King's (or Queen's) Bench, an old English officer who had charge of the prison called the King's (or Queen's) Bench in Southwark. The office was abolished by statute.

Marshall, a city and county-seat of Harrison co., Tex.; on the Paris, Marshall, and Sabine Pass, and the Texas and Pacific railroads; 40 miles W. of Shreveport. It contains Wiley University, Bishop College, and a Masonic Female Institute, waterworks, electric and street railroad plants, National banks, and daily and weekly newspapers. It has a foundry, cotton compress, cotton gin, railroad shops, furniture factories, car-wheel works, etc., and an assessed property valuation of $2,000,000. Pop. (1900) 7,855; (1910) 11,452.

Marshall, John, an American jurist; born in Germantown, Va., Sept. 24, 1755. He was educated at home; studied law; was an officer in the Colonial army from 1775 to 1779, where he won distinction, especially on courts-martial, in which he acted frequently as judge-advocate. In 1781 he resigned, and entered on the practice of law. He was elected to the Virginia Legislature, and in 1788 to the Virginia convention that ratified the United States Constitution, where he shared with James Madison the work of influencing its adoption. He went as an envoy to France in 1798, but was superseded on account of his Federalistic views. In 1799 he entered Congress, and in 1800 was appointed Secretary of War, and a little later Secretary of State. In 1801 he was nominated chief-justice of the United States by President John Adams, and confirmed unanimously by the Senate. This office he held 34 years, during which his decisions on constitutional questions established precedents in the interpretation of the Constitution that have been accepted ever since. He died in Philadelphia, July 6, 1835.

Marshall Islands, a group of islands in the W. Pacific, bisected by lat. 10° N., having the Caroline group to the W., and consisting of two parallel chains of low coral reefs — one, the Ratak group, consisting of 15 islands, and measuring in all 48 square miles; the other, the Ralik group, 18 islands, with a total area of 107 square miles Total pop. of group (1906) Euro-

peans 83 (65 Germans), others 15,000; most populous (2,600) island, Majeru; several of the islands are uninhabited. The cocoanut and pandanus palms and the bread fruit tree are the principal sources of food, besides fish. Copra is the only export; total production in 1898–1899, 2,729 tons. The inhabitants belong to the Micronesian division, and are an ugly but good-natured and hospitable race, fond of song and dance, and skillful weavers of bast mats. The Boston Mission Society have a branch here. These islands were annexed by Germany in 1885.

Marshalltown, a city and county-seat of Marshall co., Ia.; on the Chicago and Great Western, the Iowa Central, and the Chicago and Northwestern railroads; 75 miles N. E. of Des Moines. It is the seat of the Iowa State Soldiers' Home, and has National and State banks, waterworks on the gallery system, glucose factory, grain elevators, flour mills, meat-packing plant, carriage and furniture factories, and an assessed property valuation of over $1,500,000. Pop. (1900) 11,554; (1910) 13,374.

Marshalling, in heraldry, the arrangement and distribution of several coats of arms, belonging to distinct families, in the same escutcheon or shield, together with their ornaments, parts, and appurtenances, so as to denote the several marriages and alliances of the families.

Marshalsea, a jail in London, attached to the Marshalsea Court, originally established under the earl-marshal of England for the trial of servants of the royal household. Later on it came to be used as a prison for debtors and defaulters, as well as persons convicted of piracy or other offenses on the high seas. It stood near the church of St. George, Southwark, and existed in the reign of Edward III. It was abolished as the Palace Court in 1849. Bishop Bonner was confined here for nearly 10 years, till his death in 1569, and George Wither in 1613; he obtained his release by his "Satyre to the King's Most Excellent Majesty." But the Marshalsea will be longest remembered as the home of Dickens's "Little Dorrit."

Marsh Gas, in chemistry, $CH_4 = \begin{matrix} CH_3, \\ H \end{matrix}$ methane; light carburetted hydrogen, hydride of methyl, a hydrocarbon gas very abundant in nature. It is evolved from stagnant water, and great quantities are given off in coal pits where it is known as the fire damp of the miners. It is one of the usual products of the destructive distillation of organic matters. It may be formed in large quantities by the destructive distillation of a mixture of alkaline acetate with a hydrated alkali. Of all known compounds it is the richest in hydrogen, and, with the exception of the latter, is the lightest known gas (sp. gr. .5576, air = 1). It is colorless, without taste or smell, and is neutral to test paper. In water and alcohol it is sparingly soluble. It is the type of a numerous class of compounds.

Marsh Mallow, the genus *Althæa,* and specially *A. officinalis.* It is a softly pubescent plant, with axillary cymes of large rosy

MARSHMALLOW.

a, flower; b, fruit.

leaves. Wild in a few places in England in marshes near the sea. A decoction of the roots and other parts yields a tasteless, colorless mucilage. Used as a demulcent for children and in cases of irritation.

Marshman, Joshua, an English missionary; born in Westbury Leigh, England, April 20, 1768; was sent in 1799 by the Baptist Missionary Society to Serampore, where he had Carey, Ward, and others as fellow laborers. He translated a great portion of the Bible into Chinese, published the original text and a translation of the works of Confucius (1811), a Chinese grammar (1814), and with Carey a Sanskrit grammar (1815) and a Bengali-English dictionary (1825). He died in Serampore, India, Dec. 5, 1837. His son, JOHN CLARK MARSHMAN (1794–1877), founded the first English weekly newspaper in India, the "Friend of India," besides being the author of a popular "History of India," "Lives" of Carey, Marshman, and Ward, and "Memoirs" of Havelock, his brother-in-law.

Marsh Marigold (*Caltha*), a genus of plants of the natural order *Ranunculaceæ,* having about five petal-like sepals, but no

petals; the fruit consists of several spreading, compressed, many-seeded follicles. *C. palustris* is a very common British plant, with kidney-shaped, shining leaves, and large yellow flowers, a principal ornament

MARSH MARIGOLD.

of wet meadows and the sides of streams in spring. It partakes of the acridity common to the order; but the flower buds, preserved in vinegar and salt, are said to be a good substitute for capers. It is often called cowslip in the United States.

Marsh Rosemary, the North American name for *Statice Limonium,* a salt-marsh plant of North America and Europe, the root of which is a strong astringent and sometimes used in medicine.

Marsh Samphire, a leafless, much-branched, jointed, succulent plant, *Salicornca herbacea,* found on muddy or moist sandy shores, and frequent in England and Ireland. It is eaten by cattle, and makes a good pickle. It is also named glasswort and saltwort.

Marsi (mär′sī), or **Marsians** (-shianz), a nation of Central Italy, first mentioned in Roman history, 340 B. C., at which time they were on friendly terms with the Romans, against whom they leagued with the Samnites, 308 B. C. They concluded a treaty with the Romans 304 B. C., but again took up arms, 301 B. C., when, having been defeated, they were compelled to purchase peace by the cession of part of their territory. They became faithful allies of Rome, and were among the first to offer volunteers to the fleet and army of Scipio, 205 B. C. In the Social, sometimes called the Marsic war, 91 B. C., they took a prominent part, and gained several victories over the Romans; but in the next campaign, 89 B. C., after repeated defeats, they were compelled to sue for peace. The Marsi received the full rights of Roman citizens, and from that time ceased to exist as a separate nation.

Marsipobranchii (-brang′ki-ī), the order of fishes comprising the hag fishes and seal lampreys, with pouch-like gills. The organization of these fishes is of a very low grade, as indicated chiefly by the persistent notochord without ossified vertebral centra, the absence of any traces of limbs, the absence of a mandible and of ribs, and the structure of the gills.

Marston, James Westland, an English dramatic poet; born in Boston, England, Jan. 30, 1820. He was articled to his uncle, a London solicitor, but soon gave up law for literature; and in 1842 his "Patrician's Daughter," a blank verse tragedy of the day, was brought out at Drury Lane by Macready. It was the first and also the most successful of more than a dozen plays ("Strathmore," "Philip of France," etc.), all Sheridan-Knowlesian, and all forgotten, though a collective edition of them and his poetic works appeared in two volumes in 1876. Besides these, he wrote a novel (1860), a good book on "Our Recent Actors" (1888), and a mass of poetic criticism. He died in London, Jan. 5, 1890.

Marston, John, an English dramatic author; born about 1575. He was educated at Corpus Christi College, Oxford. He was entered at the Middle Temple, where he became lecturer. He was the author of eight plays, all acted at the Blackfriars Theater with applause. Six of these were printed in one volume in 1633, and dedicated to the Viscountess Falkland. He assisted Ben Jonson and Chapman in the composition of "Eastward Hoe." He also wrote three books of satires, entitled the "Scourge of Villany" (1599). He died in London, June 25, 1634.

Marston, Philip Bourke, an English poet; born in London, England, Aug. 13, 1850. His life was a series of losses — of eyesight at three, and afterward of his sister, his promised bride, and his two dear friends, Oliver Madox Brown and Rossetti. His memory will survive through his friendships —with the last and with Watts and Swinburne — rather than through his sonnets and lyrics. They are exquisite some of them, but too sad for a world that sees. "Songtide," "All in All," and "Wind Voices" were the three volumes of poetry that he published in his lifetime, between 1870 and 1883; to a posthumous collection of his stories is prefixed a memoir by W. Sharp. He was the subject of Hake's poem, "The Blind Boy," and of Mrs. Craik's "Philip, My King." His "Collected Poems," edited by Louise Chandler Moulton, appeared in 1892. He died in London, Feb. 13, 1887.

Marston Moor, a plain in Yorkshire, England, where a decisive battle was fought between the Royalists under Prince Rupert, and the Parliamentary army under Lord Fairfax and Oliver Cromwell, July 2, 1644.

It commenced about 7 P. M., and the left wing of the king's army totally routed the right wing of the Parliamentarians; but Cromwell with his "Ironsides" managed to defeat the king's right wing. After a severe struggle, victory declared in favor of the Parliamentarians, the Royalists losing all their artillery, ammunition and baggage.

Marsupialia (-ā'li-ä), or **Marsupiata** (-ā'tä), in zoölogy, pouched animals or mammals having a marsupium or pouch. Under the designation *Marsupiata* they were considered by Cuvier to be a subdivision of his order *Carnassiers* (*Carnivora*), though their teeth were of various types, and many were vegetable feeders. Some have an analogy to the *Insectivora*, others to *Carnivora*, others to the *Rodentia*, from all which they differ in possessing a marsupium or pouch. They are now generally termed *Marsupialia*, and elevated into a sub-class, called by Professor Huxley and others, *Didelphia*. The young are born of a small size and imperfect in condition, but are transferred to the marsupium, where they become attached to a long nipple which supplies them with milk. There is evidently in this arrangement a first faint approach to the oviparous one which characterizes birds. The majority of the species inhabit Australia and its adjacent islands, though the *Didelphidæ* (opossums) are American.

Viewing the *Marsupialia* as an order, Owen, in 1839, divided them into five tribes; *Sarcophaga*, *Entomophaga*, *Carpophaga*, *Poephaga*, and *Rhizophaga*. Subsequently he divided them by their dentition into the *Diprodontia* and the *Polyprodontia*. Dallas and others separated them into the phytophagus, or plant-eating, and the rapacious marsupialia, the latter including the carnivrous and the insectivorous families. Prof. Martin Duncan, regarding the *Marsupialia* as an order, divides it into two sub-orders, the *Marsupiata* and the *Monotremata*. The oldest known mammalian species, *Microlestes antiquus*, is believed to have been marsupial. It is from the Upper Trias. Others occur in the Keuper of Wurtemberg, the Rhætic rocks, etc. It is believed that during the whole Secondary period all mammals existing were marsupial, though analogy would lead one to expect that the *Monotremata* will yet be found.

Marsyas (mär'si-as), in Greek mythology, a celebrated piper of Celænæ, in Phrygia. He was so skillful in playing on the flute that he was generally deemed the inventor of it. Marsyas was enamored of Cybele, and he traveled with her as far as Nysa, where he had the imprudence to challenge Apollo to a trial of his skill as a musician. The god accepted the challenge; and it was mutually agreed that he who was defeated should be flayed alive by the conqueror. Each exerted his utmost skill, and the victory, with much difficulty, was adjudged to Apollo. The god, upon this, tied his antagonist to a tree and flayed him alive. Marsyas is often represented on monuments as tied, his hands behind his back, to a tree, while Apollo stands before him with his lyre in his hands. At Celænæ, the skin of Marsyas was shown to travelers for some time. It was suspended in the public place, in the form of a bladder or a football.

Martaban (-bän'), a town in Burma, on the Salween, opposite Maulmain (Moulmein). It is reputed to have been built in 576 by the first King of Pegu, and was down to the end of the first quarter of the 14th century the capital of the kingdom. It was taken by the King of Siam two centuries and a half later, and has been twice captured by the British, in 1824 and in 1852. The Bay of Martaban receives the rivers Irawadi and Salween.

Martagon (mär'-), a kind of lily, *Lilium martagon*. The stems are two or three feet high; the leaves are petioled, obovate, lanceolate, whorled, the upper ones linear; the flowers erect, racemose, drooping, pale purple or white, with dark raised papillæ and red-brown anthers. Native of continental Europe. The bulbs are eaten by the Cossacks.

Martel, Charles. See CHARLES MARTEL.

Martel-de-fer (mär-tel-duh-fār'), a hammer and pick conjoined, used by horse soldiers in the Middle Ages to break and destroy armor, and generally hung at the saddle-bow. They were sometimes furnished with hooks to hold them at the saddle-bow, and were perforated to receive a cord, which could be twisted round the hand or wrist, so that the weapon might not be beaten out when the soldier was engaged in fighting. They were sometimes of considerable weight.

Martel de Janville, Countess Gabrielle de (mär-tel' duh zh*ong*-vēl') (pseudonym GYP), a French novelist; born in the Château de Koëtsal, Morbihan, France, about 1850. She is the creator of several new types, among them Paulette, Loulou, Bob, etc.; and was a prolific writer. Among her numerous works are: "About Marriage" (1883), dramatized the same year; "About Divorce" (1886); "Conjugal Joys" (1887); "Miss Eve" (1889); "The Duke" (1892); "The Duchess" (1893); etc.

Martello Tower, a circular, isolated tower of masonry, erected on the coast of a country as a protection against invaders. The name was originally given to towers erected on the coasts of Sicily and Sardinia

against the pirates in the time of Charles V. (1519–1556). By some the name is derived from the practice of giving warning of the approach of an enemy by striking a bell with a hammer; by others from Mortella Bay, Corsica, where a tower of this description was taken by an English naval force in 1794 after a prolonged resistance. The tower is usually about 40 feet in height, having two stories, and a shell-proof roof with a 4½-foot parapet. The walls are 5½ feet thick; the lower story is for stores, magazine, and retreat; the second is a casemate with embrasures; the roof is armed *en barbette* with a traversing gun, under a bomb-proof. There are martello towers on the coasts of the S. of England, Ireland, and Jersey, within range of each other. The entrances are at a considerable height above the ground, and the tower has a ditch and glacis. They are now of little value as coast defenses.

Marten, the popular English name for any individual of Cuvier's sub-genus *Mustela,* or of Nilsson's *Martes.* They are limited to the N. portion of both hemispheres, ranging S. as far as 35° S. in America; one species, the Indian marten, occurs in Java. The species are very similar in their habits, arboreal, and, as a rule, carnivorous. though less so than the weasels. According to Rolleston, the common European marten "was functionally the 'cat' of the ancients." But it is as fur-yielding animals that the martens are most important, and vast numbers are taken every year to supply the wants of civilization. The finest fur comes from the highest latitudes, principally from North America and Siberia. According to Alston, the pine marten (*Mustela martes* or *abietum*) is the sole British species; though Bell includes beech marten or stone marten in the fauna.

Martensen, Hans Lassen, a Danish theologian; born in Flensborg, Aug. 19, 1808. After shaking off the influence of Grundtvigianism, by which he was dominated in his student days, he stepped into the chair of philosophy at Copenhagen, and in 1845 added to these duties those of court preacher. In 1840 he published a valuable monograph on "Meister Eckhart," the German mystic, and nine years later laid the foundation of a European fame by a masterly work, from the conservative Lutheran standpoint, on "Christian Dogmatics" (Eng. trans. 1866). This gained him in 1854 the primacy of Denmark, and this again was the cause of a powerful satirical attack upon him by Kierkegaard, which started a controversy in which Martensen suffered severely. His great intellectual energy, however, and the force of his character soon enabled him to recover from the blow, so that, after the publication of another great work, in three volumes, on "Christian Ethics" (1871–1878), his influence in the country was more dominant than ever. With a mind wonderfully acute and powerful, he was deficient in intellectual sympathy. Nevertheless he stood for many years a bulwark of defense to conservative theology. He died in Copenhagen, Feb. 4, 1884.

Martha's Vineyard, an island on the S. coast of Massachusetts, 21 miles long, 6 miles in average width. It is noted as a summer health resort.

Martial (mär'shal) **(Marcus Valerius Martialis),** a Latin epigrammatist; born in Bilbilis, Spain, in 43 A. D. His poems, which consist of about 1,500 pieces, are interesting for their allusions to the persons and manners of the times, but abound with indelicacies. In the Delphine edition of 1680, these were omitted from the body of the work, and published all together at the end. Martial went to Rome when about 20 years of age, and obtained the favor of Domitian. He died in Spain about 104.

MARTIAL.

Martial Law, an arbitrary rule, proceeding from military power and having no immediate or legislative sanction. A place, district, or country occupied by an enemy stands, in consequence of the occupation, under the martial law of the invading or occupying army, whether any proclamation declaring martial law, or any public warning to the inhabitants, has been issued or not. Martial law is the immediate and direct effect and consequence of occupation or conquest. The presence of a hostile army proclaims its martial law. Martial law does not cease during the hostile occupation except by special proclamation ordered by the commander-in-chief, or by special mention in the treaty of peace concluding the war, when the occupation of a place or territory continues beyond the conclusion of peace as one of the conditions of the same. Martial law in a hostile country consists in the suspension, by the occupying military authority, of the criminal and civil law and of the domestic administration and government in the occupied place or territory, and in the substitution of military rule and force

for the same, as well as in the dictation of general laws as far as military necessity requires the suspension, substitution, or dictation. The commander of the forces may proclaim that the administration of all civil and penal law shall continue, either wholly or in part, as in times of peace, unless otherwise ordered by the military authority. Martial law is simply military authority exercised in accordance with the laws and usages of war. Military oppression is not martial law; it is an abuse of the power which that law confers. Martial law may be less stringent in one place than in another. Much greater severity may be exercised in places or regions where actual hostilities occur, or are expected and must be prepared for. To save the country and life and property is paramount to all other considerations. All civil and penal laws continue to take their usual course in the enemy's territory under martial law, unless interrupted or stopped by order of the occupying military power. Whenever feasible martial law is carried out in cases of individual offenders by military courts, but sentence of death shall be executed only with the approval of the chief executive, provided the urgency of the case does not require a speedier execution, and then only with the approval of the chief commander.

Martin, a migratory bird, closely resembling the swallow. It builds a mud nest under the eaves of houses and barns, but it differs from the swallow in having a conspicuous white band across the lower back. The sand martin (*H. riparia*) is pale brown above and white below. It hollows out galleries in sand banks, where it nests and breeds. The sand martin and the house martin are both birds of passage, arriving in spring and departing toward the end of summer. *Cypselus apus*, the swift, is sometimes called the black martin. The purple martin of America is *Hirundo* (or *Progne*) *purpurea*. The plumage of the male is almost wholly steel-blue; the female is duller in color above, brownish-gray beneath. The fairy martin of Australia is *Hirundo ariel*.

Martin, the name of five Popes, as follows:

Martin I., succeeded Theodore in 649, but was deposed by the emperor, and banished, after suffering great indignities, to the Sarmatian Chersonese, where he died in 655, being afterward numbered, for his suffering, among the saints. Martin II. succeeded John in 882, but died within 18 months of his election. Martin III. ascended the papal chair on the death of Stephen IX., in 943, and died three years after. Martin IV. (Nicolas de la Brie), a Frenchman, succeeded Nicholas III. in 1281. Having been, from the time of his election, a devoted adherent of Charles of Anjou, he supported that monarch with all his influence, and even by the spiritual censures which he had at his command, in his effort to maintain French domination in Sicily; and it is to his use of the censures of the Church in that cause that many Catholic historians ascribe the decline and ultimate extinction of the authority in temporals which the papacy had exercised under the distinguished pontiffs who preceded him. It is in his time that took place the memorable tragedy known as the "Sicilian Vespers." He died in 1285. Martin V. (Otto Colonna), was elected after the abdication of Gregory XII., and the deposition of John XXIII. and Benedict XIII., his election finally extinguishing the great Western Schism. Martin presided at the last sessions of the Council of Constance, and the Fathers having separated without discussing the questions of reform, at that period earnestly called for in the Church, Martin undertook to call a new council for the purpose. The council was summoned accordingly, after several years, to meet at Siena, and ultimately assembled at Basel in 1431. Martin died in the same year.

Martin, Arthur Patchett, an Australian journalist; born in Woolwich, England, Feb. 18, 1851. He was one of the founders of the "Melbourne Review," and its editor for six years. He wrote in verse: "A Sweet Girl Graduate"; "An Easter Omelette" (1878); in both verse and prose "Fernshawe" (1881); "True Stories from Australian History" (1893); etc.

Martin, Bon Louis Henri (mär-ta*ng*), a French historian; born in St. Quentin, Aisne, France, Feb. 20, 1810. He studied law originally; became a senator in 1876, and member of the Academy in 1878. His great work, the "History of France," in 16 volumes, appeared in 1855–1860; the "Popular History of France" in 1867–1875; and the continuation bringing the account down to the present day, "History of Modern France from 1789" (1878–1885). He wrote besides: "France, Her Genius and her Destinies" (1847); "Italian Unity" (1865); the heroic drama "Vercingetorix" (1865); "Russia in Europe" (1866); etc. He died in Paris, Dec. 14, 1883.

Martin, Edward Sanford, an American journalist; born in "Willowbrook," Owasco Lake, N. Y., Jan. 2, 1856. He was graduated at Harvard College, in 1877, and was author of "Sly Ballades in Harvard China"; "A Little Brother of the Rich, and Other Poems"; and "Windfalls of Observation."

Martin, Homer Dodge, an American artist; born in Albany, N. Y., Oct. 28, 1836; was chiefly self-taught in painting; opened a studio in New York city in 1862; was elected a member of the National Acad-

emy of Design in 1875; and resided in France in 1882–1886. While he was influenced somewhat by the Barbizon School of painters, no painter was more original than he. He succeeded in developing a style entirely his own, which was of so high a quality as to place him among the best known of American landscape painters. His best-known works include "Landscape on the Seine"; "An Equinoctial Day"; "Brook in the Woods"; "In the Adirondacks"; "Sand Dunes on Lake Ontario"; "White Mountains, from Rondolph Hill"; etc. He died in St. Paul, Minn., Feb. 12, 1897.

Martin, John, an English painter; born near Hexham, Northumberland, England, July 10, 1789. In 1812 he painted a large picture, "Sadak in Search of the Waters of Oblivion," which obtained a place in the Royal Academy Exhibition, and for a period made him the most popular artist of his country. He produced a number of striking works; among the most attractive of these pictures are: "Belshazzar's Feast," "The Seventh Plague," "The Fall of Nineveh," "The Eve of the Deluge," and the "Destruction of Herculaneum." He died in Douglas, Isle of Man, Feb. 17, 1854.

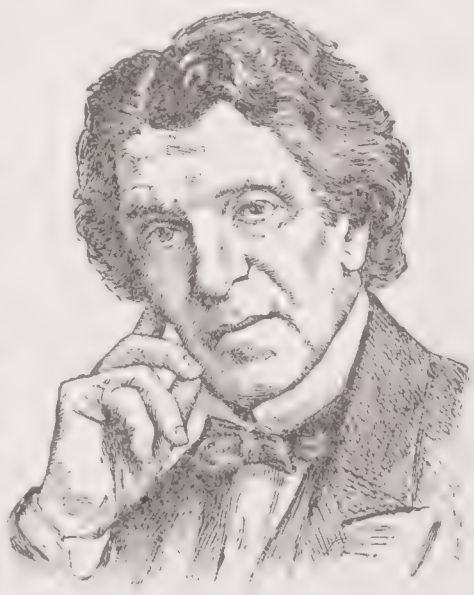
Martin, St., a saint of the Roman Catholic Church; born in Sabaria, Pannonia, about 316. He was the son of heathen parents. After embracing the Christian faith, his rise in ecclesiastical preferment was rapid, he being in 374 elected Bishop of Tours; through this and other dignities, he preserved the simplicity of the monk in manners as well as dress. He was the founder of the monastery of Marmontier; and is considered, from his special labors in that direction, as the apostle of the Gauls. He is also reputed to be the author of a "Confession of Faith in the Doctrine of the Trinity." Many miracles are attributed to him. He died in 397 or 400.

Martin, Sir Theodore, an English biographer; born in Edinburgh, Scotland, Sept. 16, 1816. He became a solicitor in London in 1846; married the actress Helen Faucit in 1851; was elected rector of the University of St. Andrews in 1880. He first became known as an author in London under the pen-name "Bon Gaultier"; and jointly with W. E. Aytoun published the famous "Book of Ballads" about 1858, also under that pseudonym. He made many excellent translations from Horace and Catullus, from Dante, from Goethe, Schiller, and Heine, and from mediæval ballads, epigrams, etc. On the completion of the "Life of the Prince Consort" (5 vols. 1874–1880), he was knighted. He also wrote "Life of the Princess Alice" (1883); and other biographies. He died Aug. 18, 1909.

Martin, William Alexander Parsons, an American educator; born in Livonia, Ind., April 10, 1827. A missionary originally at Ningpo, China (1850–1860), he founded and directed the Presbyterian mission at Peking, 1863–1868; became Professor of International Law at Tungwên College, Peking, in 1868; president in 1869; was sent by China to the United States and Europe to report on methods of education in 1880–1881; made mandarin of the third rank in 1885, and of the second class in 1898, since which time he has been president of the new Imperial University of China. He published in Chinese, "Evidences of Christianity" (1855); "The Three Principles" (1856); etc.; in English, "The Chinese, their Education, Philosophy, and Letters" (1881); etc.

Martineau, Harriet (mär′ti-nō), an English reformer, sister of James Martineau; born in Norwich, England, June 12, 1802. She visited the United States in 1834, aiding the abolitionists, and traveled in Palestine and the East in 1846. She wrote a series of stories based on political economy (1832). Among her more important works are: "Society in America," (1836); "Deerbrook" (1839), a novel; "History of England during the Thirty Years' Peace" (1848); "Philosophy of Comte" (1853); "British Rule in India" (1857); "Biographical Sketches" (1869); etc. She labored under the remarkable disability of being all her life without the senses of taste and smell, and at 16 became very deaf. She died in Ambleside, Westmoreland, England, June 27, 1876.

Martineau, James, an English clergyman and writer, brother of Harriet Martineau; born in Norwich, England, April 21, 1805. He was educated at the Norwich Grammar School, Dr. Lant Carpenter's school at Bristol, and Manchester New College, York. After holding ministerial appointments in Dublin and Liverpool, he became in 1841 Professor of Mental and Moral Philosophy in Manchester New College. In 1857 he removed to London, and was minister of Little Portland Street Chapel from 1859 to 1872. In 1868 he was



JAMES MARTINEAU.

appointed principal of Manchester New College (which from 1853 had been in London). He was author of "The Rationale of Religious Inquiry" (1837), "Endeavors after the Christian Life" (2 vols. 1843–1847), "Miscellanies" (1852), "Studies of Christianity" (1858), "Essays Philosophical and Theological" (1868), "Modern Materialism" (1876), "Hours of Thought on Sacred Things" (2 vols. 1876–1880), "A Study of Spinoza" (1882), "Types of Ethical Theory" (1885), "A Study of Religion" (2 vols. 1887), and many other works on kindred topics. He died in London, Jan. 11, 1900.

Martinelli, Sebastian (mär-tē-nel'lē), a papal delegate; born in Lucca, Tuscany, Aug. 20, 1848; studied at the St. Anne Seminary in Lucca, and at the College of St. Augustine in Rome; was ordained a Roman Catholic priest in March, 1871; made prior-general of the Augustian Order in 1889; appointed apostolic delegate to the United States, and consecrated a special archbishop in 1896; and was raised to the cardinalate, April 15, 1901.

Martinez de Campos, Arsenio. See CAMPOS, ARSENIO MARTINEZ.

Martinique, one of the French West India Islands, in the Windward group; 30 miles S. by W. of Dominica, and 20 miles N. of St. Lucia. It is of irregular form, high and rocky, about 45 miles long and 10 to 15 broad; area, 380 square miles. Its loftiest summit, Mont Pelée, is 4,450 feet high. There are six volcanoes on the island, one of which, Mont Pelée, became disastrously active in May, 1902. Extensive masses of volcanic rocks cover the interior, rise to a great elevation, and extend from the mountains to the shores of the sea, where they form numerous deep indentations along the coast. Between the volcanic rocks broad irregular valleys of great fertility occur. Those on the W. side, called Basseterre, are more extensive, fertile, and level than those on the E. side, called Cabesterre. The climate is hot but not unhealthy. Hurricanes and earthquakes are not infrequent. About two-fifths of the island are under cultivation, the remainder being covered with trees or occupied by naked rock or disintegrated pumice stone. Agriculture has made great progress in the colony. The principal object of cultivation is the sugar cane which occupies about two-thirds of the arable land. Manioc, yams, bananas, sweet potatoes, coffee, and cacao are also cultivated. The coffee of Martinique is almost as highly esteemed as that of Arabia. The mountain slopes are in most parts covered with primeval forests. In other parts the slopes are cultivated to the height of about 1,400 feet. Numerous streams flow down from the heights, most of them mere rivulets, except during the rainy season which lasts from the middle of July to the middle of October, when they become impetuous torrents. A few are navigable for boats for a short distance from their mouths, and used for the conveyance of produce to the shipping. The island has several good harbors, the best of which is Port Royal, on the S. W. side of the island. Though among the best in the Caribbees, it is much impeded by shoals. There is a regular service of packet boats between the island of Martinique and Saint Nazaire in the mother country. The principal town, St. Pierre, was destroyed with an estimated loss of more than 28,000 lives on May 8, 1902. (See ST. PIERRE.) Since 1870 Martinique has sent two deputies to the National Assembly of France. The island was discovered by the Spaniards on St. Martin's day in 1493, when it was peopled by Caribs, who called the island Madiana. In 1635 it was settled by the French, who eventually extinguished the aboriginal race. It was subsequently taken by the British in 1794 and restored in 1802; it was again taken by the British in 1809 and restored in 1814. It was devastated by a tremendous tornado in 1891 with the loss of many lives. Pop. (1905) 182,024.

For years the people of Martinique had lived in perfect safety under the shelter of Mont Pelée. Warnings of impending danger began on May 3, 1902, when the volcano threw out dense clouds of smoke. During the next night these clouds reflected the glowing mass of the crater and rumbling noises were heard. Hot ashes covered the city of St. Pierre on the 4th; and at noon of the 5th a stream of boiling mud suddenly rushed down the mountain side to the sea. The speed of this flow far exceeded that of an express train, for it is said that the distance of 5 miles was covered in three minutes. This sudden rush caused the sea to recede some 300 feet and return in a tidal wave of considerable though not serious proportions. Cable communication with Martinique was interrupted in the afternoon of May 6, and the next news filled the world with horror. An entire city of 28,000 inhabitants had been literally wiped out of existence.

From the stories of the few survivors it is gathered that on Thursday, the 8th, at 7:50 A. M., there was a sudden deafening explosion, and immediately the air was filled with hot sulphurous gases which withered everything they touched. It was believed that the whole top of the mountain had been blown off. Hot dust and shattered rock fell on the city, while mud poured out of the opening made. An eyewitness at Morne Rouge, a town 4½ miles away, which was not destroyed, states that there were seven luminous points on the side of the mountain just before the volcano burst, and that the explosion was fol-

Martinique

lowed by 10 minutes of absolute darkness. Simultaneously with this explosion a tidal wave tore the vessels in the harbor from their anchorages and wrecked them on the beach. The "Roddam," which had a full pressure of steam on, was the only vessel to escape total destruction, and she worked her way flaming from the harbor, amid a shower of molten matter. In the city almost the entire population was immediately suffocated by the hot, poisonous gases. This is proved from the fact that almost all the dead were found face downward with their hands covering their mouths. It is supposed that the destruction was the work of but a few seconds. This short duration of the intense heat is shown by the fact that delicate fabrics were found uninjured among the badly charred victims. The terrific force of the explosion tore up huge trees by their roots and laid them flat; heavy blocks of stone were scattered about; stone buildings were entirely destroyed. Debris covered the city for a depth of 12 feet. According to the estimates the loss of life was almost equal to that resulting from the tidal wave after the eruption at Krakatoa, when 36,000 people perished.

On May 9 there was also an eruption of Mt. Soufrière, St. Vincent. A large loss of life was reported and dust from the volcano spread over the Barbadoes Islands, 75 miles to the E. This eruption had probably a sympathetic connection with that of Mont Pelée. The topographical changes occasioned by these two volcanoes could not be accurately given at the time of writing. Obstructed rivers have overflowed their banks, causing floods and landslides. Important submarine changes have also taken place, for in grappling for the broken cable off St. Pierre, the cable ship "Poyer Quertier" reports that she found the sea bottom 4,000 feet below the surface of the water, where formerly the depth was but 1,000 feet. These changes may result in disaster to shipping until properly recorded by hydrographic survey.

As soon as the details of the disaster were made known in the United States President Roosevelt asked Congress for an immediate appropriation of $500,000 for the relief of the sufferers in Martinique. The Senate at once passed a resolution appropriating $100,000 which the House increased to $200,000, the appropriation being fixed at a lesser amount than the President had asked for because of large and spontaneous private contributions. The President also appointed a committee representing all the large cities in the country to receive funds for the relief of the sufferers from the eruptions both in Martinique and St. Vincent. The cruiser "Cincinnati" was ordered at once to Martinique to aid in rescuing survivors, and the supply ship "Dixie" was detailed to carry relief stores. Subsequently the United States steamship "Potomac," bearing commanders of various war vessels who had been hurried to St. Pierre, made a landing with difficulty.

There also went from the United States on the supply ship "Dixie" a number of scientific experts, desirous of making a thorough investigation of the disaster, including Prof. Robert T. Hill, representing the United States Geological Survey; Prof. Angelo Heilprin, President of the Philadelphia Geographical Society and also representing the National Geographical Society; George Kennan, the well-known traveler and author; Professor Leadbetter, and Prof. C. E. Borchegrevink, the Antarctic explorer. The experts succeeded in reaching the crater of Mont Pelée after an exceedingly hazardous journey, Professor Heilprin said:

"Positive assurance was gained that no molten matter has flowed over the lip of the new crater. Several observations taken with the aneroid barometer showed that the height of Mont Pelée has not been changed. I agree with Prof. Robert T. Hill, the geologist of the United States government, that Mont Pelée has thrown out no lava, and that there has been no cataclysm, and not any serious topographical alteration. No cinder cone was visible in the crater. What was taken for a cone is a pile of ejected rocks. Perhaps the bottom of the new crater may contain a cinder cone, but we could see down only about 150 or 200 feet. I believe, however, that the crater is very much deeper than this. I do not know the exact materials of which the pile of rocks in the center of the crater is composed, but it seems to be matter which has been ejected from the crevasse. This pile of rocks has no vent.

"The eruption of Mont Pelée of May 8 was unique in that it resulted in the greatest destruction of life and property ever known by direct agency of a volcano.

"The phenomenon of the explosion of flaming gases is probably new, but a careful study of observations is necessary before an opinion can be reached. The electrical phenomena, also new, probably did not play the chief rôle in the destruction of St. Pierre, but were developed by and aided the other forces. I have specimens which show the effect of the bolts of lightning. The latter were small and intense, and penetrated within the houses of the city. For rapidity of action as well as for lives destroyed Mont Pelée holds the record among volcanoes."

On the night of Aug. 30, after previous warnings of renewed disturbance, another great eruption occurred, reported as even more violent than that in May. The villages of Morne Rouge and Ajoupa Bouillon were destroyed, the country from Mont Capote to the Valley of Campflore devastated, and Le Carbet swept by a tidal wave.

By official report 1,060 deaths were recorded by Sept. 4, with 150 persons injured.

Martinsburg, a city and county-seat of Berkeley Co., W. Va.; on the Cumberland Valley and the Baltimore and Ohio railroad; 70 miles W. of Washington, D. C. It contains a King's Daughters' Hospital, the Berkeley Female Seminary, the Berkeley Female Institute, St. Joseph's parochial school, United States court house, and weekly newspapers. It has woolen and hosiery mills, foundry, lime, brass, and phosphate works, the shops of the Baltimore and Ohio railroad, canning factory, etc., and an assessed property valuation of over $2,000,000. Pop. (1900) 7,564; (1910) 10,698.

Martin's Ferry, a city in Belmont co., O.; on the Ohio river, on the Cleveland, Lorain, and Wheeling, the Wheeling Bridge and Terminal, the Wheeling and Lake Erie, and the Pennsylvania railroads; almost opposite Wheeling, W. Va. It is located in an iron, bituminous coal, and limestone region; has waterworks, street railroads, iron and nail works, extensive tin mills, machine shops, large manufactories of glass, planing mills, stove works, etc., and an assessed property valuation of nearly $2,500,000. Pop. (1900) 7,760; (1910) 9,133.

Martire d'Anghiera, Pietro. See MARTYR, PETER.

Martius, Carl Friedrich Philipp von (märt'sē-ös), a German naturalist; born in Erlangen, April 17, 1794. In 1817–1820 he was in Brazil as member of a scientific expedition sent out by the Austrian and Bavarian governments, and by his researches and works on the ethnology, botany, etc., of that region acquired a reputation which ranked but little inferior to that of Humboldt. He died in Munich Dec. 13, 1868.

Marty, Martin, an American clergyman; born in Schwyz, Switzerland, Jan. 12, 1834; was educated in Switzerland and Austria; ordained in the Roman Catholic Church; came to the United States in 1860; and was appointed the first superior of a priory that was founded in St. Meinrad, Ind., in 1865. This priory was made an abbey in 1870 and Father Marty raised to a mitred abbot. After several years of faithful work in this office, the abbot resigned and began mission work among the Dakota Indians, whose languages he studied, especially that of the Sioux. He gained great influence over these Indians and gave considerable aid to the government in its dealings with them. The Territory of Dakota was organized into a vicariate-apostolic in 1879, and placed under the direction of Father Marty, who was consecrated Bishop of Tiberias, Feb. 1, 1880. He was transferred to the St. Cloud diocese, Minn., 1894. He was the author of a Sioux grammar and dictionary. He died in St. Cloud, Minn., Sept. 19, 1896.

Martyn, Henry, an English missionary; born in Truro, England, Feb. 18, 1781. He was educated at Cambridge University. After taking orders he served some time as Charles Simeon's curate, but in 1805 sailed for India as a chaplain. He was stationed successively near Serampore, at Dinapore, and at Cawnpur, and from the beginning gave himself to the study of the native languages with an eager zeal that surmounted even his greatest difficulty — broken health. He translated the whole New Testament into Hindustani, Hindi, and Persian, as well as the Prayer-book into Hindustani and the Psalms into Persian. He died in Tokat, Armenia, Oct. 6, 1812.

Martyn, Sarah Towne, an American writer; born in Hopkinton, N. H., Aug. 15, 1805. Some of her books are: "Huguenots of France" (1865); "Sibyl Grey" (1866); "Women of the Bible" (1868); "The Crescent and the Cross" (1869); "Dora's Mistake" (1870); and "Hillside Cottage" (1872). She died in New York, Nov. 22, 1879.

Martyn, William Carlos, an American historical writer; born in New York city, Dec. 15, 1841. He was a Presbyterian clergyman in that city. In his works are included "Life of John Milton"; "Life of Martin Luther"; "History of the Huguenots"; "History of the Pilgrim Fathers of New England"; and "The Dutch Reformation."

Martyr, one who suffers death or persecution on account of his religious belief. One who, for the sake of a great cause or ruling principle, makes sacrifice of life, estate, or worldly station. In the early Church many Christians suffered death at the hands of the Romans, bearing witness to the truth of Christianity with their blood. Many of these underwent, with astonishing fortitude, the most cruel tortures, and doubtless in this way contributed greatly to the spread of Christianity. Those who suffered persecution on account of their faith, but short of death, were called "confessors." The martyrs were supposed to enjoy very peculiar privileges. According to some they passed at once to the full enjoyment of heaven, for which others had to wait till the day of judgment. Martyrdom was thought so meritorious that it was called the second baptism, or baptism in blood; and in any case in which a catechumen was apprehended and slain for the name of Christ before he could be admitted into the Church by baptism, his martyrdom was deemed sufficient to answer all the purposes of that sacrament. The day of martyrdom, as being held to be the day of the martyrs' entering into eternal life, is called, by the

Roman Catholic Church, natal or birthday, and as such is celebrated with peculiar honor and with special religious services. Their bodies, clothes, books, and the other objects which they had possessed are honored as relics, and their tombs are visited for the purpose of asking their intercession. Stephen, the proto-martyr, was stoned in Jerusalem (Acts vii: 58–60) in May, 31; Polycarp, the last of the apostolic fathers, suffered death in 169. Eusebius, who wrote in the beginning of the 4th century, is the first writer who gives an account of the early martyrs.

Martyr, Peter, more correctly PIETRO MARTIRE D'ANGHIERA, an Italian historian; born in Anghiera, Milan, Feb. 2, 1455. In 1487 he entered the service of Ferdinand and Isabella of Spain, who created him counsellor of the Indies. Charles V. also treated him with favor. His principal works are a history of the discoveries of Columbus and his successors, from their own narratives; a work on "Newly Discovered Islands," an account of his embassy to Egypt in 1501; and his "Epistolary Treatise." He died in Granada in 1526.

Martyr, Peter (Pietro Vermigli), an Italian reformer; born in Florence, Italy, Sept. 8, 1500. He entered the order of the regular canons of St. Augustine at Fiesole in 1516, and in 1519 removed to Padua, where he studied Greek and philosophy. After holding important offices in his order he was compelled in 1542 on account of his religious opinions to take refuge in Zürich. Soon after he became Professor of Divinity at Strasburg, and in 1547 accompanied Bucer and other reformers, on the invitation of Archbishop Cranmer, to England. He was appointed to the theological chair at Oxford in 1549, but on the accession of Queen Mary was commanded to quit the country, and returned to his Strasburg professorship. In 1556 he removed to Zürich to occupy the office of theological professor. Martyr was the author of many works on divinity, including Biblical commentaries. He died in Zürich, Nov. 12, 1562.

Martyrology, a list of martyrs and other saints, with brief notices of their life and death, together with the mysteries of religion, such as the Incarnation, the Trinity, etc., commemorated on each day of the year. It is simply a calendar, amplified by short notices of the subject of each feast. In the religious orders of the Roman Church it is read at Prime. It was formerly, and in some orders is still, read in the monastic chapter, and not in choir.

Martyrum. See ACTA SANCTORUM.

Marut, in Hindu mythology, the god of the wind and tempest.

Marvel, Ik. See MITCHELL, DONALD G.

Marvell, Andrew, an English publicist; born in Winestead, Yorkshire, England, March 31, 1621. He was educated at Cambridge University. After spending several years in foreign travels, he was appointed secretary of embassy at Constantinople, and after his return to England, in 1657, became secretary to the poet Milton. After the restoration he represented his native town in Parliament, and soon became distinguished as the most disinterested and incorruptible man of his day. As a political writer, and as a poet and satirist, his merits were of the highest order. Charles II. delighted in his wit and conversation, though obnoxious to the government by reason of his outspoken denunciation of political chicanery and jobbery. The latter, indeed, sought to make an ally of the opponent it feared; but Marvell steadily refused to sacrifice his personal and political integrity, and on one occasion being sent a present of $5,000, "as a mark of the king's private esteem," he rejected the gift without hesitation, though obliged, after the envoy's departure, to send to a friend for the loan of a guinea. "Honest Andrew Marvell" died in London, Aug. 18, 1678.

ANDREW MARVELL.

Marwar (mär'wär), or **Jodhpur** (jōd-pör'), a State of Hindustan, tributary to the British; area, 34,963 square miles; pop. (1901) 1,935,565. Marwar may be taken as the type of the old Rajpoot States of India. The country consists generally of open plains, the hills being almost confined to the S.; the soil, almost everywhere watered by torrents and affluents of the Loonee, or Salt river, produces heavy crops of barley and other kinds of grain; the inhabitants are chiefly Rajpoots. Capital, Jodhpur, 100 miles W. S. W. of Ajmeer; pop. (1901) 60,437.

Marx, Karl (märks), a German socialist; born in Treves, May 5, 1818. He studied jurisprudence, philosophy, and history, at Bonn and Berlin; edited the "Journal of the Rhine," 1842–1843; on its suppression went to Paris, but was expelled from there (1845), and took refuge at Brussels; founded the "New Journal of the Rhine" at Cologne (1848); expelled again from Prussia (1849), settled in London. He was the

controlling spirit of the International, 1864–1872. His great work was "Das Kapital" (Capital: 1867; new ed. 1885). Vol. I, containing all the essential points of his theory, was translated into English (London, 1887). The entire work appeared in an English translation in 1893. He died in London, March 14, 1883.

Mary (Hebrew Miriam), called in the New Testament The Mother of Jesus, is held in high honor, and her intercession is invoked with a firmer confidence than that of all the other saints in the Roman Church. The Christian Churches of the East — the Greek, the Syrian, the Coptic, the Abyssinian, and the Armenian — also hold the Virgin Mary in reverence. The incidents in her personal history recorded in Scripture are few in number, and chiefly refer to the Annunciation and to her relations with our Lord. Many theological questions respecting the Virgin Mary have been raised among Christians of the various Churches.

Mary, the mother of Mark the Evangelist. She had a house in Jerusalem, where the followers of Jesus were wont to convene. Hither Peter, when delivered from prison by the angel, came and knocked at the gate. (Acts xii: 12.)

Mary, the wife of Cleophas, and mother of James the Less and Joses, (Matt. xxvii: 56, 61; Luke xxiv: 10; John xix: 25). This last passage leaves it uncertain whether this Mary was sister to Mary, our Lord's mother, or not. Some suppose that four persons are there named: Christ's mother, his mother's sister, Mary of Cleophas, and Salome. She believed early in Jesus Christ, and accompanied Him in some of His journeys, to minister to Him; followed Him to Calvary, and was with His mother at the foot of His cross. She was also present at His burial; prepared perfumes to embalm Him, and was early at His sepulcher on the morning of His resurrection.

Mary, the sister of Lazarus, whom our Lord raised from the dead. Her character presents a beautiful companion picture to that of her more active and impulsive sister Martha. Contemplative, confiding, and affectionate, it was like heaven to her to sit at the feet of her Lord. (Luke x: 39–42.) The character of the two sisters was well contrasted at the supper in Bethany, after the resurrection of Lazarus. No service was too humble for Martha to render, and no offering too costly for Mary to pour out, in honor of their Saviour. (John xi:, xii: 1–8.) This occurrence should not be confounded with that described in Luke xii: 37–50.

Mary, the Magdalene, or native of Magdala, on the Sea of Galilee. She was foremost among the honorable women who ministered unto Christ and His disciples. (Matt xxviii: 1–10; Mark xv: 47, xvi: 1–10; Luke xxiv: 1–12; John xx: 1, 2, 10–18.) She was especially devoted to Christ for His mercy in casting out from her seven evil spirits. (Luke viii: 2, 3.) She was early at His tomb; and lingering there when the disciples had retired, she was the first to throw herself at the feet of the risen Saviour. There is no evidence that she was ever a profligate.

Mary I. (Mary Tudor), Queen of England, daughter of Henry VIII. and his first queen, Catherine of Aragon; born in Greenwich Palace, Feb. 18, 1516. She early espoused her mother's cause during the proceedings for divorce then pending, and thereby became estranged from her father. After the death of Queen Anne Boleyn, in 1539, Mary, though educated a Roman Catholic, was induced to acknowledge the king

MARY I. OF ENGLAND.

as head of the Reformed Church of England, and yielded an outward conformity to the successive changes of religion during Henry's reign, thereby securing to herself the succession (after her brother) by act of Parliament passed in 1514. During the reign of her half brother, Edward VI., Mary steadfastly refused to conform to the Protestant religion; which led to the attempt to transfer the succession to the crown to her cousin, Lady Jane Grey, to her own exclusion. This proceeding failed, though Lady Jane was actually proclaimed on Edward's death in 1553, and Mary entered London in triumph. She liberated the imprisoned Roman Catholic prelates, substituting Archbishop Cranmer, Bishop Latimer, and other leading Protestant divines

in their stead; then she sent Lady Jane Grey and her husband, Lord Guilford Dudley, to the block on a charge of treason; and on the instigation of Gardiner proclaimed the repeal of all the laws of Henry VIII. and Edward VI. for the maintenance of the Reformed religion. An insurrection, headed by Sir Thomas Wyat, having for its object the prevention of her union with Philip II. of Spain, was suppressed after considerable bloodshed, and the marriage took place in Winchester in 1554. In 1557 war being renewed between France and Spain, and Mary taking sides with Spain, Calais was lost to the English nation. She died in St. James Palace, Nov. 17, 1558.

Mary II., Queen of England; born in St. James Palace, April 30, 1662. She was daughter of James, Duke of York, afterward James II., by his wife Anne Hyde, daughter of Lord Clarendon. She was married in 1677 to William, Prince of Orange; and when the Revolution dethroned her father, Mary was declared joint-possessor of the throne with William, on whom all the administration of the government devolved. During the absence of William in Ireland in 1690, and during his various visits to the Continent, Mary managed at home with extreme prudence. She was strongly attached to the Protestant religion and the Church of England. She died of smallpox in Kensington Palace Dec. 28, 1694.

Mary Stuart, Queen of Scots; born in Linlithgow Palace, Scotland, Dec. 8, 1542; was the daughter of James V., by his queen, Mary of Lorraine, a princess of the family of Guise. Her father dying when she was six days old, disputes arose among the nobility about the guardianship of the infant sovereign and the conduct of public affairs. The regency was at length vested in the Earl of Arran, and Henry VIII. of England having demanded the hand of Mary in marriage for his son Edward, the regent's ultimate rejection of the proposal occasioned a war, in which the Scots were defeated at the battle of Pinkie, near Musselburgh (1547). But the victory of the English had no effect in furthering the object of the war. In August, 1548, the young queen was sent to France, embarking in one of the royal galleys at Dumbarton, and landing at Brest. The Scottish princess was educated with the children of the royal family, and received instruction in every branch of learning and polite accomplishment which was fashionable at that period. On April 24, 1558, she was married to the dauphin, afterward Francis II. He died in December, 1560, 17 months after his accession to the crown, and in August, 1561, the widowed queen returned to Scotland. Mary had, of course, been educated in France as a Roman Catholic, and her instructors had succeeded in inspiring her with a sincere attachment for the Roman Catholic faith. The Scottish Reformation had just taken place (August, 1560), and when she returned she found that the influence of the Protestants was paramount in her kingdom. In these circumstances she had sufficient discernment to see that it was vain for her in the beginning of her reign to make any open attempt to have Roman Catholicism again set up in Scotland, though she claimed the right of exercising her own religion.

Within a few days after her arrival in Scotland she had an interview with John Knox, hoping that by her arguments, and still more by the fascinations of her person and manner, which were usually unfailing in their effect, she might gain him over, at least so far as to take a more tolerant view of her own adherence to the Roman Catholic ritual, which Knox had the hardihood openly to condemn in the pulpit. In this interview it is evident from Knox's own account of it, she displayed consummate tact, but was unable to extort the slightest concession from the inflexible reformer. Seeing

MARY QUEEN OF SCOTS.

this she resigned herself to circumstances, and quietly allowed her half-brother, Lord James (natural son of James V., by Lady Margaret Erskine), whom she first created Earl of Mar, and then Earl of Murray (or Moray), to assume the position of first minister; surrounded herself with a number of other Protestant advisers, and dismissed the greater part of the train of French courtiers who accompanied her to Scotland. She even gave these ministers her active support in various measures that had the effect of strengthening the Protestant party; but she still continued to have the mass performed in her own private chapel

at Holyrood, and that without injuring the popularity which her fine person and queenly manners acquired among the greater number of her subjects in all parts of her dominions.

This early part of Mary's reign presents a great contrast with the remaining part of it, and indeed with the remainder of her whole life. It is marked by only one notable political event, the suppression of the rebellion raised in 1562 by the Earl of Huntly, the most powerful Catholic nobleman in Scotland. The irony of fate decided that Huntly's power should be reduced by a sovereign of his own faith, and Mary cannot have willingly agreed to the acts of her advisers. Otherwise, her early rule was successful. Her subjects were quiet, she herself was popular and her court was one of the most brilliant in Europe. The calamities of Mary began with her second marriage. Almost from the time of her arrival in Scotland numerous suggestions had been made for the disposal of her hand. At this period Mary was ambitious of contracting a marriage which should add to her dignity and power, and accordingly the only one of the proposals that were made on which she looked with any favor, was that for her marriage with Don Carlos, son of Philip II., and heir to the extensive dominions of Spain. Negotiations for accomplishing this match were secretly carried on by her for many months, but were suddenly put a stop to in February, 1565, when she saw for the first time at Wemyss Castle her cousin, Lord Darnley, son of the Earl of Lennox. The queen's heart was at once captivated. Lord Darnley had numerous favors conferred on him; was made in a short time Lord of Ardmanach, Earl of Ross, and Duke of Albany. On May 15, 1565, Queen Mary announced to an assembly of her feudal lords her intention of marrying him, and on July 29 following, the marriage was actually celebrated. The marriage was doubtless a love match; but it had also a political aspect, for Darnley (being descended from Margaret Tudor, widow of James IV.) was, after Mary herself, the nearest heir to the throne of England, and the Scottish queen's claim on the English succession was thus consolidated.

The marriage was in every respect an unfortunate one. Darnley was a Roman Catholic, and immediately after the marriage the Earl of Murray, Glencairn, Rothes, Kirkcaldy, and others of the Protestant lords combined against the new order of things; but their attempt at rebellion was easily thwarted, and the rebels themselves compelled to take refuge in England, where they were received by Queen Elizabeth, who provided them with money. Meanwhile, Mary's mistake became apparent. Darnley proved a profligate and ungrateful husband, and a weak and worthless man. Within a year after the marriage the numerous indignities which he offered to the queen were crowned by his putting himself at the head of a band of conspirators, who had united for the purpose of murdering David Rizzio, an Italian, who, having found his way to the queen's court in the train of some foreign ambassador had gained her favor by his skill in music and various other accomplishments, and had thus excited the envy and hatred of the Scotch nobility who were less highly favored. Darnley had been worked on to believe that as a husband he had cause to be jealous of Rizzio, and was induced to join the conspiracy, but he had a stronger reason for dislike of Rizzio than this suspicion which he probably could not seriously entertain. He had become ambitious of obtaining the crown matrimonial, which would have raised him from the position of a prince consort, and Rizzio had strongly urged Mary not to grant his request. The conspiracy involved, besides the murder of Rizzio, the grant of the crown matrimonial to Darnley and the return to Scotland of the exiled nobles. Murray and his confederates were thus plotting to confer the crown matrimonial on the very man whose marriage with the queen had led to their taking up arms a few months before. It is, of course, doubtful if they would have carried out their promise had the plot fully succeeded.

The plan of the conspirators was carried out in the most heartless manner, Rizzio being forcibly removed by the assassins from the queen's presence while he was supping with her and the Duchess of Argyle, and murdered within a short distance of the queen (March 9, 1566). Mary was then imprisoned in Holyrood, and the exiled nobles arrived in Scotland next day. Murray had an interview with his sister and received her forgiveness. The development of the plot was arrested by Mary's winning Darnley over to her side and together they escaped by night to Dunbar. The murderers of Rizzio had to flee to England, and received assistance from Elizabeth, who had been aware of the existence of the plot. In consequence of this act of violence the breach between Darnley and the queen became wider than ever. Mary indeed professed to believe Darnley's declaration of his own innocence of any connection with the affair, but she soon learned (if she did not know from the first) the part he had played. A little more harmony prevailed between the two for a short time after the birth of their son, afterward James VI. of Scotland and I. of England, which took place on June 19, 1566; but about the close of the same year Darnley withdrew from the court, assuring the queen that she should not see his face for a long period. Meanwhile the Earl of Bothwell had risen

high in the queen's favor. The first step had been made on the occasion of the rebellion of the Protestant lords consequent on the queen's marriage with Darnley, when Bothwell came over from the Continent and offered his services in putting down the rebels. From that time Bothwell had always occupied a place of great influence at the court. When the young prince James was baptized at Stirling Castle, on Dec. 7, 1566, Bothwell did the honors of the occasion, and Darnley, the father of the prince, was not even present. In the month of November, when Mary was residing at Craigmillar Castle, the nobles proposed to her that she should divorce Darnley; but she declined to listen to this suggestion, because by the law of the Roman Church it would involve the annulment of the marriage and so affect the legitimacy of her son.

Grave doubts surround the events of the next few months. It is certain that the nobles had all along disliked Darnley, and he had awakened the special enmity of his fellow conspirators in the Rizzio murder, whom he had betrayed and deserted. Matters remained in this state till January, 1567, when Darnley, who had fallen ill, and was lying at Glasgow under the care of his father, the Earl of Lennox, begged Mary to come and see him. The queen consented, and on her arrival at Glasgow a reconciliation ensued, and it was arranged that Darnley should be removed to Edinburgh. For reasons which are variously stated, he was not lodged in Holyrood nor at Craigmillar, but in a house called Kirk-of-Field, close to the city wall. It was on the last day of January, 1567, that Darnley was lodged in Kirk-of-Field, and from that day till Feb. 9 he was tended there by the queen herself, who slept in a chamber beneath Darnley's. On the evening of Feb. 9, Mary left her husband to be present at a masque at Holyrood, in honor of the marriage of a favorite page, and during the night the house in which Darnley lay was blown up by gunpowder, and he himself was afterward found dead with marks of violence on his person. The circumstances attending this crime were very imperfectly investigated, and though popular suspicion unequivocally pointed to Bothwell as the ringleader in the outrage, he still continued in favor and power at the court, and Parliament put its seal on the acquittal which followed the legal proceedings taken in acordance with the instructions of the privy council, on April 12. An accusation of Bothwell was laid before the jury by one of the gentlemen of the household of the Earl of Lennox, father of the murdered person, but the prosecution produced no witnesses, demanding a postponement of the trial, which was refused, and Bothwell was acquitted. On the 19th of the same month a large proportion of the nobility met at a great supper and signed a document recommending the queen's marriage with Bothwell as a proper step to be taken for the public good. The event here foreshadowed very soon after actually took place.

On the 21st the queen went to Stirling to visit her son the infant prince, and on her return she was intercepted by Bothwell at the head of a body of armed men, and carried off with but little resistance, or show of resistance, to his castle of Dunbar. A divorce between Bothwell and his wife, whom he had married only the year before, was now procured, and Mary's intention of marrying him was publicly announced. The completeness of the ascendency that Bothwell had now acquired over the queen is evident from the fact that he was able to insist on having the marriage ceremony performed not in the manner required by the queen's religion, but in that of his own, which was Protestant. The ceremony was performed on May 15. Very few were present at the marriage, and after its occurrence Holyrood continued to be ominously deserted. On the first occasion on which Mary saw fit to make a proclamation to her subjects she found that she had lost their allegiance; for when on May 28 she summoned the feudal forces together for an attack on the border marauders, the summons remained unobeyed. Alarmed at this, Bothwell and Mary suddenly fled from Holyrood to Borthwick Castle, about 13 miles from Edinburgh, and when they saw themselves surrounded here by a hostile force managed to make their escape to Dunbar. In a few days Bothwell succeeded in collecting a force numerous enough to warrant him in meeting that of the nobles who had confederated themselves against him; but on Carberry Hill, about 7 miles from Edinburgh, where the armies met on June 15, his army melted away. The queen surrendered to the nobles, who asserted that they had taken up arms to deliver her from the tyranny of Bothwell, and promised to acknowledge her as their sovereign if she would abandon him. Bothwell took refuge in flight. He first made his escape to Dunbar, then to the Orkney Islands, and finally to Denmark where he died in 1576.

The confederates broke their promise to the queen, alleging that she had tried to communicate with Bothwell, and they conveyed her to Edinburgh, where, in passing through the city to the provost's house, the place to which she was first taken, she was exposed to the insults and contempt of the populace. From Edinburgh she was removed to Loch Leven Castle, where she was placed in confinement, in the custody of Lady Douglas, mother of the Earl of Murray. A few days after these events, on June 20, the nobles, who now declared that they had taken up arms against the queen on account of her share in the murder of

her husband, asserted that they had found, among the possessions of the Earl of Bothwell, a casket containing eight letters and some poetry, all said to be in the handwriting of the queen. The originals of these papers are now lost, but their contents were published in 1571 in the form of a translation appended to Buchanan's "Detection," and other contemporary versions have been found in the Record Office and among the Cecil MSS. at Hatfield. These letters breathe the most passionate devotion to the person to whom they are addressed, and if they are genuine and have not been tampered with in the form in which we know them, clearly show that the writer was herself party to the murder of Darnley. The question of their genuineness has been the cause of endless discussion among the partisans and accusers of Mary. Whatever doubt may attach to the letters in our day, certain it is that their discovery at this critical time was used by the confederates as affording unmistakable evidence of the queen's guilt. On July 24 she was forced to sign a document renouncing the crown of Scotland in favor of her infant son, and appointing the Earl of Murray regent during her son's minority.

At this time Murray was abroad, but he instantly returned to Scotland and was inaugurated as regent on Aug. 22. After remaining nearly a year in captivity Mary succeeded, with the help of George Douglas, the younger son of Lady Douglas, and one Willy Douglas, often called "the little Douglas," in making her escape from Loch Leven (May 2, 1568), and, assisted by the few friends who still remained attached to her, she made an effort for the recovery of her power. The battle of Langside (May 13, 1568) insured the triumph of her enemies, and to avoid falling again into their power she fled to England, to claim the protection which had been offered her by Queen Elizabeth. She landed at Workington, in Cumberland, on May 16, and the 17th is the date of a long letter which she wrote to Elizabeth, in which, after giving a long account of her distresses, she entreats the promised protection of her rival. In subsequent letters she earnestly sought for a personal interview with Elizabeth; but this the latter distinctly refused to grant till Mary should have cleared herself from the charges laid against her by her subjects, especially that of being concerned in the murder of her husband. Mary all along denied the right either of a Scotch or an English court to sit in judgment upon her; but at last consented that her cause should be discussed by certain commissioners, one set of whom was to be appointed by herself, one set by the confederates who governed in Scotland, and the third set by the English government. It was arranged that Mary should appear

Mary Stuart

as prosecuting her rebel nobles, who justified their proceedings on the ground of her guilt. Elizabeth for her part made promise, on certain conditions, to set up Queen Mary again as Queen of Scotland, provided this conference turned out satisfactorily.

The commissioners met first at York, but the conference was afterward transferred to Westminster. The commissioners representing the Scottish nobles plainly accused Queen Mary of participation in the murder of Darnley, and supported their accusation by the casket letters among other documents. Elizabeth then pressed Mary to reply to this charge; Mary demanded to be shown either the originals or copies of the documents produced as evidence against her, and on Elizabeth's refusing both, she directed her commissioners to withdraw from the conference. Elizabeth then abruptly closed the proceedings by finding that while Mary had failed to prove her case against the nobles, they, on their part, had given the English queen no reason for taking any "evil opinion of the queen, her good sister." The question of Mary's guilt or innocence remained really undecided, and subsequent investigation cannot be said to have attained any certain conclusion. It may, however, be regarded as almost certain that, even if the casket letters are genuine, the murder of Darnley and the Bothwell marriage were not the results solely of a domestic conspiracy between Mary and Bothwell. There can be little doubt that others of the nobles were implicated; they subsequently leveled at each other accusations of a share in the murder, and the Earl of Morton, one of Mary's most prominent accusers, was afterward put to death for his guilt in the matter. The immediate result of the conference was that all the parties concerned remained in the same condition as before. Murray continued to be regent in Scotland in place of the infant King James VI.; Mary remained in captivity in England.

The rest of her life was passed in a succession of intrigues for accomplishing her deliverance, and sometimes for greater objects. The first of these intrigues was begun when the conference was still going on. The leader in it was the Duke of Norfolk, the chief of the commissioners first appointed by Elizabeth, who was flattered with the hope of obtaining Mary's hand. The plot having been detected Norfolk was committed to the Tower. On being released in the following year (1570) he renewed his correspondence with Mary; but was apprehended a second time, convicted of treason, and beheaded (June 2, 1572). For more than 18 years Mary continued to be the prisoner of Elizabeth, and in that time the place of her imprisonment was frequently changed. She was at last accused of being

implicated in Babington's plot against Elizabeth's life and government, and having been tried by a court of Elizabeth's appointing was on Oct. 25, 1586 condemned to be executed. There was a long delay before Elizabeth signed the warrant for the sentence to be carried out, a delay attributed by different writers to different motives; but this was at last done on Feb. 1, 1587. Mary received the news of her destined fate with great serenity; wrote her will; and having prepared herself for death by practising the ceremonies enjoined by the Catholic faith to which she was devotedly attached suffered decapitation, Feb. 8, 1587, in the castle of Fotheringay, where she had been long confined; and on Aug. 1 was interred with great pomp in the Cathedral of Peterborough. Her body was subsequently removed by her son, James I., to Henry VII.'s chapel, Westminster, where a magnificent monument was erected to her memory.

The character and conduct of Mary, Queen of Scots, have been made the subject of much controversy. "No inquiry," says Sir Walter Scott in his "History of Scotland," "has been able to bring us to that clear opinion on the guilt of Mary which is expressed by many authors, or to guide us to that triumphant conclusion in favor of her innocence of all accession, direct or tacit, to the death of her husband, which others have maintained with the same obstinacy. The great error of marrying Bothwell, stained as he was by universal suspicion of Darnley's murder, is a spot on her character for which we in vain seek an apology. What excuse she is to derive from the brutal ingratitude of Darnley; what from the perfidy and cruelty of the fiercest set of nobles who existed in any age; what from the manners of a time in which assassination was often esteemed a virtue, and revenge the discharge of a debt of honor, must be left to the charity of the reader." The works which have either been expressly written on the subject, or which contain matter relating to it, are almost innumerable. They are mostly written in English or French, and have been constantly appearing from the date of the events under discussion down to the present day.

Authorities are more agreed as to the attractions, talents, and accomplishments of Mary Stuart than as to her character. Contemporary writers who saw her unite in testifying to the beauty of her person, and the fascination of her manners and address. The great influence which she could exert over most of those persons with whom she came into direct contact, was manifested to the very end of her career.

Marye's Hill, a locality in Spottsylvania Co., Va., in the vicinity of Fredericksburg, which during General Burnside's attack on that town (Dec. 13, 1862) was held by a force of Confederates under General Longstreet. General French, aided by General Hancock, attempted to carry the post by storm, but they were repulsed with a loss of nearly half of their men. Soon afterward General Hooker made a similar attempt, and was also driven back, leaving 2,013 men dead on the field. General Howard's division then came to the assistance of Generals French and Hancock, but met with similar ill fortune. The whole afternoon had now been spent, to no other effect than the loss of over 5,000 Union soldiers, when General Burnside, in spite of the advice and even entreaty of many of his officers, declared that, "That crest must be taken tonight." General Humphreys, therefore, with 4,000 men, followed in the fatal track of his predecessors, and was also repulsed, with a loss of 1,700 killed and many wounded. The approach of darkness only ended the awful conflict. Subsequently, during the battle of Chancellorsville, Marye's Hill was taken by General Sedgwick, May 3, 1863.

***Maryland,** a State in the South Atlantic Division of the North American Union; bounded by Pennsylvania, Delaware, Virginia, West Virginia, and the Atlantic Ocean; one of the original 13 States; number of counties, 24; area, 9,860 square miles; pop. (1900) 1,190,050; (1910) 1,294,450; capital, Annapolis.

Topography.— The surface of the State is varied, with three prominent divisions, the Coast Plain, including the Western Shore, between the ocean and Chesapeake Bay; the Piedmont plateau, extending from the bay W. to the Catoctin Mountains, and the Appalachian mountain region. The Chesapeake Bay cuts the State in two parts, and with its principal affluent, the Potomac river, forms the principal water system of the State. The mountains in the W. are divided into three ranges, the Blue Ridge, Appalachian, and Alleghany, and reach an elevation of 3,000 feet. The Atlantic coast has no good harbors, but the bay with its numerous coves, and estuaries gives excellent facilities for water transportation. The principal rivers are the Potomac on the S. boundary, the Susquehanna flowing in from Pennsylvania on the N. and emptying in the bay, and the Patuxent, Patapsco, Gunpowder on the Western Shore; and the Elk, Sassafras, Chester, Choptank, Nanticoke, Wicomico, and Pocomoke, on the Eastern Shore, all of which empty into Chesapeake Bay.

Geology.— Nearly every geological period is represented in Maryland, the Archæan deposits are found over nearly the whole State. Metamorphosed rocks, such as granites, gneisses, basalt, and marble, occur in the Piedmont Plateau, and in Western Maryland the Silurian, Devonian, and Carboniferous series are found. The Eastern

*For Map, see DELAWARE.

Maryland

Shore presents sands, clays, and granites of more recent origin. The Upper Jurassic period is represented by dinosaurian remains in Prince George's county.

Soil.— The soil in the E. part of the State is a light sandy loam, and is especially adapted to truck farming and market gardening. The soil in the valleys of the N. and central portions is especially adapted to grass and wheat cultivation. The climate is equable, and not subject to sudden changes, the thermometer seldom falling below zero. The principal forest trees include cypress, gum, cedar, juniper, dogwood, holly, magnolia, elm, cherry, oak, locust, sycamore, sassafras, poplar, maple, walnut, ash, birch, chestnut, hickory, and pine.

Mineralogy.—The mineral productions are inextensive, the principal output being coal, with a production in 1900 of 4,024,688 short tons, valued at $3,927,381. The stone industry is carried on extensively, the production being, sandstone, $6,655; granite, $486,822; slate, $128,673; marble, $70,000; limestone, $317,207; total, $1,009,357. The clay products amounted to, brick and tile, $1,317,915, and pottery, $361,726; total, $1,679,641. The production of mineral waters was 373,320 gallons, valued at $36,849.

Agriculture.— The agricultural advantages of Maryland are quite extensive. The principal farm crops in 1900 were wheat, 15,187,848 bushels, valued at $10,783,372; corn, 15,232,808 bushels, valued at $6,245,802; oats, 1,783,416 bushels, valued at $552,859; rye, 408,028 bushels, valued at $212,175; buckwheat, 111,525 bushels, valued at $63,569; potatoes, 1,269,455 bushels, valued at $685,506; and hay, 302,292 tons, valued at $4,247,203. The farm animals reported for 1899 were horses, 130,959, valued at $6,950,014; mules, 12,891, valued at $937,005; sheep, 138,177, valued at $485,553; milch cows, 154,712, valued at $4,610,418; and other cattle, 102,722, valued at $2,604,643.

Manufactures.— In 1900 there were reported 9,880 manufacturing establishments, employing $163,422,260 in capital and 108,361 persons; paying $38,761,551 for wages, and $144,539,680 for materials; and having an annual output valued at $242,752,990. The principal manufactures included fertilizers, flour, machinery, furniture, iron and steel, lumber and timber products, paper, cotton and woolen goods, tobacco, etc.

Commerce.— The imports of merchandise at the port of Baltimore for 1900 aggregated in value $19,688,476; and the exports, $111,462,168; giving a total foreign trade of $131,150,644. The principal articles of export were oysters, tobacco, coal, petroleum, grain, sugar, and cotton.

Banking.— On Oct. 31, 1901, there were reported 79 National banks in operation, having $16,118,460 in capital, $7,392,981 in outstanding circulation, and $6,153,750 in United States bonds. There were also 28 State banks, with $1,508,990 capital and $433,766 surplus; 9 private banks, with $578,474 capital and $77,202 surplus; and 5 loan and trust companies, with $4,950,000 capital and $3,850,000 surplus. The exchanges at the United States Clearing House at Baltimore, for the year ending June 30, 1901, amounted to $1,182,838,784, a decrease from those of the previous year of $110,666,388.

Education.— In 1899 the school population was 345,350; the enrollment in public schools, 229,332; and the average daily attendance, 132,685. There were 5,127 teachers; 2,503 buildings used for public school purposes, public school property valued at $4,750,000; receipts for the previous year $2,932,396; and expenditures, $2,912,527. For higher education there were 48 public high schools, 37 private secondary schools, 1 public, and 3 private normal schools, 11 colleges and universities for men and for both sexes, and 5 colleges for women. The most noted colleges include Johns Hopkins University and University of Maryland at Baltimore, Rock Hill, and St. Charles Colleges at Ellicott City, and Western Maryland College at Westminster. Among the women's colleges are Woman's College, of Baltimore, and Notre Dame of Maryland, at Baltimore, and Woman's College at Frederick.

Churches.— The strongest denominations in the State are Roman Catholic; Methodist Episcopal; Protestant Episcopal; Lutheran, General Synod; African Methodist; Methodist Protestant; Reformed; Methodist Episcopal, South; Presbyterian, North; and Regular Baptist, South. In 1899 there were reported 2,531 Evangelical Sunday-schools, with 32,903 officers and teachers, and 206,156 scholars.

Postoffices, Periodicals, and Railroads.— In 1901 there were 1,159 postoffices of all grades; and 208 periodicals, of which 17 were daily, 1 semi-weekly, 145 weekly, 2 bi-weekly, 1 semi-monthly, 33 monthly, 2 bi-monthly, and 7 quarterly. In 1901 the total length of railroads within the State was 1,358 miles.

Finances.—In 1900 the total funded debt was $6,309,326; the available assets, $3,424,057; the assessed property valuation, $616,719,782; and the tax rate, $1.775 per $1,000. The receipts of the State for the year ending Sept. 30, 1900, amounted to $3,622,493; balance in treasury, Sept. 30, 1899, $707,926; total, $4,330,419; disbursements, $3,480,534; cash balance in treasury Sept. 30, 1900, $849,885.

State Government.— The governor is elected for a term of four years, and receives a salary of $4,500 per annum. Legislative sessions are held biennially in even years, beginning on the first Wednesday in

January, and are limited in length to 90 days. The Legislature has 26 members in the Senate and 91 in the House, each of whom receives $5.00 per day. There are 6 representatives in Congress. The State government in 1901 was Democratic.

History.— The earliest settlement in Maryland occurred in 1631, in which year a party of English from Virginia, under Capt. William Clayborne, established themselves on Kent Island in Chesapeake Bay. The main colonization of this region, however, was made in 1634 by a body of English Roman Catholic cavaliers under a charter granted to the 2d Lord Baltimore (*q. v.*) by Charles I., bearing date June 20, 1632. The expedition sailed from England in November, 1633, and landed on St. Clement's Island in March, 1634, founding the settlement of St. Mary's, on the mainland, two days after their arrival. Leonard Calvert was elected first governor, and a House of Assembly established in 1639, which, 11 years later, was divided into two houses — the one consisting of members chosen by the Proprietary, and the other by the Freemen. In 1642, difficulties supervened from the introduction of the Puritan element into the province in the shape of a body of nonconformists who had been exiled from Virginia. The latter, true to their natural instincts of bigotry and intolerance, soon manifested a spirit of insubordination toward the executive of their newly-adopted country; and made themselves masters of the province in 1644. Two years later, however, Governor Calvert returning at the head of a considerable military force succeeded in reëstablishing his authority. On the overthrow of the royal authority in England, and the substitution of the Commonwealth and Puritan rule, the partisans of the latter, who had by this time obtained a considerable footing in the province of Maryland, demanded an instant recognition of the new form of government. The Proprietary and executive, however, proclaimed Charles II., but were compelled, in 1652, to abdicate their functions, which were usurped by commissioners dispatched from the puritanical home government. In 1654 Lord Baltimore made a resolute attempt to restore his authority, and a civil war ensued, in which the Puritans were eventually victorious in 1655. At length, after the restoration of Charles II., the Proprietary was reinstated. In 1729 Baltimore was founded, and in 1745 the Maryland "Gazette," the first journal printed in the province, was published at Annapolis, maintaining its existence for 94 years afterward. Frederick City was laid out in 1751, and the colony progressed rapidly in wealth and population. In 1774 the Stamp Act, and the act levying a duty on tea, met with resolute and active opposition from the Marylanders, who, assembled in convention, abolished the Proprietary government and substituted therefor a Committee of Public Safety. In 1776 a convention of the people adopted a bill of rights and a constitution; in the following year the first elected Legislature was convened at Annapolis, and in March, Thomas Johnson took office as the first republican governor. During the Revolution the Marylanders bore a highly distinguished part, participating in nearly every battle of the war. During the campaign of 1812 Maryland suffered severely from the naval operations of the British; Havre de Grace, Fredericktown, and other places being plundered and burned. The militia of the State as vainly opposed the march of the English army to Washington in 1814. In the same year occurred the battles of Bladensburg and North Point; in the former of which the enemy was successful, while in the latter the British General Ross was killed, and the Americans gained a slight advantage. An attack (Sept. 14–16) on Baltimore by the enemy's fleet was successfully repelled. At the outbreak of the Civil War, in 1861, the Marylanders were divided in sentiment, many of the people being in sympathy with the Confederates, though the State remained loyal to the Federal cause. During a series of Confederate invasions from Virginia during the protraction of the war, the State became the theater of important military operations and sanguinary engagements. Maryland is one of the few States of the Union that rejected the ratification of the 15th Amendment to the Constitution of the United States. In 1867 a new constitution was adopted, making several important changes in the organic law of the State. In the year 1880 Baltimore celebrated its 150th anniversary with a week of festivities, and in 1884 the 250th anniversary of the landing of the colonists was celebrated. In 1891 a monument was erected to Leonard Calvert, the first governor, on the site of the old city of St. Mary's, the first capital of the State, of which scarcely a trace remains.

Wilfred Bateman.

Maryville College, a coeducational institution in Maryville, Tenn.; founded in 1819 under the auspices of the Presbyterian Church; has endowment of about $500,000; grounds and buildings valued at over $175,000; volumes in the library, about 15,000; ordinary annual income, about $60,000; average number of faculty, 35; average student attendance, 620.

Marzials, Théophile, an English poet, of French parentage,; born in Brussels in 1850. He was educated in Belgium, Switzerland, and England, and was employed in the British Museum after 1870. He published "Gallery of Pigeons and Other

Poems" (1873), which has been highly praised. His best-known piece is the song "Twickenham Ferry."

Masaccio, Tommaso Guidi (mä-sät'-chō), an Italian painter; born in San Giovanni, Tuscany, Dec. 21, 1402. He is believed to have studied under Masolino, and went while very young to Rome, where he painted in the Church of San Clemente a remarkable series of frescoes, the finest of which represents St. Catherine and the doctors before Maxensius. In 1421 he was admitted into the guild of the Speziali at Florence. The greatest works of Masaccio are the frescoes in the Brancacci chapel of the Carmine, among which are the "Expulsion from Paradise"; "St. Peter's Sermon"; the "Tribute," the grandest composition in the series; "St. Peter Baptizing"; and the "Resuscitation of the King's Son"; the last of which was partly painted by Filippino. He introduced the same plastic boldness into painting which Donatello did into sculpture, and was a great master of perspective and color. He died in Rome in 1428.

Masai (mä-sī'), a people of East Equatorial Africa, dwelling in a district that includes Kilimanjaro, Kenia, and Lake Baringo. The S. half of the district is low and barren, with no rivers and little rain, while in the N. it rises into a plateau region (5,000 to 9,000 feet), rich in running streams, forests, and grass land. The Masai are not a Negro or Bantu race; they resemble the Gallas, being men of magnificent stature and Apollo-like forms, though their faces are ugly and ferocious in expression. This is due to the warlike habits of their youth, when, for nearly a score of years, they live in military kraals, spending their time in alternate idleness and on the war-path, eating nothing but beef and drinking nothing but milk. After marriage, which takes place when they lay aside the habits of the warrior, they settle down as cattle breeders. The arms of the warriors consist of an ox-hide shield, a spear with a blade 2 to 2½ feet long and 3 inches broad, affixed to a shaft of 15 inches, a sword, and a knobkerry. They are an aristocratic race and clever public speakers. The work is done by slaves and by the women and boys. They speak a Hamitic language.

Masaniello (mä-sä-nyel'lō), the commonly received name of TOMMASO ANIELLO, a fisherman of Naples; born in Amalfi in 1623. He headed the populace in their revolt against the Spanish viceroy in 1647, when only 25 years of age. His career lasted but nine days, in which time he had 150,000 men under his orders and was elevated to sovereign authority. He was murdered by four assassins armed with arquebuses at Naples, July 16; and as the resistance he commenced never ceased till the Spanish yoke was broken, he has since been venerated as the liberator of his country.

Mas-a-Tierra. See JUAN FERNANDEZ.

Masbate (-bä'tā), an island of the Visayan group in the Philippine Islands, constituting a province; area, 1,732 square miles; pop. (1899) 19,507, including 66 dependent islands. It is under a civil government in accordance with the provincial organization act of 1901. Lignite and gold are found, and a leading industry is the manufacture of sugar sacks.

Mascagni, Pietro (mäs-kän'yē), an Italian composer; born in Leghorn, Tuscany, Dec. 7, 1863. He produced, after a somewhat irregular musical education, the brilliantly successful one-act opera "Cavalleria Rusticana" (Rustic Gallantry) in 1890, in competition for a prize, the plot being taken from a story by Verga. Later operas were "Friend Fritz" (1891), "The Rantzaus" (1892), "Nero," besides songs and ballads.

Mascalonge (*Esox nobilior*), a fine North American fresh-water fish of the pike genus, inhabiting the St. Lawrence basin, but also introduced into other waters.

Mascara (mäs-kä-rä'), a town in Algeria, picturesquely situated on the S. slope of Mount Atlas, 48 miles S. E. of Oran. It was a stronghold of Abd-el-Kader, and was taken by the French in 1835 and 1841. Pop. (1891) commune, 16,482.

Mascarene (mäs-ka-rēn') **Islands,** the islands of Bourbon, Mauritius, and Rodriguez, so called from Mascarenhas, a Portuguese navigator who discovered Bourbon in 1545.

Mascle, in old armor, a lozenge-shaped plate or scale. In heraldry, a bearing in the form of a lozenge, perforated or voided so that the field appears through the opening.

Mascot, one who or that which is supposed to bring good luck.

Mashhad. See MESHHED.

Mashona (-shō'nä), a Bantu tribe belonging to the Kafir family inhabiting Mashonaland. In former times the Mashonas were the most powerful native race between the Zambezi and Limpopo, but were defeated and subjugated by the Matabeles.

Mashonaland, a country in the interior of Africa. It forms part of British Zambezia, and is situated N. E. of Matabeleland. It consists of very fertile plateaux and plains, watered by numerous rivers flowing partly to the Zambezi and partly to the Sabi. See RHODESIA.

Masinissa (-nis'sä), King of ancient Numidia; born about 238 B. C. He was at first ruler only of the E. portion of the country, but latterly of the whole, having, by the help of the Romans during the second Punic war, defeated Syphax, King of Western Numidia, taking him prisoner with his wife Sophonisba, whose hand had formerly been promised to Masinissa. Masinissa now made her his wife, but Scipio Africanus, fearful of her influence, claimed her as a prisoner of Rome. Unable to resist, Masinissa sent her a poisoned chalice, of which she voluntarily drank. Masinissa commanded the Roman cavalry on the right wing at the battle of Zama, which ended the second Punic war (201 B. C.). His acquisition of a number of Carthaginian provinces led to the third Punic war, in the second year of which he died (148 B. C.), aged about 100 years. His kingdom, at his own desire, was divided among his three sons, of whom Mastanabal, the youngest, was the father of Jugurtha.

Mask, a sportive cover for the face; that which conceals the face ludicrously, especially a cover with apertures for the eyes and mouth; a visor (see MASQUE). The kings and priests of Egypt wore, upon certain occasions, masks of papyrus, representing the heads of hawks, lions, and other birds and animals, and from them the knowledge of masks passed to the Greeks and Romans, by whom they were employed in dramatic exhibitions. The tragic masks of the Greek stage were frequently very beautiful; but in comedy a grotesque effect was produced by representing the mouth opened and the features distorted. The custom of the use of masks by public executioners is mentioned in 1295. They were first worn by French, and afterward by English ladies toward the end of the 16th century; and in the 17th and 18th centuries they were worn by ladies on horseback, being suspended to the side by a string. In architecture the name denotes a kind of corbel, the shadow of which bears a close resemblance to the human face. It was common in works of the 13th and 14th centuries, and is also called "notch head."

Maskat. See MUSCAT.

Maskelyne, Nevil, an English mathematician and astronomer; born in London, England, Oct. 16, 1732. He was educated at Westminster and Cambridge, chosen a fellow of the Royal Society, and in 1761 deputed to proceed to St. Helena to observe the transit of Venus. In 1765 he became astronomer royal; and in 1767 commenced the publication of the "Nautical Almanac," which he edited till his death. In 1774 he was employed in observations on the eclipses of Jupiter's satellites. He died in Greenwich, England, Feb. 9, 1811.

Mason, Caroline Atherton (Briggs), an American verse-writer; born in Marblehead, Mass., July 27, 1823. She published "Utterance, a Collection of Home Poems" (1852); and "Rose Hamilton," a story (1859). Her poems "Do They Miss Me at Home?" and "The King's Quest," are widely popular. She died in 1890.

Mason, George Hemming, an English painter; born in Stoke-upon-Trent, Staffordshire, England, March 11, 1818. He studied medicine, but in 1844 abandoned it and traveled on the Continent studying art till 1858. His best works were "The Evening Hymn" (1868); "Girls Dancing by the Sea" (1869), and "The Harvest Moon" (1872). He died Oct. 22, 1872.

Mason, James Murray, an American legislator; born on Mason's Island, Fairfax co., Va., Nov. 3, 1798; was United States Senator from Virginia from 1847 till expelled in July, 1861; drafted the "fugitive slave law" in 1850; was sent by Jefferson Davis as Confederate commissioner with John Slidell to England and France in 1861, and was captured on the "Trent," Nov. 8, and kept in Boston as a prisoner of war till Jan. 2, 1862. He died near Alexandria, Va., April 28, 1871. See TRENT AFFAIR.

Mason, Sir Josiah, an English philanthropist; born in Kidderminster, England, Feb. 23, 1795; began life by selling cakes on the street, and after turning his hand to various employments engaged in the split ring business in Birmingham. He began to make pens in 1829, and his business increased till he became the largest penmaker in the world. Partner with Elkington in the electroplating trade (1842–1865), he gave Dr. (afterward Sir) C. W. Siemens his first start in life by paying him $8,000 for a patent; and he paid Krupp, founder of the works at Essen, $50,000 for the patent for machinery to roll the metal blanks from which spoons and forks are made. Mason erected and endowed almshouses, and an orphanage at Erdington at a cost of $1,300,000, and was the founder of the Josiah Mason College at Birmingham. He died in Erdington, England, June 16, 1881.

Mason, William Ernest, an American legislator; born in Franklinville, N. Y., July 7, 1850; removed with his parents to Bentonsport, Ia., in 1858; received an academic education; was admitted to the bar and began practice in Chicago, Ill., in 1872; member of the Illinois General Assembly in 1879 and of the State senate in 1881–1885; of Congress in 1887–1891; and elected United States Senator in 1897, in which capacity he was an ardent advocate of Cuban independence.

Mason and Dixon's Line, in United States history, a line popularly regarded as dividing the slaveholding from the non-slaveholding States, and to have run due E. and W. In reality it ran for more than one-third of its length between two slave States, Maryland and Delaware, and a small part of it is an arc of a circle. It was run by two English engineers, Charles Mason and Jeremiah Dixon, between the years 1764 and 1767, for the purpose of settling the disputed boundaries between Maryland on the one side and Pennsylvania and Delaware on the other. Their instructions were to begin at the most E. point on the Atlantic Ocean, and run due W. to a point midway between the Atlantic and the Chesapeake Bay; thence N., so that the line should become a tangent to the N. W. boundary of Delaware, which was a circle described from Newcastle court house as center, with a radius of 12 miles. The line was then to follow the curve in a W. direction till it reached a point due N. of the point of tangency; thence due N. till it intersected a line run due W. from a point 15 miles S. of Philadelphia; and thence due W. until it intersected a line running due N. from the most W. source of the Potomac river. The work was done with such skill and accuracy that a revision in 1849, with instruments of much greater precision, disclosed no error of importance.

Masonry, the art or occupation of a mason; the art of so arranging stones or brick as to produce a regular construction. The masonry of the ancient Egyptians was remarkable for the large size of the stones employed, sometimes as much as 30 feet in length. They were laid without mortar. The Cyclopean or earlier masonry of the Greeks, some remains of which exist in the walls of Mycenæ and Tiryns, was formed of large and irregularly shaped masses of stone, the interstices being filled with smaller stones. In a few of the earlier English buildings, considered by some to be Saxon, the quoins, the door, and window jambs, and occasionally some other parts, were formed of stones alternately laid flat and set up endwise; the latter were usually much longer than the others. This is termed "long and short" work.

Masonry. See FREEMASONRY.

Mason Spider (*Mygale* or *Cteniza cœmentaria*), a spider more commonly known as the "trap-door spider."

Masoola (-sö'lä), a boat of the Coromandel coast, adapted to be beached on the surf-beaten shore. The planks are sewed together with coir, over wads of the same material which press upon the seams. They are 30 to 35 feet long, 10 to 11 feet beam, 7 to 8 feet deep, and are rowed by 12 men, oars double banked, and a steersman with an oar at the stern.

Masora (-sō'rä), a critical work, containing remarks on the verses, words, letters, and vowel-points of the Hebrew text of the Bible. As the sacred books were originally written without any breaks or divisions into chapters or verses, or even words, the Jews found it necessary to establish a canon to fix and ascertain the reading of the Hebrew text. This rule, or canon, is designated Masora, or tradition, in which the verses, letters, words, etc., are all numbered; and by this means the slightest variations can be detected. The Jewish rabbis who drew up this work are styled Masorites.

Maspero, Gaston Camille Charles (mäs-pe-rō'), a French Egyptologist; born of Italian parents, in Paris, France, June 23, 1846. He began to lecture on Egyptology at the School of Higher Studies in Paris in 1869, and in 1873 was appointed Professor of Egyptology at the College of France. In 1881 he founded a school of Egyptian archæology at Cairo, and succeeded Mariette as director of explorations and custodian of the Boulak Museum. In 1886 he became professor at the Institute of Paris. As an explorer he excavated or opened the pyramids of the kings belonging to the 5th and 6th dynasties, and the burial fields of Sakkara and Dahshûr, and discovered new sepulchral sites of great value at Deir el-Bahari, near the entrance to the Valley of the Tombs of the Kings, at Eckmîn, 130 miles S. of Thebes, and at other places. His most valuable written work includes the excellent "Ancient History of the Nations of the Orient"; "Guide to the Boulak Museum"; "Egyptian Archæology" (1887; Eng. trans. 1887); "Popular Tales of Ancient Egypt" (1882); "Egyptian Studies" (1879–1882); and several technical productions. Knighted in 1909.

Masque (mask), a species of dramatic performance, much in vogue in England toward the close of the 16th and the beginning of the 17th century. It was in fact the favorite form of private theatricals at the time. The masque appears to have originated in the practice of introducing, in any solemn or festive processions, men wearing masks, who represented either imaginary or allegorical personages. At first it was simply an "acted pageant," as in the well-known progresses of Queen Elizabeth; but gradually it expanded into a regular dramatic entertainment, and in the hands of men like Fletcher and Ben Jonson attained a high degree of literary beauty. Jonson's masques were represented at court and were greatly relished. The taste for this kind of amusment, however, died away in the reign of Charles I.; nevertheless, to the

time of that monarch belongs the finest masque, and one of the most splendid poems ever written — the "Comus" of Milton (1634).

Masquerade, a species of amusement, in which persons of both sexes mask or disguise themselves, and engage in dancing, festivities, or miscellaneous conversation. Masquerades are said to have been the invention of Granacci, an Italian, who lived in the beginning of the 16th century. In Italy they were fashionable in 1512, and during the reign of Henry VIII. they were first introduced into England in 1513; into the French court by Catherine de Medicis (1519–1589); and into Germany toward the end of the 17th century.

Mass, in Roman Catholic theology and ritual, "the perpetual sacrifice of the new covenant, in which the body and blood of Jesus Christ are really and truly offered to God under the species of bread and wine." According to the "Catechism of the Council of Trent," the Sacrifice of the Mass was instituted by our Lord at His last supper (Luke xxii: 19); it must be offered to God alone; was signified in Malachi i: 11; is the same sacrifice with that of the Cross; there is one priest of both, for the celebrant uses not his own words, but those of Jesus Christ; it is a sacrifice of praise and propitiation, and available for the living and the dead. There is an obligation on all Christians of the Roman Obedience to hear mass on all Sundays and holy days of obligation.

Mass, in music, a setting of certain portions of the mass to music; the portions of the mass usually set to music — namely, the Kyrie, the Gloria, the Credo, the Sanctus, and the Agnus Dei. An Offertory and Benedictus are sometimes added to these numbers. Masses are designated musically after the key in which they commence, as Beethoven in D; and liturgically, according to the character and solemnity of the accompanying ceremonial.

Mass, in mechanics and astronomy, the quantity of matter contained in a body, as measured by its weight at a given place. The mass of a body is constant, while its weight varies with the variation of the attraction of gravity in different latitudes and at different heights above the earth's surface. The weight of a body, as measured by a pair of balances, would appear to be the same at all parts of the earth's surface, but if measured by a spring or torsion weighing apparatus it would vary with the variation in the force of gravity. In astronomy, the masses of the planets of the solar system which have no satellites are difficult to determine.

Massachusetts, a State in the North Atlantic Division of the North American Union; bounded by Vermont, New Hampshire, Connecticut, Rhode Island, New York, and the Atlantic Ocean; one of the original 13 States; number of counties, 14; area, 8,040 square miles; pop. (1890) 2,238,943; (1900) 2,805,346; (1910) 3,366,416; capital, Boston.

Topography.— The surface of the State is mostly rough and rugged, with irregular mountain systems. The coast counties are, however, mostly level, with low, rounded hills, and rocky eminences on the coast. Cape Cod is a low, sandy arm of land extending in a semicircle around Cape Cod Bay. There are numerous salt marshes in the E. part of the State. The W. part of Massachusetts is traversed by two mountain chains, the Taconic and the Hoosac, the latter a continuation of the Green Mountains of Vermont. Between these ranges is the Hoosac valley, which at its N. end is 1,100 feet above the sea. Mount Greylock and Mount Washington are the highest points in the State; the former has an altitude of 3,505 feet and the latter 2,624 feet. A rugged tableland 1,000 feet high extends E. from the Hoosac range to the Connecticut river valley, with a series of trap ridges reaching their highest elevation in Mount Tom (1,200 feet) and Mount Holyoke (1,120 feet). The valleys of the Connecticut and Housatonic are noted for their beautiful scenery. The coast line is very irregular, being indented by numerous bays, the largest of these being Massachusetts, Cape Cod, and Buzzards, all of these affording excellent harbors. The Connecticut, with its tributaries, the Westfield, Deerfield, Millers, and Chicopee rivers, forms the principal river system of the State. The Blackstone, Hoosac, Housatonic, Charles, Nashua, Taunton, and the Merrimac are large and navigable streams.

Geology.— The rocks of Massachusetts are largely of metamorphic nature. The sands of the E. portion and Cape Cod are of glacial deposit. The rocks in the E. are of the Laurentian, Cambrian, and Carboniferous periods, and the Connecticut valley is largely Triassic. The mountains in the W. are chiefly of Silurian origin. The sandstones of the Connecticut valley are rich in fossil footprints. The principal mineral productions are included in the building stones. The values of the different stone outputs in 1900 were: granite, $1,698,605; sandstone, $153,427; marble, $130,735; limestone, $209,359; total, $2,192,126. Massachusetts ranks first in the United States in the production of granite. The clay products were brick and tile, $1,887,677; pottery, $294,033; total, $2,181,710; and the production of mineral waters was 4,898,246 gallons, valued at $240,524.

Soil.— Most of the soil is too rocky for cultivation and is suited only for pasturage. In the central counties and in the river valleys the soil is more fertile, and agriculture is carried on to a small extent, the principal crops being garden vegetables, dairy products, hay, maple sugar, and cranberries. Of the latter, the sandy coast plains produce over 300,000 bushels annually.

Manufactures.— Massachusetts is preeminently a manufacturing State. The abundant water supply and transportation facilities give the State opportunities for the most varied manufactures. Lowell is noted as the largest carpet milling city in the United States. Worcester has the largest steel wire works in the world, and Holyoke ranks first in paper manufacturing, North Easton in shovels, and Lynn in electrical instruments. Lawrence is noted for its cotton and woolen mills; Haverhill, for shoe factories; Dalton, for note paper; Taunton, for cotton and silverware; Chicopee, for bronzes, automobiles and cotton; Roxbury, for rubber goods; Wakefield, for rattan; Fitchburg for tools; etc. According to the census of 1900 there were 29,180 manufacturing establishments, employing $823,264,287 capital and 525,308 persons; paying $259,498,072 for wages and $552,717,955 for materials; and yielding a combined product valued at $1,035,198,989. The principal articles, according to value of output, were textiles ($214,600,980); boots and shoes ($117,115,243); cotton goods ($111,125,175); foundry and machine shop products ($56,290,159); paper, brass, iron, steel, tin, glass, and rubber goods, clothing, chemicals, machinery, household and agricultural utensils, engines, boilers, bicycles, automobiles, and railroad cars.

Commerce.— The imports of merchandise at the ports of Barnstable, Boston and Charlestown, Edgartown, Fall River, Gloucester, Marblehead, New Bedford, Newburyport, Plymouth, Salem and Beverly, for 1900, aggregated in value $68,835,361; and the exports, $123,897,392. The imports of gold and silver amounted to $92,737; and exports, $15,000. The collections of internal revenue in the State during the year ending June 30, 1900, amounted to $7,953,570.

Banking.— On Oct. 31, 1901, there were reported 248 National banks in operation, with $77,097,820 in capital, $31,025,076 in outstanding circulation, and $26,300,500 in United States bonds. There were also 186 mutual savings banks, with $540,403,687 in deposits, and 35 trust and loan companies with $11,575,000 capital and $8,284,000 surplus. The exchanges at the United States Clearing Houses at Boston, Worcester, Lowell, New Bedford, Springfield, Holyoke, and Fall River for the year ending June 30, 1901, amounted to $7,415,414,218, an increase over those of the preceding year of $872,190,518.

Education.— In 1900 the school population was 641,500, the enrollment in public schools, 474,891, and the average daily attendance, 366,136. There were 13,575 teachers; 3,395 buildings used for public school purposes; public school property valued at $39,027,405; receipts for the previous year, $13,826,243; and expenditures $13,826,243. For higher education there were 233 public schools, 101 private secondary schools, 10 public and 3 private normal schools, 9 colleges and universities for men and for both sexes, and 5 colleges for women. Among the most noted colleges are Harvard University at Cambridge; Amherst College, at Amherst; Boston University, at Boston; Williams College, at Williamstown; and College of the Holy Cross, at Worcester. The women's colleges include Radcliffe College, at Cambridge, Mount Holyoke College, at South Hadley; Smith College, at Northampton; and Wellesley College, at Wellesley.

Churches.— The strongest denominations in the State are the Roman Catholic; Congregational, Regular Baptist; Methodist Episcopal; Unitarian; Protestant Episcopal; Spiritualist; and Universalist. In 1899 there were reported 1,965 Evangelical Sunday-schools with 38,614 officers and teachers, and 305,000 scholars.

Postoffices, Periodicals, and Railroads.— In 1901 there were 849 postoffices of all grades; and 819 periodicals, of which 86 were daily, 6 semi-weekly, 334 weekly, 5 bi-weekly, 6 semi-monthly, 153 monthly, 4 bi-monthly, and 25 quarterly. In 1901 the total length of railroads within the State was 2,102 miles.

Finances.— On Jan. 1, 1901, the total funded debt of the State was $66,039,835; sinking funds, etc., $18,223,404; net public debt, $47,816,431. The assessed valuations were, real estate, $2,315,687,381; personal property, $1,562,983,689; total, $3,878,671,070. In 1899 the State owned property to the value of $22,809,912.

State Government.— The governor is elected for a term of one year and receives a salary of $8,000 per annum. Legislative sessions are held annually beginning on the first Wednesday in January, and are not limited as to length of time. The legislature has 40 members in the Senate and 244 in the House, each of whom receives $750 per annum and mileage. There are 13 representatives in Congress. The State government in 1901 was Republican.

History.— The history of Massachusetts begins with the landing of the Pilgrims at Plymouth in 1620, though it is probable that portions of the coast were tempo-

VERMONT
NEW HAMPSHIRE
MASSACHUSETTS
CONNECTICUT
BERKSHIRE HILLS
GREEN MOUNTAINS
Pittsfield
Northampton
Springfield
Holyoke
Chicopee
Greenfield
Brattleboro
Bennington
N. Adams
Williamstown
Deerfield R.
Connecticut R.
Westfield R.
Farmington R.
Hoosac Mts.
Mt. Greylock
Mt. Everett
Mt. Tom
Mt. Holyoke
Mt. Lincoln
Mt. Toby
Mt. Tekoa
Mt. Grace
Mt. Wachusett
Monadnock Mt.
Menomonee Pd.
Wendell Dep.
Millers Falls
Turners Falls
Athol
Orange
Gardner
Fitchburg
Leominster
Winchendon
Ashburnham
Templeton
Phillipston
Petersham
Barre
Hardwick
Ware
Palmer
Monson
Brimfield
Wilbraham
Hampden
Longmeadow
Agawam
Southwick
Granville
Tolland
Sandisfield
Otis
Monterey
Great B.
Egremont
Alford
Lenox
Stockbridge
Lee
Becket
Washington
Windsor
Cheshire
Adams
Florida
Clarksburg
Williamstown
Hancock
Dalton
Pittsfield
Lanesboro
Richmond
Lenox Sta.
Housatonic
Tyringham
Barrington
Hartsville
Middlefield
Huntington
Montgomery
Russell
Blandford
Granville
Southampton
Easthampton
Loudville
Norwich
Chester
Huntington
Worthington
Cummington
Plainfield
Ashfield
Buckland
Shelburne Falls
Greenfield
Deerfield
Conway
Whately
Hatfield
Hadley
Amherst
Sunderland
Montague
Leverett
Shutesbury
Pelham
Granby
Belchertown
Ludlow
Wilbraham
Monson
Brimfield
Palmer
Warren
Brookfield
West Brookfield
North Brookfield
Spencer
Leicester
Oxford
Dudley
Webster
Southbridge
Sturbridge
Charlton
Auburn
Worcester
Barre Sta.
Petersham
Athol Center
Templeton
Phillipston Sta.
Baldwinsville
Winchendon Sprs.
Waterville
Royalston
Northfield
Warwick
Gill
Leyden
Bernardston
Heath
Hoosac Tunnel
Florida
Readsboro
Pownal
Bennington
N. Bennington
Shaftsbury
White Creek
Eagle Bridge
Williamstown Sta.
Clarksburg
Brattleboro
Dummerston
Putney
Williamsville Sta.
Wilmington
Dover
Marlboro
Keene
S. Keene
S. Chesham
Dublin
Petersboro
Marlboro Depot
Westport
Troy
Fitzwilliam
Winchester
Hinsdale
Greenville
Nashua R.
Contoocook R.
Millers R.
Deerfield R.
Green R.
Hoosic R.
Hoosic Mts.
Taconic Mts.
Housatonic R.
Farmington R.
Westfield R.
Connecticut R.
Boston
Cambridge
Somerville
Chelsea
East Boston
Charlestown
Brookline
Roxbury
Dorchester
Newton
Newtonville
Newton Center
Newton Highlands
Newton Upper Falls
Watertown
Waltham
Belmont
Medford
Malden
Everett
Revere
Winthrop
Arlington
Lexington
Concord
Wayland
Framingham
Natick
Wellesley
Needham
Dedham
Milton
Quincy
Braintree
Weymouth
Hingham
Cohasset
Scituate
Marshfield
Duxbury
Plymouth
Kingston
Bridgewater
Abington
Rockland
Hanover
Norwell
Hingham
Hull
Nantasket Beach
Boston Harbor
Governors Island
Castle Island
Thompson Island
Spectacle Island
Long Island
Moon I.
Apple Island
Snake I.
Pt. Shirley
Deer I.
Dorchester Bay
Quincy Bay
Boston Light
Minot's Light
Scituate Light
Gurnet Light
Duxbury Pier Light
Plymouth Light
Cohasset Rocks
Hingham Bay
Weymouth Fore River
Weymouth Back River
Fore River
Neponset River
Charles River
Mystic River
Mystic Lakes
Chelsea R.
Malden R.
Saugus R.
Pines R.
Ipswich R.
Merrimack R.
Boston Harbor
Boston and Environs
Scale of One Mile
0
½
1
Long. 72°
73° 30′
73° 15′
73°
72° 45′
72° 30′
72° 15′
42°
42° 45′
42° 30′
42° 15′
41° 45′
41° 30′
41° 15′
41°

MASSACHUSETTS AND RHODE ISLAND

SCALE OF MILES

0 5 10 15 20 25 30

State Capitals ⊛ County Seats ⊙

Size of type indicates relative importance of places

Hammond's 8 x 11 Map of Massachusetts and Rhode Island.

Copyright, 1908, by C.S.Hammond & Co., N.Y.

H 71° 30′ J 71° 15′ K 71° L 70° 45′ M 70° 30′ N 70° 15′ O 70°

1 2 3 4 5 6 7 8

42° 45′ 42° 30′ 42° 15′ 42° 41° 30′ 41° 15′ 41°

H from 71° 30′ J Greenw. 71° 15′ K 71° L 70° 45′ M 70° 30′ N 70° 15′ O 70°

rarily settled by Norwegians as early as A. D. 1000. In 1628 another colony was established at Salem, and both were united under one government with Maine in 1692. In 1675, an Indian chief, named Philip of Pokanoket, or King Philip, began a war which had for its object the entire extermination of the English. This war lasted three years, and ended by the death of King Philip himself. From this time till the Revolutionary War Massachusetts enjoyed a period of comparative peace and prosperity. When the oppressive measures of the English Parliament finally brought about the rupture with the colonies, none took a more active or more prominent part than Massachusetts in the National cause. The passage of the Stamp Act aroused the wildest excitement; and its repeal the following year was received with demonstrations of joy. The arrival of the "Romney" man-of-war renewed the excitement, and Massachusetts issued a circular letter to the colonies, which the British ministry in vain commanded the authorities to rescind. Then followed the Boston massacre in 1770, the destruction of the tea in 1773, and the Port Bill in 1774. The Revolutionary War had its outbreak in Massachusetts, the bloodshed at Lexington and the contest at Concord being the instigative incidents that led to the war. Its earliest event was the siege of Boston, made notable by the battle of Bunker Hill, the acceptance of the command by Washington at Cambridge, and the evacuation by the British. In 1780 a constitution was framed for the State, and adopted by popular vote. In 1786 the tranquillity of the State was again disturbed by a party of rioters, who, under the leadership of Daniel Shays, attempted to resist the authorities, but the revolt was suppressed. On the breaking out of the Civil War in 1861 Massachusetts was among the first to offer assistance to the National cause; and, till the final success of the Federal army, continued to perform a patriotic and liberal part. **C. B. Tillinghast.**

Massachusetts, The, a first-class, twin screw, steel battleship of the American navy; length 348 feet; breadth 69 feet, 3 inches; mean draft 24 feet; main battery four 13-inch, eight 8-inch and four 6-inch rifles; secondary battery 31 rapid-fire guns of small calibre. Speed 16.21 knots; crew, 32 officers and 441 men; cost, $3,020,000.

Massachusetts Agricultural College, a coeducational non-sectarian institution in Amherst, Mass.; founded in 1863; has endowment of over $360,000; grounds and buildings valued at $425,000; scientific apparatus, etc., $225,000; volumes in the library, 33,000; average faculty, 40; students, 450; graduates, over 800.

Massachusetts Bay, a large bay to the E. of the central part of Massachusetts; bounded on the N. by Cape Ann, and on the S. by Cape Cod.

Massachusetts Institute of Technology, a coeducational non-sectarian institution in Boston, Mass.; founded in 1865; has endowment of over $1,875,000; grounds and buildings valued at $1,340,000; scientific apparatus, etc., $400,000; volumes in the library, 82,000; ordinary income, about $525,000; average number of faculty, 250; students, 1,460.

Massage (mass'ij), a scientific method of curing disease by systematic manipulations comprising: (1) Surface friction (*effleurage*); (2) A form of kneading (*pétrissage*); (3) Manipulations with the tips of the fingers (*massage à friction*); and (4) A kind of striking or percussion with the hands (*tapotement*). These procedures are combined according to definite rules, and the treatment is found useful in paralysis, neuralgia, rheumatism, joint diseases, etc. It is used among the Sandwich Islanders under the name of *lomi-lomi,* and in Tonga is called *toogi-toogi, mili,* or *fota.*

Massagetæ (mas-saj'e-tē), a wild and warlike people who inhabited the broad steppes on the N. E. of the Caspian Sea, to the N. of the Araxes or Jaxartes river. Herodotus says that they had a community of wives; that they sacrificed and devoured their aged people; that they worshiped the sun and offered horses to him; that they lived on the milk and flesh of their herds, and on fish, and fought on horseback and on foot with lance, bow, and double-edged axe. Cyrus is said to have lost his life in fighting against them, 530 B. C.

Massasoit, Indian chief; born in Massachusetts about 1580. His dominions comprised the district in the S. E. part of Massachusetts between Cape Cod and Narragansett Bay. In March, 1621, three months after the landing of the Pilgrims, he sent a warrior named Samoset to Plymouth who shouted in English, which he had learned from Penobscot fishermen, "Welcome Englishmen!" Later Massasoit visited the Pilgrims in person and arranged a treaty of friendship in which both sides promised to refrain from all overt and hostile acts and to aid each other if either were unjustly attacked. This is the oldest diplomatic act recorded in the history of New England and was faithfully kept for 54 years. When Roger Williams (see Williams, Roger), who was exiled from the Massachusetts colony, was on his way to Providence he was cared for by Massasoit for several weeks. Massasoit died near the present Warren, R. I., in 1660.

Massaua, or **Massowah** (-sou'ä), Abyssinian Mutugna or Mutogna; called by the people of Tigre Baze, a fortified seaport town in Africa; capital of the Italian col-

ony of Eritrea; situated on a sterile coral island in the Red Sea, one mile in circumference and 200 yards from the mainland, with which it is connected by an embankment 4,920 feet long, which contains the conduit by which water is conveyed into the town. The place of anchorage, the ancient Sabaïtikon, is formed by the deep channel stretching between the N. shore of the islet and the mainland. Massaua is surrounded by islets, which make navigation very difficult; is a place of exchange for the products and merchandise of Abyssinia and the Sudan and those of India and Europe; chief trade in skins, butter, and mother-of-pearl. The name, a corruption of Medzaua, is believed by Egli to be derived from an Ethiopian word *dzaua*, "to call," and to refer to the fact that the island is "within call" of the shore. Formerly an Egyptian possession, it was taken by Italy in 1885. Pop. (1906) 2,275; Europeans, 524.

Masséna, André (mä-sā-nä′), **Prince of Essling, Duke of Rivoli,** a French military officer; born in Nice, May 6, 1758. He went through the regular gradations in an Italian regiment, commencing his military career at the age of 17, After 14 years' service he obtained his discharge; but in 1792, the French revolution caused him to enter the service of the French republic. He had the chief command in Switzerland in 1799, when he finished the campaign by completely routing the Austro-Russian army under the Archduke Charles and General Korsakoff. In 1800 he commanded in Italy, but with less success than in his former campaigns. He was, however, again successful in the campaigns of 1805 and 1806, taking possession of Naples, and signalizing himself in the campaign of Poland, which was terminated by the treaty of Tilsit. He was afterward employed in Germany, and eminently distinguished himself in the memorable battles of Essling and Wagram. In 1810 he was appointed Commander-in-Chief of the army in Portugal, but his campaign did not answer to the expectation of Napoleon. Overpowered by the climate, and quite a confirmed invalid during the whole campaign; seeing his army decimated by sickness, and — owing to the jealousy of Soult — not receiving the reinforcement indispensable to carry the position in which Wellington had fortified himself, Massena began, March 5, 1811, his celebrated retreat in Spain, entering Salamanca in the latter part of April, after having lost 30,000 men within six months. On May 5 he fought the bloody but indecisive battle of Fuentes d'Onoro; and soon after, on account of ill-health, he resigned his command and returned to France, where Napoleon left him without active employment. He gave his adhesion to the Bourbons after the restoration; became Commander-in-Chief of the National Guard of Paris, and died in Paris, April 4, 1817.

Massenet, Jules (mäs-nā′), a French composer; born in Montaud, France, May 12, 1842. He won the "Prix de Rome" in 1863, was favorably received as the composer of meritorious orchestral works and a comic opera, "The Great Aunt" (1867), before the Franco-Prussian War, and in 1873 took his place among the foremost of the younger composers of France, his fame being established by the comic opera "Don Cæsar de Bazan" (1872), the classical opera "The Furies" (1873), and the oratorio "Mary Magdalen" (1873). These were followed by the oratorios "Eve" (1875) and "Virgin" (1879), the great operas "King of Lahore" (1877), "Herodiade" (1881), "Manon Lescaut" (1884), and "Esclarmonde" (1889), besides numerous pianoforte and orchestral pieces.

Massey, Gerald, an English poet; born in Tring, England, May 29, 1828. In youth he worked in a silk-mill and as a strawbraider. He founded and edited the "Spirit of Freedom" in 1849, and was secretary of the Christian Socialists. He lectured in the United States in 1873. He was a firm believer in spiritualism. The title of his works are: "Voices of Freedom and Lyrics of Love" (1851); "Ballads of Babe Christabel," etc. (5th ed. 1855), "War Waits" (1855); "Havelock's March," etc. (1861); "Shakespeare's Sonnets Never Before Interpreted" (1866); "Concerning Spiritualism" (1871); "A Book of the Beginnings" (1881); "The Natural Genesis" (1883); "My Lyrical Life" (1889); etc. He died Oct. 29, 1907.

Massico (mass′-) (Mons Massicus), a mountain in the province of Terra di Lavoro, Naples, Italy, and having on its slopes a town of the same name. Massic wine has been famous from remote times.

Massicot, protoxide of lead having a scaly crystalline structure. Hardness, 2; sp. gr., 8; when pure, 9.2–9.36. Color, sulphur to orpiment yellow, sometimes reddish. Crystallization orthorhombic. Found in considerable quantities in Mexico.

Massillon, a city in Stark co., O.; on the Tuscarawas river, the Ohio canal, and the Wheeling and Lake Erie, the Cleveland, Lorain and Wheeling, and the Pennsylvania railroads; 8 miles W. of Canton, and 55 miles S. of Cleveland. It is located in the famous Tuscarawas valley coalfield. There are electric light and street railroad plants, waterworks, business college, high school, National banks, and daily and weekly newspapers. It is the seat of the State hospital and Asylum for the Insane, and has machine shops, rolling mill, extensive agricultural implement works, bridge works, glass works, foundry, pottery, etc., and an

assessed property valuation of $4,000,000. Pop. (1900) 11,944; (1910) 13,879.

Massillon, Jean Baptiste (mä-sē-yôn*g*), a French preacher; born in Hyères, France, June 24, 1663. He was director of the Seminary of St. Magloire, Paris, in 1699; court preacher in 1699, 1701, and 1704; preached the funeral orations of Conti in 1709, the dauphin in 1711, and Louis XIV. in 1715. The regent appointed him in 1717 to the see of Clermont. In the year following he was chosen to preach before Louis XV., then nine years old, and wrote a series of sermons, 10 in number, so famous under the title of "Petit-Carême," which are masterpieces of pulpit eloquence. They are remarkable also for the political truths which they contain; among others, that the monarch is made for the people, who appointed him, in conformity with the order of God; that not the prince, but the laws should rule. In 1719 Massillon was chosen a member of the Academy. Cardinal Dubois procured him the prelacy of Sévigny. His last discourse in Paris was the funeral sermon on the Duchess of Orleans. He never left his diocese, where his virtues had procured him the reverence of all. He died in Clermont Sept. 18, 1742.

Massinger, Philip, a distinguished English dramatist, in the beginning of the 17th century; was the son of a retainer of the Earl of Pembroke, and was born in Salisbury in 1583. He studied at Oxford, but quitted the university without taking a degree, in consequence, perhaps, of his having become a Roman Catholic; or according to Anthony à Wood, in consequence of the withdrawal of supplies by his patron the Earl of Pembroke, who was displeased at his spending his time over poetry and romances instead of logic and philosophy. He repaired to London about 1606. Little is known of his personal history, yet he appears to have been intimately connected with the wits and poets of his time, in conjunction with some of whom, as Fletcher, Middleton, Rowley, and Dekker, he composed some of his dramas. As a dramatist Massinger is more natural in his characters and poetical in his diction than Jonson, and some critics rank him next to Shakespeare. In tragedy, however, he is rather eloquent and forcible than pathetic, and he is defective in humor. His best plays are the "Duke of Milan," "A City Madam," "A Very Woman," "The Fatal Dowry," "A New Way to Pay Old Debts." The last-mentioned still maintains its place on the stage, chiefly on account of the characters Marrall and Overreach. He died in 1640, it is supposed in rather straitened circumstances. He was buried in the churchyard of St. Saviour's by the hands of the actors; and the parish register contains the pathetic entry, "March 20, 1639–1640, buried Philip Massinger, a stranger."

Masson, Auguste Michel Benoit Gaudichot (mä-sôn*g*), a French novelist and dramatist; born in Paris, France, July 31, 1800. He wrote much in collaboration. Among his works in fiction are "Tales of the Workshop" (1832–1833); "A Young Girl's Heart" (1834); "The Bundle of Straw" (1861); "The Stubborn Wife" (1865). He also wrote: "Reminiscences of a Child of the People" (1838–1841), autobiographic; "History of Celebrities" (1838, many editions); the dramas "The Devil in Love" (1836), "Madame Favart" (1837), "A Fixed Idea" (1850), "The Orphans of Notre Dame Bridge" (1849); etc. He died in Paris, April 23, 1883.

Masson, David, a Scotch author; born in Aberdeen, Scotland, Dec. 2, 1822; educated at Marischal College, Aberdeen, and at the University of Edinburgh; became editor of a Scotch provincial paper, and later joined the literary staff of W. & R. Chambers. In 1847 he settled in London, writing for the reviews, the "Encyclopædia Britannica," and the "English Encyclopædia." In 1852 he succeeded Clough in the chair of English literature in University College; in 1865 became Professor of English Literature in the University of Edinburgh, a post he resigned in 1895. Masson edited "Macmillan's Magazine" from 1859 to 1868. His first published work was his "Essays, Biographical and Critical" (1856), reprinted with later essays in three volumes (1874–1876) entitled respectively "Wordsworth, Shelley, and Keats," "The Three Devils — Luther's, Milton's, and Goethe's"; and "Chatterton, a Story of the Year 1770." His great work is his ponderous "Life of John Milton" (6 vols. 1859–1880), the most complete biography of any Englishman, and of great value for the contemporary history. Other works are "British Novelists and their Styles" (1859); "Recent British Philosophy" (1865); "Drummond of Hawthornden: the Story of his Life and Writings" (1873); the "Cambridge" edition of "Milton," with introductions, notes, and an essay on Milton's English (3 vols. 1874; new ed. 1890), the "Golden Treasury" edition (2 vols. 1874), and the "Globe" edition (1877). Later works are "De Quincey" (1878) in the "Men of Letters" series, and his edition of De Quincey's works (14 vols. 1889–1891), besides some volumes of Sketches and Essays (1892 and 1894). After 1879 he edited the "Register" of the privy council of Scotland, and in 1893 became Historiographer Royal for Scotland. He died Oct. 7, 1907.

Massorah (mäs-sō'rä), a marginal directory, indicating on almost every line in

the margin of the MS. Bibles how the letters, words, forms, and phrases are to be written, according to the most ancient rules laid down by those who compiled, preserved, and transmitted the canon and the Old Testament scriptures. Every spurious letter or redundant word, every variation in the vowel points, accents, or in repetition of a phrase, and every peculiarity of construction over which the copyist is likely to blunder, and which have been the great source of the various readings, are most carefully noted; and those who are engaged in multiplying the codices are warned against the passages in question that here there is a peculiar phenomenon which is not to be made conformable to the ordinary reading. The Massorah also gives the various readings contained in standard MSS. of the Bible — viz., the Codex Hilleli, the Jericho Codex, the Muggah Codex, the Sinai Codex, etc. It was at first traditionally transmitted by the authorized and professional scribes, who afterward committed it to writing.

Massowah. See MASSAUA.

Massys. See MATSYS.

Master, in the navy, an officer who navigates a ship under the direction of the captain; he is selected from the list of lieutenants when he has qualified for the special duty. Also the captain of a merchant vessel.

Master of Arts (abbreviated M. A., and A. M.), a degree conferred by universities and some colleges. In the universities of England this title follows that of bachelor. The dignity of master (*Magister artium liberalium*) was held in high esteem in the Middle Ages. In Germany it is now obsolete, having been superseded by that of doctor.

Master Singers. See MEISTERSINGERS.

Master Wace. See WACE, ROBERT.

Masterwort (*Peucedanum Ostruthium*), a perennial herb of the natural order *Umbelliferæ*. It is a native of the N. of Europe and the N. of America, and is found in moist pastures in some parts of Great Britain, but apparently naturalized rather than indigenous, its root having formerly been much cultivated as a potherb, and held in great repute as a stomachic, sudorific, diuretic, etc. The root has a pungent taste, causes a flow of saliva and a sensation of warmth in the mouth, and often affords relief in toothache. *Astrantia major*, an herb belonging to the same natural order and having similar properties, is also named masterwort.

Mastic, a kind of mortar or cement used for plastering walls. It consists of finely-ground oölitic limestone, mixed with sand and litharge, and used with a considerable portion of linseed oil. It sets hard in a few days, and is much used in works where great expedition is required.

In chemistry, the resin of *Pistacia lentiscus*, occurring in small rounded translucent grains or tears, which soften when masticated, giving out a slightly bitter, aromatic taste. It is soluble in rectified spirit and oil of turpentine and is used in fumigations and in the manufacture of varnishes. Its sp. gr.= 1.074, and its composition, according to Schrötter, is $C_{20}H_{32}O_2$.

Mastication, the trituration of the food and the mixing of it with the salivary secretion, preparing it for the further action of the stomach. Mastication is voluntary in the adult, except when the will is in abeyance; in infants and the lower animals it becomes instinctive. It is performed by the action of the lips, teeth, and mouth. This action is mechanical, while the further digestive process in the stomach is chemical. Mastication is succeeded by deglutition, or swallowing, by which the aliment is conveyed into the pharynx, and from there to the stomach.

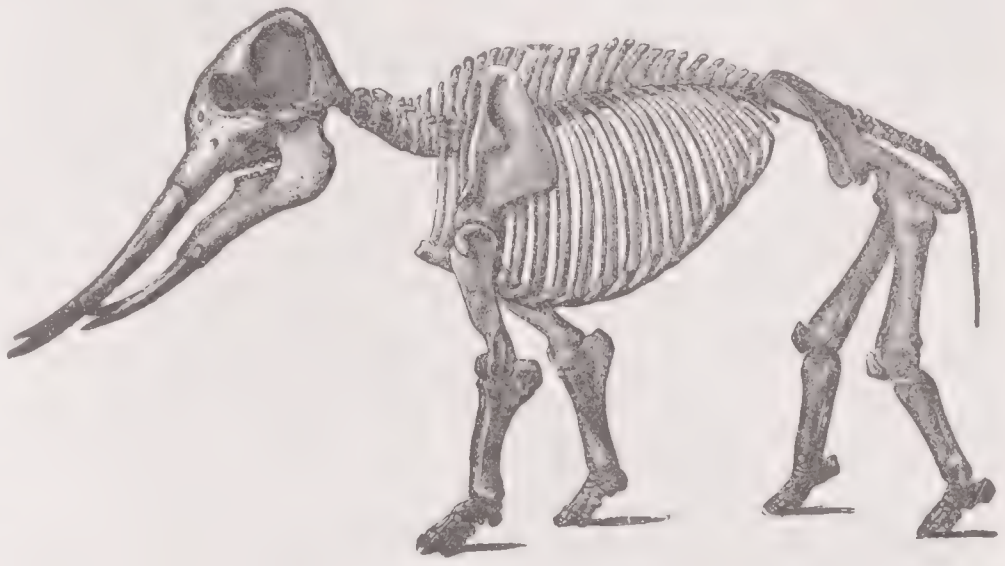
Mastiff, a variety of dog of an old English breed, probably peculiar to the British Isles. It is the *Dogue de forte race* of Buffton, the *Canis molossus* of Linnæus, *C. mastivus* of Ray, and *C. villaticus* or *catenarius* of Caius. The head resembles that of the bulldog, but with the ears dependent. The upper lip falls over the lower jaw. The end of the tail is turned up, and the fifth toe of the hind foot is frequently developed. The nostrils are separated by a deep furrow. The bark is deep-toned, and the aspect of the animal grave and noble. It is taller than the bulldog, but the chest is not deep, and the head is large in proportion to the general form. The mastiff is faithful and affectionate, and makes an excellent watchdog. A Cuban mastiff is a variety of mastiff, intermediate in size between the English variety and the bulldog, it is extremely savage, and was used in the days of slavery for tracking runaway negroes. It is now used as a watchdog, and by the Spaniards for bull fighting.

Mastiff Bats, the cheiropterous subfamily *Molossinæ*. The popular name is derived from a faint resemblance which they bear to mastiffs in the conformation of the head.

Mastodon (mas′-), an extinct genus of proboscideans, closely allied to the true elephants. The crowns of the molar teeth have nipple-shaped tubercles placed in pairs, and from the number of these projections, Falconer divided the genus into groups: (1) Trilophodon, and (2) TETRALOPHODON (*q. v.*). Generally speaking, the two upper incisors formed long curved tusks, as in the elephants, but in some cases there were two

lower incisors as well. The genus ranged in time from the middle of the Miocene period to the end of the Pliocene in the Old World, when they became extinct. In America several species — especially that which, from the abundance of its remains, is the best known, *M. ohioticus*, *americanus*, or *giganteus* — survived to a late Pleistocene period.

In 1897 the skeleton of a mastodon, the largest yet discovered, was unearthed on a farm near New Paris, O. It was found in what had evidently at one time been a morass, and was buried 10 feet below the surface, where from all indications it had lain for centuries. It was very nearly perfect, and though some of the bones crumbled away on exposure to the air, they were cleverly replaced, and the skeleton was set up at Earlham College, Ind., where it has been visited by scientific men from many foreign countries. An entire fossil monster of this kind is extremely rare, and besides this one there are only two others in existence, one of these being in the British Museum and the other in Boston. The estimated weight of this creature when living was about 10 tons, its skull, complete, alone weighing considerably over 300 pounds. The skeleton stands 11 feet 2 inches high, and its length, from forward curve of tusks to backward curve of tail, is 20 feet 2 inches.



MASTODON.

Masudi, or Al-Masudi (mä-sö′dē), an Arabic historian; born in Bagdad, about the close of the 9th century. He has been called "the Arabian Herodotus." His best work was "Meadows of Gold and Mines of Gems" (many editions; the latest, text with French translations, 9 vols. Paris, 1861–1877). It abounds in information regarding his time, the result of extensive travel, and is the most celebrated of its kind in the language. He died in Egypt in 957.

Masulipatam (mä-sö″li-pä-täm′), the principal seaport of Kistna district, Madras, British India, 215 miles N. of Madras city. Here the English established an agency in 1611, and after 1628 it became the center of their trade in those parts. Since 1841 the town has been an active missionary center. In 1864 a storm wave swept over it and destroyed 30,000 lives.

Matabeleland. See Rhodesia.

Matador (mat′-), one who kills; in Spanish bull fights the man appointed to administer the fatal stroke to the bull, when excited to fury by the attacks of the picadores and banderilleros. He is armed with a sword and a small stick (*muleta*), to which a piece of scarlet silk is attached. The animal is killed by plunging the sword into it near the left shoulder blade, and if the stroke is skillfully and properly given, death is instantaneous. At cards, one of the three principal cards in the games of ombre and quadrille, which are always two black aces and the deuce of spades and clubs, the seven of hearts and diamonds. These are called murdering cards because they take or kill all others.

Matamoros (mä-tä-mō′rōs), a port of Mexico, opposite Brownsville, Tex., on the Rio Grande, 40 miles from its mouth in the Gulf of Mexico. With the other Mexican towns on the river it has formed a free trade league since 1861. The Rio Grande is navigable for small vessels as far as Reynosa, and a railway from Matamoros extends beyond this point to San Miguel (75 miles). Another Matamoros is in the Mexican state of Puebla, 4,160 feet above sea-level. It has coal mines.

Matanzas (mä-tän′thäs), a seaport on the N. W. coast of Cuba, 52 miles E. of Havana, with a large, safe, and convenient harbor; has considerable commerce, exporting sugar, molasses, and coffee, and ranking in importance next to Havana. On April 27, 1898, the forts protecting Matanzas harbor were shelled and destroyed by the United States warships "New York," "Cincinnati," and "Puritan." Pop. (1907) 64,385. The province of Matanzas is one of the six territorial Cuban divisions; area, 3,700 square miles; pop. (1907) 239,812.

Matarich. See Heliopolis.

Match, anything which readily catches fire, either from a spark or by friction, and is used for conveying, communicating, or retaining fire; specifically, a splint or strip of combustible material, usually wood, one end of which is dipped in a composition

that ignites by friction. There are numerous varieties of matches, adapted for different uses, as fusees, vestas, vesuvians, etc.

A slow match consists of loosely-twisted hempen cord dipped in a solution of saltpeter and lime-water. It burns at the rate of one yard in three hours. A quick-match is cotton coated with a composition of mealed powder, gum, and water. When not confined it burns at the rate of one yard in 13 seconds. Another quick-match is made of cotton wick boiled in saltpeter and water. Alcohol and mealed powder are added to the warm solution, and the wick left to steep for 24 hours. The match is then dried.

Matchlock, an old form of musket fired by means of a match. They were invented in the first half of the 15th century, and were succeeded by the arquebus.

Mate, in the mercantile navy, is the officer who acts as the deputy of the master, taking his place during his absence. They are of four grades — first, second, third, and fourth mate; small ships carry often but one or two at most; large and well-found vessels carry three or four. The junior mate has usually the superintendence of the stowing of the vessel. The law recognizes only two classes of persons in charge of a trading vessel — the master and the mariners, the mates being included in the latter. Certificates of competency in each of the grades are granted by the local marine boards of the various British ports on the applicant passing a satisfactory examination. These may be canceled or suspended if the holder has been found guilty of gross negligence, misconduct, or has given proofs of incompetence. In the royal navy, the term mate is now limited to the assistants of certain warrant officers, as boatswain's mate, gunner's mate, etc.

Maté (mä'tā), the plant that yields Paraguay tea, the *Ilex Paraguayensis*, a kind of holly, natural order *Aquifoliaceæ*. It has smooth, ovate-lanceolate, unequally serrated leaves, much branched racemes of flowers, the subdivisions of which are somewhat umbellate. In Brazil and other parts of South America the leaves are extensively used as a substitute for tea, the name maté having been transferred to the plant from the gourd or calabash in which the leaves are infused.

Its use as an article of food is of ancient origin; it was found to be general among the natives when the Portuguese conquered Brazil, and has become a fashionable beverage among the European settlers all over the South American continent. The leaves are prepared by drying and roasting; large branches are cut off from the plants and placed upon hurdles over a wood fire till sufficiently roasted; the branches are then placed on a hard floor and beaten with sticks; the dried leaves are thus knocked off and then reduced to powder. Maté is drunk at every hour of the day.

Boiling water is poured upon the powdered leaves, then a lump of burned sugar and sometimes a few drops of lemon juice are added. Usually the infusion is sucked through a tube, sometimes of silver, having a perforated bulb to act as a strainer at the lower end. It contains theine, and acts as a slight aperient and diuretic.

Materialism, the system of philosophy which regards Mind as a function of matter; the mechanical theory of the Universe. The first traces of materialism as a system are to be found in the atomistic philosophy of Leucippus and Democritus, which sought to comprehend all phenomena as products of matter and motion alone. Next in order comes the Epicurean School; but Epicurus differed from Democritus in ascribing to the atoms a certain power of individual or arbitrary self-determination. From this time a supernatural element may be said to have found a place in every philosophical system till the 17th century, since which time materialism has again come to the front. Gassendi (1592–1655) sought to combine Epicureanism with Christian theology; but F. A. Lange does not scruple to call him "the renewer in modern times of systematic materialism." In England, Hobbes (1588–1679) accepted materialism as the foundation of his theory and was followed by Hartley (1704–1757), and still later by Priestley (1733–1804), who, like Gassendi, sought to combine materialism with Christianity. In France the "System of Nature" of Holbach (1723–1789) was the greatest production of materialist philosophy in the 18th century. In Germany materialism has many champions, men distinguished for physical — and especially biological — research standing in the foremost ranks. Moleschott, combating Liebig, comes to the conclusion: "No matter without force; no force without matter." The chief opponents of the outburst of materialism in Germany were Wagner, Lotze, and Fichte.

Materia Medica (ma-tē'ri-ä med'i-kä), a general term for the different medicines employed for curative purposes; a list of remedies. Also a description of the several material substances employed for curative purposes with an investigation into their modes of operation, and their effects upon the human frame. It includes both pharmacy, or pharmacology, and therapeutics.

Mathematics, the science in which known relations between magnitudes are subjected to certain processes which enable other relations to be deduced. Mathematical principles which are deduced from ax-

Mathematics

ioms with the help of certain definitions belong to pure mathematics, and those which have been deduced with the help of pure mathematics from certain simple physical laws, belong to mixed mathematics. Arithmetic, Euclid, modern geometry, algebra, trigonometry, coördinate geometry, the differential and integral calculus, kinematics, quaternions, the calculus of finite differences, etc., are departments of pure mathematics; the dynamics of rigid bodies and the application of its principles in astronomy and in investigating the actions of forces on ordinary matter, acoustics, the undulatory theory of light, optics, thermodynamics, electricity and magnetism, etc., are departments of mixed mathematics. An axiom is a principle the truth of which is evident to any person who understands the language in which it is expressed. That certain principles are axiomatic is most likely due to the transmitted experience of mankind, for man must always have been testing, consciously or unconsciously, the simple and complicated logical consequences of these principles. The sciences of arithmetic and geometry are logical developments of axioms and definitions regarding number and the representation of number and of straight lines and circles in space. The expression of any quantity involves two ideas, a number and the value of a unit. Arithmetic treats of number; it deals chiefly with the employment of systems of numeration and notation and the processes of addition, subtraction, multiplication, and division. Some of the principles of arithmetic are merely translations into the language of numbers of certain algebraic and geometric principles, such as proportion, the extraction of roots, etc. Indeed, it is found that not only arithmetic, but every section of mathematics, gains considerably in power when it makes use of the principles of other sections. Arithmetic as taught in modern schools treats not merely of numbers but of quantities, for in the well-known reduction and compound rules and in the applications (called practice, interest, discount, stocks, etc.) of the principle of proportion, quantities of matter, space, time, money, etc., and not merely numbers, are subjected to processes. Geometry and trigonometry establish the relations of the lengths of straight and curved lines, the areas of plane and curved surfaces, and the volumes of mathematical figures; the arithmetical adoption of these relations is called MENSURATION (*q. v.*). The geometry of ancient philosophers has been transmitted to us by Euclid; many of Euclid's demonstrations are set aside in modern treatises; being now regarded as axiomatic; others are much more easily effected by algebraic and trigonometric methods. The new science of modern geometry (as expounded in recent works) is a development of Carnot's theorems regarding transversals; its laws of generalization enable us to attack the most difficult problems in geometry. But the power of modern geometry is eclipsed by that of Hamilton's quaternions, for the method of this new science seems to comprehend all others in mathematics, while it is of extraordinary simplicity.

The principles of algebra are deduced from arithmetic and from certain definitions. Numbers, and the arithmetical processes to which they are subjected, are indicated by symbols; thus $a + b$, $a - b$, $a \times b$ or $a : b$ or simply ab, $a \div b$ or $a : b$ or $\frac{a}{b}$ indicate respectively that a number represented by the letter b is added to, subtracted from, multiplied into, or is the divisor of the number represented by the letter a. Each of the algebraic expressions a^2, a^n, log. a, signifies that the magnitude represented by the letter a is subjected to a certain process. The symbol $=$ indicates that the expression on one side of it is equal to the expression on the other; the connection of two expressions by this symbol is called an equation. When the relation existing among a number of magnitudes is known, it may generally be stated in the form of an algebraic equation. The equation is said to be solved for any particular magnitude when the value of this magnitude is found in terms of the others — that is, an algebraic combination of the others.

Equations which contain only the first power of the magnitude whose value in terms of the others is required, are called simple equations, or equations of the first degree; containing no higher power of the unknown magnitude than the second, they are quadratic equations, or equations of the second degree; and generally the degree of the equation is that of the highest power of the unknown quantity. When there are two equations connecting a number of quantities, the values of two of the quantities may generally be found in terms of all the others; and generally if there are n such simultaneous equations, the value of n of the quantities may generally be found in terms of all the others. When from two simultaneous equations a third is deduced, in which one of the quantities does not appear, this quantity is said to have been eliminated. The solutions of equations, the results of elimination, etc., must be reduced to their simplest forms; the object of a great many algebraic processes is the simplification of expressions. Equations higher than the second order are dealt with by processes which may be found described in treatises on higher algebra. The solution of an equation is often expressed in the form of a determinant, a conventional

arrangement of quantities which indicates the sum of a certain number of different products of them. The determinants —

$$\begin{vmatrix} a_2 & b_2 \\ a_1 & b_1 \end{vmatrix} \text{ and } \begin{vmatrix} a_1 & b_1 & c_1 \\ a_2 & b_2 & c_2 \\ a_3 & b_3 & c_3 \end{vmatrix}$$

mean $a_1b_2 - a_2b_1$ and $a_1(b_2c_3 - b_3c_2) + a_2(b_3c_1 - b_1c_3) + a_3(b_1c_2 - b_2c_1)$ respectively. Euclid's definition of ratio may be shown to agree with the algebraic definition, in which it is represented by a quotient; thus proportion is simply the equation of two quotients. When the ratio between the values of two varying quantities is constant, one of them is said to vary with the others; thus if $\frac{x}{y} = k$ where x and y are varying quantities and k is a constant, $x = ky$, or as it is usually expressed, $x \propto y$. When two quantities susceptible of change are so connected that if we alter one of them there is a consequent alteration in the other, this second quantity is called a function of the first. Thus if different numerical values may be assigned to x, then the expressions x^2, $(1 + x)^3$, log. x, and sin x are all functions of x. Expanding functions into the sum of a series of many simpler functions is often of considerable importance in mathematics. Many functions of x may be expanded into series of the form $A + Bx + Cx^2 + Dx^3 + \text{etc.}$ (where A, B, etc., are constants), by a process termed the method of indeterminate coefficients. In the binomial theorem the nth power of a binomial (an expression consisting of two terms connected by + or —) is expanded into a series; it is as follows:

$$(a + b)n = an + n\,a^{n-1}\,b + \frac{n\ (n-1)}{1\cdot 2}\,a^{n-2}\,b^2 + \text{etc.} + \frac{n\ (n-1)}{1\cdot 2}\,a^2\,b^{n-2} + n\,a\,b^{n-1} + b^n,$$

where a and b are any algebraic quantities whatever, and where n is any number, positive or negative. The form of the rth term of the series is evidently

$$\frac{n(n-1)\ (n-2)\ldots\ldots(n-r+2)}{1:2:3\ldots\ldots(r-1)}\,a^{n-r+1}\,b^{r-1}.$$

This is merely a particular form of Taylor's theorem of the differential calculus. The multinomial theorem is a similar expansion of $(a + b + c + \text{etc.})n$. The calculation of logarithms depends on an application of the binomial theorem. Other processes and divisions of algebra are the summing of arithmetic, geometric, harmonic, and other regular series; the use of continued fractions (expressions of the form $\cfrac{1}{a + \cfrac{1}{b + \text{etc.}}}$);

Mathematics

calculating the possible number of permutations and combinations of a given number of things; the signification of imaginary expressions (involving $\sqrt{-1}$); the theory of numbers; the theory of probability; the calculation of interest, discount, annuities, life insurances, etc.

Trigonometry defines methods of measuring angles; it introduces the notion of a limit into mathematics; from its definitions a body of powerful mathematical laws and principles are deduced. Angles are measured in degrees and in circular measure. When a circle is described about the vertex of an angle, the length of the arc intercepted between the two straight lines divided by the radius of the circle is called the circular measure of the angle. The unit angle in circular measure is the angle at the center of a circle subtended by an arc equal in length to the radius. Angles may be compared by means of certain functions which we proceed to define: Let the angle be an acute angle A in any right-angled triangle A B C where C is the right angle; then

Sin A or the sine of A is $\frac{BC}{AB}$

Cos A or the cosine of A is $\frac{AC}{AB}$

Tan A or the tangent of A is $\frac{BC}{AC}$

Cot A or the cotangent of A is $\frac{AC}{BC}$

Sec A or the secant of A is $\frac{AB}{AC}$

Cosec A or the cosecant of A is $\frac{AB}{BC}$

For any given angle the above functions are shown to be always the same. We see from these definitions that sin A = cos B, and therefore sin A = cos (90° — A), and similarly, tan A = cot (90 — A), sec A = cosec (90 — A). Again sin A and cosec A are reciprocals of one another, as are cos A and sec A, tan A and cot A. Also $(\sin A)^2 + (\cos A)^2 = 1$. The extended definition of sin, A, etc., when A may have any value greater or less than a right angle, the signification of negative angles, etc., will be found in treatises on trigonometry. The trigonometric functions of an angle which is the sum or difference of two or more angles may be expressed in terms of the functions of the separate angles, and some of these relations greatly facilitate the simplification of mathematical expressions. Trigonometry further deals with the relations of the sides, angles, and areas of triangles and other mathematical figures; the expansion of certain functions into series, etc.

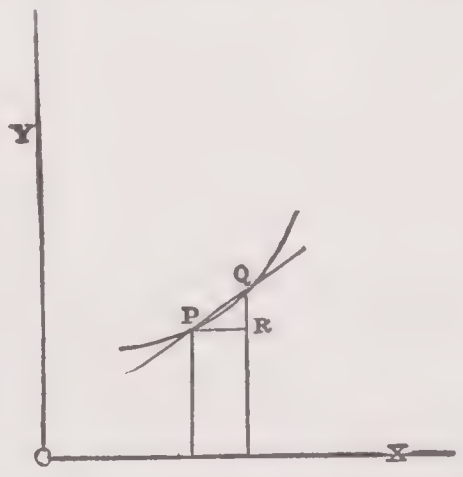
Spherical Trigonometry deals with the triangles formed on the surface of a sphere

Mathematics

by the intersection of great circles of the sphere, just as plane trigonometry deals with plane triangles. The arcs of great circles forming the sides of a spherical triangle really represent the angles which the radii of the sphere to the corners of the triangle make with one another, and hence the formulæ of spherical triangles involve the sines, cosines, etc., of the sides as well as of the angles. Spherical trigonometry is applied in many departments of solid geometry; it is of great importance in navigation.

Analytical or coördinate geometry is deduced by the principles of Euclid, algebra, and trigonometry, from a defined method of indicating the position of a point. When two lines, called the coördinate axes, are drawn at right angles to one another, the position of any point in the plane of the axes is known when its two perpendicular distances from the axes are known; one of these distances is called the x coördinate, the other the y coördinate of the point. If a straight line be drawn anywhere in the plane of the axes, it may be shown that the x and y of every point in the line satisfy a certain relation of the form $Ax + By + C = 0$, where A, B and C are certain constant coefficients, positive or negative. This relation is called the equation of the straight line. The equation of a straight line is always of the first degree in x and y. The coördinates of every point in any particular mathematical curve are found to satisfy a particular algebraic relation which is called the equation of the curve in question. The curves called conic sections (the circle, ellipse, hyperbola, and parabola) have equations of the second degree in x and y; they are called curves of the second degree; curves of the third, fourth, and higher degrees are those which have equations of the third, fourth, and higher degrees in x and y. The position of a point may be defined in another way than by x and y coördinates. Let there be a fixed line O X in a certain plane, and let a point O in this line be called "the origin," now the position of any point P in the plane is quite definite if the distance O P is known, and the angle X O P These are called the "polar coördinates" of P. The distance O P is called the "radius vector" of P, it is generally indicated in mathematics by the letter r; the angle X O P is indicated by the letter θ. It is evident that the equation of a straight line or curve instead of involving x and y may involve r and θ When we are concerned with points not restricted to one plane, instead of the two coördinate axes we employ three planes at right angles to one another; the coördinates of a point are its three perpendicular distances (designated by the letters x, y, and z) from these planes. The equation to any surface is a relation which is true for the x, y, and z of every point in the surface. An equation of the first degree in x, y, and z may be shown to represent a plane; an equation of the second degree represents what has been called "a quadric," which is a surface such that every section of it by a plane is a conic section. The simplest quadric is a sphere. In this system a curve is indicated by two simultaneous equations; in fact, as a curve may be regarded as the intersection of two certain surfaces, the equations of these surfaces are given to define the curve. In the "polar" method of defining the position of a point P in space a fixed plane and a line in it O X are employed for reference; then the distance O P (called r), the angle (called θ) between O P and the fixed plane, and the angle (called Φ) between O X and the projection of O P on the fixed plane are the "polar coördinates" of P. Any equation involving x, y, and z may be transformed into a polar equation.

The differential calculus is founded on the idea of a limit as enunciated in the definition of a "differential coefficient." If y is a function of x (see above), the differential coefficient of y with respect to x, for a particular value of x, is the rate of alteration of y with x. It is usually indicated by the symbol $\frac{dy}{dx}$. For any given value of x we can find the value of y; now let x be slightly increased in value, and the corresponding value of y found; the ratio of the increment of y to the increment of x becomes in the limit, as the increments are supposed to be smaller and smaller, the

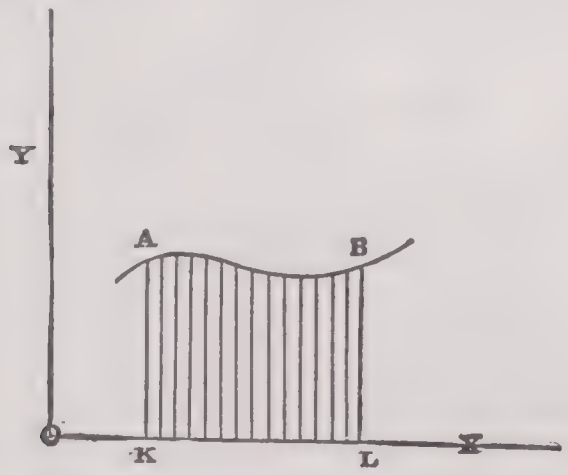


differential coefficient of y with respect to x. Let O X and O Y be the axes of coördinates; let P and Q be points very near each other in a curve; now the ratio of the increment of y from P to Q to the increment of x, is tan Q P R. But as Q is supposed to be nearer and nearer P, the direction of P Q becomes more and more nearly the direction of the tangent at P, and hence $\frac{dy}{dx} = \tan \theta$ if θ is the angle made by the tangent of a curve with the axis O X. If at any point in

Mathematics

a curve $\frac{dy}{dx} = 0$ it is evident that the value of y is there either a maximum or a minimum, and an examination of the curve (by means of its equation) in the neighborhood of the point will settle whether y has a maximum or minimum value. Readers will perceive that the differential coefficient of a function of x with respect to x is of great power in showing the shape of a curve whose equation is given; it enables calculations to be made respecting tangents, normals asymptotes, radii of curvature, evolutes and involutes of curves, and enables the form of any function of a variable to be known for every value of the variable. The differential coefficient (indicated by the symbol $\frac{d^2y}{dx^2}$) of $\frac{dy}{dx}$ with respect to x is called the second differential coefficient of y with respect to x; the nth differential coefficient of y with respect to x is indicated by the symbol $\frac{d^n y}{dy^n}$. When the value of y is known in terms of x we are able to express the values of these successive differential coefficients in terms of x, by employing certain methods of the differential calculus. "Taylor's Theorem" enables a function of $x+h$ to be expressed as the same function of x together with the sum of a series, each term of which contains a power of h and a differential coefficient of the function of x with respect to x: it has many important applications in higher mathematics. MacLaurin's theorem is a simplified form of Taylor's, it is much employed in expanding functions in series; by means of it many of the expansions which are effected laboriously in trigonometry with the help of Demoivre's theorem, may be written out at once. The theorems of Lagrange and Laplace are developments of that of Taylor.

In the integral calculus the process of differentiation is reversed. Let A B be a



curve; let a great number of equidistant perpendiculars be let fall from A B upon O X; let their common distance asunder be called δx. Now the area of the space between any two perpendiculars and the curve and O X is nearly equal to one of the two perpendiculars multiplied by δx, and more and more nearly as δx is smaller; thus if δx is very small the whole area A B L K is nearly equal to the sum of a great number of terms of the form $y \,.\, \delta x$. As δx becomes smaller and smaller the number of terms becomes greater and greater. When δx is supposed to get infinitely small it is called the differential of x, and is indicated by the symbol dx. The whole area is regarded as the sum of an infinite number of terms of the form $y \,.\, dx$. This sum is called the integral of $y \,.\, dx$ between the limits $x = $ O L and $x = $ O K, and it is written in the form

$$\left\{ \begin{matrix} \text{O L} \\ y\,dx \\ \text{O K} \end{matrix} \right.$$

Now it may be proved that if y is the differential coefficient of any function of x (say $f(x)$) with respect to x, the above series is equal to f (O L) $-$ f (O K). In applying this principle there is often great difficulty in finding of what function y is the differential coefficient, and there are many expedients which may have to be adopted in reducing y to the form of a known differential coefficient. Some of the common applications of the calculus are the determinations of areas and volumes of mathematical figures. Among the chief works on this subject are the treatises of Todhunter, Johnson, and Edwards on the differential and integral calculus, and those of Boole, Forsyth, and Johnson on differential equations.

Kinematics is a department of pure mathematics; it treats of the motions of bodies without reference to the forces which have caused motion. In any motion of a point "the velocity" or rate of change of position with time is evidently $\frac{ds}{dt}$ where s is distance measured along the point's path. The rate of change of velocity in the direction of motion with time is evidently $\frac{d^2 s}{dt^2}$, and this is called "the acceleration" in the direction of motion. There is always another acceleration when the body moves in a curved path, for the direction of the velocity is always changing; this acceleration is evidently at right angles to the path; its amount may be shown to be $\frac{v^2}{\rho}$, where v is the velocity in the direction of motion, and ρ is the radius of curvature of the path. The "Hodograph" of the motion of a body is such that its radii vectores are at every instant parallel to, and represent by their length the amount of the velocity of the moving body. It is easily proved

that velocity in the hodograph exactly represents in magnitude and direction the acceleration of velocity in the real path at any instant. Kinematics is founded on an axiom called "the parallelogram of velocities."

Mixed mathematics is the application of mathematics to physics. When observation and experiment have suggested the causes of phenomena, physicists observe accurately the conditions of the phenomena to determine a quantitative law. From this law a vast body of relations may generally be deduced by means of mathematics. The disagreement or agreement of any of the deduced laws with experiment and observation is evidence of the fallacy or correctness of the original statement. It is obvious that every mathematical deduction from two or more simple laws must be proved by experiment and observation before it can be received with confidence. The principles of the dynamics of a rigid body may be deduced by mathematics from Newton's laws of motion. These laws were first suggested by observation; the exact observation of astronomers and physicists has confirmed our belief in their truth, and in the truth of the laws deduced from them. Certain experiments on light gave Young the notion of investigating light phenomena on mechanical principles, the truth of these deductions being corroborated by experiments. The mathematical development of the experimental laws of reflection and refraction of light is called optics. Thomson, Clausius, Clerk Maxwell, and others have created the modern science of thermodynamics by applying mathematics to the experimental results of Davy, Rumford Mayer, Joule, and Thomson. By the application of the principles of thermodynamics and of mathematics generally, to the experimental electrical and magnetic laws of Coulomb, Oersted, Ohm, and Faraday, a new science has been created within the last 20 years. The energy displayed in this department of mixed mathematics is in part due to the great development of electric telegraphy. One of the best examples of the employment of mathematics in physics is afforded by Clerk Maxwell's investigation of Faraday's idea that electro-magnetic induction is a mechanical action.

In this article we cannot enter into a description of modern mathematical methods of investigation; their nature in many special cases is sketched in separate articles. For the history and particulars regarding the various branches of mathematical science, readers are referred to the articles ARITHMETIC: ALGEBRA: GEOMETRY: TRIGONOMETRY: CALCULUS: QUATERNION: UNDULATORY THEORY: THERMODYNAMICS: POTENTIAL, etc.

Mather, Cotton, an American clergyman; born in Boston, Mass., Feb. 12, 1663. After graduating at Harvard College in 1678 and early manifesting a truly Puritan spirit of austerity, he devoted himself to theological studies, and in 1684 was ordained as his father's colleague in the pastorate of the North Church, Boston. In this avocation he displayed a singular fervency of sectarian religious zeal, and strove to maintain the declining ascendency of the Puritan clergy in civil affairs. More notably, however, did he distinguish himself as the self-called exterminator of witchcraft; in relation to which delusion he published, in 1685, his "Memorable Providences relating to Witchcraft and Possessions," a work redolent of the bigoted superstitious spirit of the period. Following this diatribe against demonology appeared in London a discourse from his pen, pronouncing witchcraft "the most nefandous high treason against the Majesty on high," — with a preface by Richard Baxter. In 1692 he produced his "Wonders of the Invisible World," and from this time forward till his death wrote voluminously, his chief work being "Illustrations of the Holy Scriptures." Falling into public odium through his many eccentricities the latter years of his life were passed in comparative obscurity. He died in Boston, Mass., Feb. 13, 1728.

Mather, Increase, an American clergyman; born in Dorchester, Mass., June 21, 1635. Educated at Harvard College, where he took his degree in 1656. In the following year he went to England, where he obtained preferment, and was greatly distinguished for his urbanity and integrity; but in consequence of his Nonconformist opinions was obliged to return to his native colony, where he was appointed minister at Boston; in 1684 was elected president of Harvard College. He was the author of many theological works, a "History of the Indian War," and a "Discourse on Comets and Earthquakes." He died in Boston, Mass., Aug. 23, 1723.

Mathew, Theobald, an Irish reformer; born in Thomastown Castle, near Cashel, Ireland, Oct. 10, 1790; entered the college at Maynooth in 1807, and was ordained in the Franciscan order in 1814. On April 10, 1838, he signed a total abstinence pledge and began a temperance crusade. He traveled over all parts of Great Britain and Ireland, and in the United States in 1849–1851. In the course of the first five months of his work he administered the pledge at Cork alone to over 150,000 converts. The expenses of these tours involved him in heavy liabilities, and on one occasion led to his imprisonment for debt, from which he was relieved only by the grant of a pension by the queen. The immediate results of his preaching were a marked decrease in crime and intoxication, accompanied by a reduction in the duties of Irish spirits of

£582,155 in a period of five years. The permanency of his work was largely destroyed, however, by the Irish famine, which he also did more than any one else to relieve. Thousands of Father Mathew Total Abstinence Societies have been organized throughout the world in his honor. He died in Queenstown, Ireland, Dec. 8, 1856.

Mathews, Charles, an English actor; born in London, England, June 28, 1776. He made his first appearance as an amateur — in the part of Richmond — at the Richmond theater in 1793, and as a professional comedian in the Theater Royal, Dublin, the following year. He then served in the famous York company under Tate Wilkinson, and made his first appearance in London in May, 1803, at the Haymarket. Next year he played at Drury Lane, and he afterward acted at Covent Garden and the Lyceum; but he was not satisfied with the class of part given to him, and in 1818 he took up the profession of "entertainer" and made an immense success with his "At Home" and other entertainments. In this class of business he passed the remainder of his life, appearing frequently in the provinces and visiting the United States twice. He died in Plymouth, England, June 28, 1835. His son, CHARLES JAMES (born Dec. 26, 1803; died June 24, 1878), was a delightful light comedian, with charming grace and delicacy. In 1838 he married the famous Madame Vestris.

Mathieu, Adolphe Charles Ghislain (mä-tyuh′), a Belgian poet and journalist; born in Mons, June 22, 1804. He was curator of the public library at Mons, 1840–1845; assistant professor at the University of Liège, 1849; chief librarian of the Royal Library, 1864. He wrote: "Poems of the Belfry" (2d ed. 1846); "Roland de Lattre" (2d ed. 1840); "Mons and Brussels" (1853); "Olla Podrida" (1828–1829); "Memories" (1866); "Clippings" (1863–1871); the dramas "Two Weddings for One" (1836); "D'Aubigné" (1854), etc.; "Mons Biographies" (1848); the political works "The Reveillé of Liberty" and "France and Belgium." He died near Brussels, June 13, 1876.

Mathilda, or **Matilda, Countess of Tuscany,** daughter of Boniface, Count of Tuscany, and of Beatrice of Lorraine; born in 1046. She married first Godfrey (surnamed the Hunchback), Duke of Lorraine, from whom she lived separate in Italy, and afterward, when over 40 years of age, the boy Guelph of Bavaria. Both were mere alliances of policy. In 1077 she made a gift of all her vast possessions to the Church, a bequest that caused a long contest. It was at her castle of Canossa that Henry IV. did his humiliating penance to Pope Gregory. Four years later she alone stood by the Pope when Henry poured his troops into Italy, she supported him with money when he was besieged in Rome, and after his death at Salerno boldly carried on the war against the emperor. "The great Countess" died in 1115.

Mathura. See MUTTRA.

Matico (-tē′kō), an astringent plant, supposed to be *Artanthe elongata;* called also *Piper angustifolium.* It is applied in leaf or as fine powder to stop hemorrhage from wounds or leech bites; sometimes also an infusion is taken internally.

Matilda, "the Empress Maud," only daughter of Henry I. of England; born in London, England, in 1103. She married in 1114 the Emperor Henry V., and after his death in 1128 Geoffrey of Anjou, by whom she became mother of Henry, afterward Henry II. of England. There was civil war between her and Stephen, 1139–1147. She died in Notre Dame des Prés, near Rouen, France, Sept. 10, 1167.

Matin, a dog considered by the French to be the progenitor of all breeds that resemble, and yet cannot be classed with the greyhound. It is rather a species in which are included a variety of dogs. The head is elongated, the forehead flat, the ears pendulous toward the tips; color, yellowish-fawn. It is commonly employed in France as a sheep dog and watchdog.

Matins, the daily office of Morning Prayer in the Anglican communion. It is composed in part of the pre-Reformation offices of Matins and Lauds. In the Roman Catholic Church, the first portion of the Divine Office with which Lauds are usually associated. On Sundays and double feasts matins have three nocturns; on simple feasts and week-days, one nocturn. Easter and Pentecost have each only one nocturn, with three psalms. After private prayer versicles and responses are recited; the invitatory psalm follows. In the first nocturn are said three psalms on feast days, 12 when the office is of the Sunday, and three lessons from Scripture; the second and third nocturns have each three psalms, and the lessons are chosen from the patristic writings for the second, and from some commentary on the Gospel of the day for the third nocturn. On feasts of saints the lections of the second nocturn are usually biographical. Lauds consist of five psalms, the little chapter, a hymn, the canticle *Benedictus,* collect, and commemorations, if any.

Matsmai, or **Fukuyama,** a port of Japan, situated at the S. W. extremity of the island of Yesso, at the W. entrance to the Strait of Tsugar. Formerly the principal town of the island, it has in recent times been outstripped by its more successful rival Hakodate. Pop. (1894) 34,527.

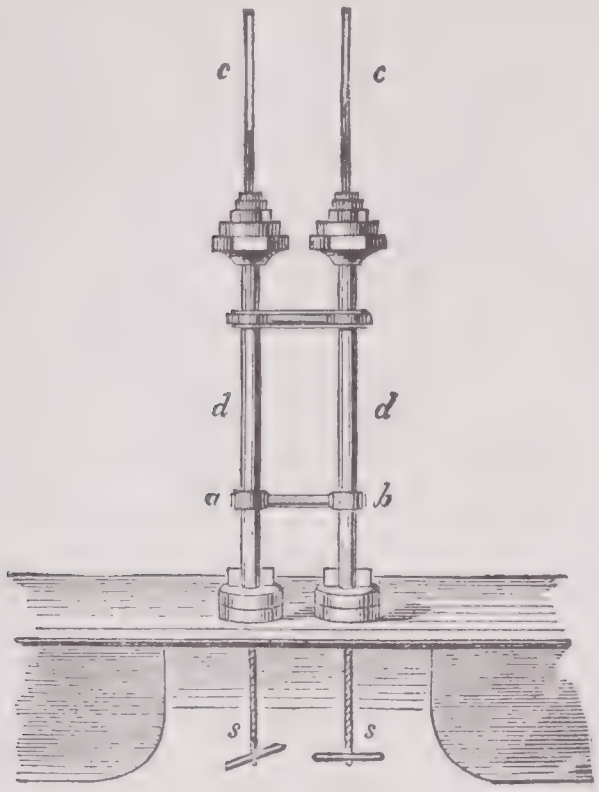
Matsys, Metsys, or **Massys, Quentin,** a Flemish painter; born in Louvain, Belgium, in 1466. It is said he quitted the forge for the pencil in consequence of having become enamoured of the daughter of a painter, whose hand was to be obtained only by a master of the same profession. He quitted his native city in 1491 and went to Antwerp, when he was made master of the famous guild of painters of that city. He chiefly painted portraits and half-figures in common life, but sometimes undertook great works, of which a "Descent from the Cross," in the cathedral of Antwerp, is a favorable specimen. He died in Antwerp in 1529.

Matter. The idea of force seems to have arisen from consciousness of our own muscular exertion; but coexistent with this idea is the idea of matter on which force exerts itself. Matter may appear in the solid, liquid, or gaseous state; sometimes useful purposes may be served by considering bodies such as tar and pitch as in a state intermediate between the solid and liquid states. To distinguish between solids and liquids we observe that the form of a solid body is not easily changed; that is, the form of a solid body can only be changed by the application of definite forces; whereas the form of a liquid body depends on the form of its containing vessel, and the smallest force imaginable acting on a portion of a liquid is able to alter its position relatively to the rest, thus changing the form of the body. A solid body may be caused to change its form when sufficient time is allowed by a force which would otherwise be too small to produce any such effect. But when the force becomes very small it cannot produce change of form, however much time may be allowed. In this we have the real distinction between solids and liquids. Very small forces will change the form of a liquid if sufficient time is allowed. A perfect fluid would be matter in such a state that it would resist pressures tending to diminish its volume, but would not resist pressures tending to change its form (except the resistance which all bodies oppose to being set in motion). No liquid known to us is a perfect fluid; all liquids (and, as Prof. Clerk Maxwell has shown, all gases) possess viscosity, which is a sort of molecular friction incapable of preventing change of form, but which offers resistance while the change is being produced, this resistance being less as the change is made more gradually. This viscosity is to be distinguished from inertia, or the resistance which all bodies oppose to being set in motion. A gas tends to fill the vessel in which it is placed. If we imagine it formed of a great number of little particles these particles must be continually striving to get as far away from each other as possible. When solid bodies are heated sufficiently they become liquids, and when liquids are heated sufficiently they become gases. It becomes more and more evident to physicists that the ultimate particles of matter are in rapid motion, and that when bodies are heated their particles move more rapidly. In a solid each particle seems to be constrained to a certain orbit; as the motion increases, this orbit in general gets greater, and when so much heat has been given to the solid that it melts or becomes a liquid the particles move without restraint among each other. When the motion gets still greater by the addition of heat, and the body becomes a gas, the particles are far apart, and move about with great rapidity in straight lines, coming into collision with each other and the sides of the containing vessel continually.

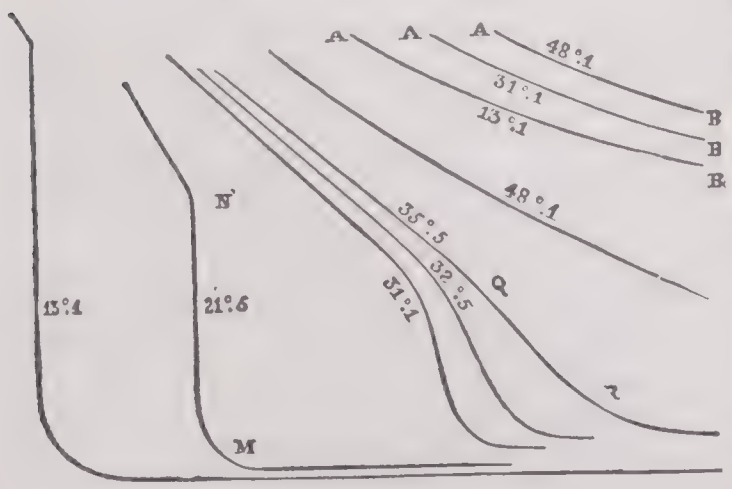
Many facts in physics are explainable by the supposition that there is a subtle medium filling interstellar and intermolecular space, which transmits heat and light and other disturbances; this hypothetical medium must be almost infinitely elastic and imponderable, and must resemble a solid rather than a fluid.

Continuity of States of Matter.— The well-known kinetic theory of gases, invented by Bernouilli to account for the tension of elastic fluids, revived in the early half of the 19th century by Herapath, Joule, and others, and subsequently developed by Clausius and Clerk Maxwell, involved as a necessary consequence the absolute continuity of the gaseous and liquid states of matter; and the successive liquefaction of gases by Faraday and others proved it by induction. One of the results of Faraday's experiments led him to the conclusion that there is no broad distinction between gases and vapors, the difference in their nature being simply one of degree, a vapor being in reality a gas near its temperature of liquefaction. (See LIQUEFACTION OF GASES.) In the Bakerian Lecture of the Royal Society of London for 1869 Dr. Andrews described the fine series of careful experiments carried out by him during several years, from which he deduced that "the ordinary gaseous and liquid states of matter are widely separated forms of the same condition of matter, and may be made to pass into one another by a series of gradations so gentle that the passage shall nowhere present any interruption or breach of continuity." The apparatus employed by Dr. Andrews consisted of two very strong copper or wrought iron tubes *d*, communicating at *a b*. Dry air was inclosed in one of the strong glass tubes *c*. The gas to be experimented on was inclosed in the other tube *c*. Short threads of mercury in the tube *c* indicated the volumes of the gases; the height of each mercury thread at any time was measured by means of a cathetometer. The space be-

low the mercury threads and everywhere inside the tubes *d* was filled with water. Two fine screws *s*, when turned, forced



themselves into the water space, so that the water and the gases might be subjected to pressure; it is evident (see HYDROSTATICS) that this pressure was nearly the same everywhere. A rectangular case (not shown in the figure) with plate glass sides might surround each glass tube to keep it at any temperature by means of a stream of water. The precautions taken to have light connections and to have pure dry gases in the tubes, and the corrections applied to the observations of pressure and volume, cause these experiments of Dr. Andrews to be regarded as models for the imitation of physicists. The results with carbonic acid are given in the diagram; each of the curves A B indicates the variation of volume and pressure of dry air at some constant temperature; the other lines



relate to carbonic acid. The vertical heights of points in a curve, from a certain horizontal line not shown in the cut, represent the relative volumes; and their distances, measured horizontally from a certain vertical line (to the left of the figure, but not shown), represent the relative pressures to which the fluid was subjected. When the carbonic acid was always kept at the temperature of 13.1° C. it condensed at the pressure of 47 atmospheres; that is, the space in the tube was occupied partly by liquid and partly by gas, the surface of demarcation being distinctly visible; as the space was made smaller and smaller the gas became completely converted into liquid. Steam at 100° C. exhibits phenomena of the same kind, condensing when subjected to the pressure of one atmosphere. It is found, however, that liquid carbonic acid is far more compressible than ordinary liquids, and that its expansion by heat is much greater than that of ordinary liquids; in fact in its elasticity and expansion by heat it approximates more to a gas than ordinary liquids. This becomes more apparent at the temperature of 21.5° C., when the gas condenses at 60 atmospheres, and the liquid occupies nearly one-third of the volume of the gas from which it condenses. Thus, though they are still quite distinct, the very heavy gas and the very light liquid are approximating to each other in their properties. But Andrews found that at 30.92° C., which is called the critical temperature, and at the pressure of from 73 to 75 atmospheres, very slight changes of temperature or pressure changed the carbonic acid into a gas or into a liquid; these changes were indicated by flickering movements in the tube. If the temperature is above the critical point, for instance 31.1° C., no liquefaction is observed, however great the pressure may be; up to 73 atmospheres the carbonic acid behaves somewhat like air, though it does not nearly so well follow the law of Boyle; from 73 to 75 atmospheres the volume diminishes rapidly, but by no means suddenly; and above 75 atmospheres the volume diminishes more gradually than in the case of a perfect gas, but yet more rapidly than in most liquids. In the curves for 32.1° C. and 35.5° C. we may observe changes of compressibility at Q and R, but the curve for 48.1° C. is concave upward everywhere. At this temperature we have reason to believe that the carbonic acid is a gas at all pressures. These experiments and the principles deduced from them showed why several gases had till then resented every attempt to liquefy them. Too much reliance had been placed on the application of enormous pressures, but such a method was now seen to be altogether useless unless the gases were at a temperature below the critical temperature. Hence the application of intense cold was adopted.

To make carbonic acid pass without any interruption of continuity from the gaseous to the liquid condition Dr. Andrews took a

quantity of the gas at 50° C., exposed it to pressure increasing to 150 atmospheres, and then cooled it gradually to the temperature of the atmosphere. During these two processes no change of condition was observed in the gas, nor was there any sudden change in compressibility. He began with a gas, and it was easy to show that he ended with a liquid, for on removing the pressure boiling commenced. The question answered by Dr. Andrews was, What is the condition of carbonic acid when it is compressed at temperatures above 30.92° C. from the gaseous state to the volume of the liquid without giving evidence at any part of the process of liquefaction having occurred? His answer he found "in the close and intimate relations subsisting between the gaseous and liquid forms of matter. The ordinary gaseous and liquid states are, in short, only widely separated forms of the same condition of matter, and may be made to pass into one another by a series of gradations so gentle that the passage shall nowhere present any interruption or breach of continuity. * * * Under certain conditions of temperature and pressure carbonic acid finds itself, it is true, in what may be described as a state of instability, and suddenly passes, with the evolution of heat and without the application of additional pressure or change of temperature, to the volume which by the continuous process can only be reached through a long and circuitous route. * * * There is no difficulty here, therefore, in distinguishing between the liquid and the gas. But in other cases the distinction cannot be made, and under many of the conditions I have described it would be vain to attempt to assign carbonic acid to the liquid rather than the gaseous state. Carbonic acid at the temperature of 35.5° C., and under a pressure of 108 atmospheres, is reduced to $\frac{1}{430}$ of the volume it occupied under a pressure of one atmosphere; but if any one ask whether it is now in the gaseous or liquid state the question does not, I believe, admit of a positive reply." Dr. Andrews found that nitrous oxide, hydrochloric acid, ammonia, sulphuric ether, and bisulphide of carbon exhibited at fixed pressures and temperatures critical points, and rapid changes of volume when the temperature or pressure was changed in the neighborhood of those points. Andrews also suggested that if physicists are to make a distinction between gases and vapors a vapor may be defined to be a gas at any temperature under its critical point. Thus, in this sense of the term, a gas cannot be liquefied by pressure.

The possible continuity of the solid and liquid conditions of matter is a difficult problem, the probable direction of the inquiry into which is indicated at the end of Dr. Andrews' paper. Prof. James Thomson proved that the melting temperature of a solid changes with the pressure to which it is subjected. We might draw a number of curves, each expressing the relations between pressure and volume exhibited by ice and water at a certain temperature (if not much higher than 0° C.), if we knew exactly the rate of change of volume of ice with the change of temperature and pressure.

It would appear that so far no such series of experiments has been made, but judging from the results of detached experiments, it does not seem improbable that isothermal curves for ice and water should indicate the existence of a low critical temperature (just as the gradual approach of such points as M and N in Andrews' curves indicates a critical point), and therefore that by subjecting water to very great pressure at a temperature above 0° C., cooling to a low temperature, and decreasing the pressure, the water may be found to have been converted into ice without any apparent breach of continuity. For solids which expand on melting the critical temperatures which we suppose to exist must be higher than the ordinary melting temperatures. In this case we may yet be able to obtain a gradual continuous transformation from the liquid to the solid state by subjecting the liquid to high pressure and cooling gradually to a temperature lower than the ordinary melting point.

Matterhorn (mät'-) (in French Mont Cervin, in Italian Monte Silvio), a peak of the Alps between the Swiss canton of Valais and Piedmont, rising to the altitude of 14,705 feet. The actual peak was first scaled by Lord Francis Douglas, the Rev. C. Hudson, Hadow, and Whymper, with three guides, July 14, 1865, when the three first-named and one of the guides fell over a precipice and were killed.

Matthew, an apostle of Jesus, almost certinly the same as Levi, the son of Alpheus. (See Matt. ix: 9–13, Mark ii: 14–16, and Luke v: 27.) He was a "publican" —*i. e.*, a taxgatherer — who sat at the receipt of custom at Capernaum on the shore of the Sea of Galilee. Taxgatherers are rarely popular men; and, moreover, the money which Matthew raised was not for the Jewish, but for the Roman government, he was, therefore, regarded as outside the pale of society, and his companions, when he was called to the apostleship, were "publicans and sinners." After his call he figures in all the lists of apostles. (Matt. x: 3; Mark iii: 18; Acts i: 13). Clement of Alexandria represents him as dying a natural death; much later tradition represents him as having been martyred.

The Gospel according to St. Matthew, the first of the four Gospels in arrangement, and long most universally held to have been the first in point of publication, though it

is more probable that Mark came first and Matthew only second in point of time. The author's name is nowhere given in it, but universal Christian tradition assigns it to Matthew the apostle, called Levi, and there is a fragment of internal evidence in the same direction. In connection with the call of Matthew the first Gospel relates that "as Jesus sat at meat in the house, behold many publicans and sinners came and sat down with Him and His disciples" (Matt. ix: 10). Why they presumed to come is not stated; but St. Luke explains that they came because they were invited. He says that "Levi (Matthew) made him a great feast in his own house; and there was a great company of publicans and of others that sat down with them" (Luke v: 29). If the author of the first Gospel felt diffident about recording the hospitality of Matthew, the only reason can be that he was Matthew himself; the sole argument against this view is that Mark also withholds the information that invitation to the party was given (Mark ii: 15). The special object of the first Gospel was to show that Jesus was the Messiah of ancient prophecy. The author continually quotes the Old Testament prophets, sometimes indicating that the events took place to fulfil the prophecy (i: 22, ii: 15, 23, etc.), at others simply that they fulfilled the prophecy (ii: 17). The book was addressed specially to the Jews. The ancient fathers believed that it was published at first in Aramaic, but, on the other hand, no quotations from the Aramæan book is extant, and the Greek has every appearance of an original work rather than a translation; of two kinds of quotations from the Old Testament, one is from the Septuagint Greek.

Eusebius fixes the date of its publication in the third year of Caligula, A. D. 41, but lived too late really to know; Irenæus is in favor of a later date, apparently 60. Rationalistic writers, who disbelieve in prophecy, place it after the destruction of Jerusalem.

In 1771 Williams attacked the authenticity of the first two chapters. He was followed by Stroth, Hesse, Ammon, Schleiermacher, Norton, etc. They were defended by Fleming, Griesbach, Hug, Credner, Paulus, Kuinoel, Neander, etc. All the old manuscripts and versions contain them, and they are quoted by the fathers of the 2d and 3d centuries.

Matthew is the only evangelist who reports at length the Sermon on the Mount. He gives prominence to other discourses of Jesus. Like his fellow synoptists he gives details of the ministry of Jesus in Galilee, not speaking much of Jerusalem till the closing scenes drew nigh.

Matthews, (James) Brander, an American author; born in New Orleans, La., Feb. 21, 1852. He was graduated at Columbia College in 1871, and from Columbia Law School in 1873, being admitted to the bar the same year. He soon turned to literature, taking especial interest in the drama, and made himself an authority on French dramatic literature; also wrote several clever comedies. In fiction he steadily gained in art and reputation, his short studies of New York city life in the realistic vein being among the very best of their kind. He also wrote a strong novel of New York life, "His Father's Son." He was one of the founders of the Authors' Club of New York, did valuable work in organizing the American Copyright League, and was a frequent contributor of essays and fiction to periodicals. Of his many writings the following books are the more important: "The Theaters of France"; "French Dramatists of the Nineteenth Century"; "Margery's Lovers, a Comedy"; "The Last Meeting, a Story"; "The Secret of the Sea, and Other Stories"; "A Family Tree, and Other Stories"; "The Story of a Story"; "Tom Paulding"; "Studies of the Stage"; "Americanisms and Briticisms"; "Vignettes of Manhattan"; "Introduction to the Study of American Literature"; "The Royal Marine"; "Tales of Fantasy and Fact"; "Outlines of Local Color"; and "A Confident Tomorrow." He became Professor of Literature in Columbia University in 1892.

Matthias, one of the 70 disciples of Jesus Christ who was chosen by lot, in preference to Joseph Barsabas, into the number of the apostles, to supply the deficiency caused by the treachery and suicide of Judas (Acts i: 23–26). Nothing is known of his subsequent career.

Matthias (mät-thē'äs), Emperor of Germany; born in Vienna, Feb. 24, 1557. At the age of 21 he was sent by the Emperor Rudolph II. to take the government of the Low Countries, then in revolt against Spain, but he was unequal to the task, and in a few years returned. In 1592 he commanded the army against the Turks in Hungary, and three years later became heir presumptive by the death of his brother Ernest. He was elected King of Hungary in 1607, King of Bohemia in 1611, and on the death of Rudolph in the following year he was chosen emperor. He re-

MATTHIAS, EMPEROR OF GERMANY.

signed the crown of Bohemia to his cousin Ferdinand in 1617, and the persecution of the Protestants in that country by the latter occasioned the Thirty Years' War. He died broken down by the sense of the calamities impending over his dominions, March 20, 1619.

Matthias Corvinus (-vē'nös), called the GREAT, King of Hungary and Bohemia; born in Klausenburg, March 27, 1443. He was the son of John Hunniades. The enemies of his father confined him in prison in Bohemia; but, on regaining his liberty he was elected King of Hungary in 1458, when only 15 years of age. His election, however, was opposed by many of the Hungarian magnates, who offered the crown to Frederick III. The Turks, profiting by these divisions, invaded the country, but were expelled by Matthias, who compelled Frederick to yield to him the crown of St. Stephen, of which he had obtained possession. The war was afterward renewed, and Matthias, overrunning Austria, took Vienna and Neustadt; on which the emperor was obliged to make a peace, in 1487. Matthias reformed many abuses, particularly with respect to duels and lawsuits, and was preparing an expedition against the Turks, when he died in Vienna, April 6, 1490.

Matto Grosso (mät'tö gros'sö) ("dense forest"), an inland State of Brazil, bordering on Bolivia, second to Amazonas alone, in size and sparseness of population; area, 532,708 square miles; pop. (1900) 118,025, nearly all Indians and blacks. Within this vast territory several great rivers rise, including the Madeira and the Paraguay; but in most parts there is a scarcity of water during the dry season. The vegetation is generally scanty, grass, bush, and low trees covering the sandstone plateau; high trees and rich vegetation are confined to the river valleys. The gold and diamonds which formerly constituted the wealth of Matto Grosso have been exhausted, and agriculture (insufficient for the wants of the state) and cattle raising, with the gathering of medicinal plants by the Indians, are now the principal industries. The capital is Cuyabá. The former capital, Matto Grosso, on the Guaporé, greatly decayed with the gold mining industry.

Mattoon, a city in Coles co., Ill.; on the Illinois Central, the Cleveland, Cincinnati, Chicago, and St. Louis, and the Peoria, Decatur, and Evansville railroads; 56 miles W. of Terre Haute, Ind. There are gas and electric light plants, waterworks, high school, public library, National banks, and daily and weekly newspapers. It contains the machine shops of the Cleveland, Cincinnati, Chicago, and St. Louis, and the Peoria, Decatur, and Evansville railroads; has broom factories, grist mills, planing mill, etc., and an assessed property valuation of over $1,000,000. Pop. (1890) 6,833; (1900) 9,622; (1910) 11,456.

Maturin (mä-tö-rēn'), a section of the Venezuelan State of Bermudez, W. of the Orinoco delta, and consisting almost entirely of llanos. The town Maturin, on the Guarapiche, has plantations of cacao, and a trade with the West Indies; its port is Colorado, 25 miles below, and a railway has been constructed to this point.

Maturin, Charles Robert (mat'ū-rin), an Irish novelist; born in Dublin, Ireland, in 1782. A clergyman of the Church of England, he was noted for eloquence in the pulpit and hostility to Roman Catholicism. His best novel was "Melmoth the Wanderer" (1820); others being "The Wild Irish Boy" (1808), "The Milesian Chief" (1812), etc. His tragedy, "Bertram," thought by many to be his best work, was produced by Edmund Kean at Drury Lane in 1816. He died in Dublin, Oct. 30, 1824.

Maturin, Edward, an American novelist; born in Dublin, Ireland, in 1812. In 1832 he came to America with letters of introduction from Thomas Moore and other literati. He wrote "Montezuma, the Last of the Aztecs: A Romance" (2 vols. 1845); "Benjamin, the Jew of Grenada: A Romance" (1848); "Lyrics of Spain and Erin" (1850); and "Bianca, a Tale of Erin and Italy" (1852). He died in New York city, May 25, 1881.

Matzoon (mat'-), a milk food used by the inhabitants of Armenia; prepared by exposing cows' milk in open vessels to a heat of 80° or 90° F., and when coagulation takes place the curd is broken up by a churning process, and a little salt is added.

Mauch (mâk) **Chunk,** a town and county-seat of Carbon co., Pa., on the Lehigh river, the Lehigh Coal and Navigation Company's canal, and on the Central of New Jersey and the Lehigh Valley railroads; 46 miles W. by N. of Easton. It marks the extreme boundary of the anthracite coal region of Pennsylvania; is famous for its striking natural scenery; and in the summer is visited by thousands of tourists. Near the town are the Summit Hill coal mines, which are among the best in the State. The coal is now carried through a tunnel, but was formerly transported to Mauch Chunk by a gravity railroad known as the Switchback, which has become famous as an exciting pleasure route for tourists. Mount Pisgah and Mount Jefferson, the summits of which are reached by the Switchback railroad, Prospect Rock, Flagstaff Peak, and Glen Onoko are points of large interest. The town contains a county building, Y. M. C. A. building, the

Dimmick Memorial Library, electric street railroad, electric lights, National banks, and several daily and weekly newspapers. It has a number of foundries, a shoe factory, car shops, etc. Pop (1890) 4,101; (1900) 4,029.

Maudsley, Henry, an English alienist; born in Rome, near Settle, Yorkshire, England, Feb. 5, 1835; was educated at University College, London; was Professor of Medical Jurisprudence in University College, London, 1869–1879; and editor of the "Journal of Mental Science," 1863–1878. He published: "Physiology and Pathology of the Mind"; "Responsibility in Mental Disease"; "Body and Will"; "Natural Causes and Supernatural Seemings" (1897); etc.

Maulmain (mâl-mān′), or **Moulmein** (moul-mīn′), a town in the province of Tenasserim, Burma, near the mouth of the Salween river. There are numerous public buildings, churches, chapels, and missionary establishments, several charitable and educational institutions, barracks, a hospital, gaol, etc. The principal exports are teakwood and rice; the imports consist of general merchandise, chiefly piece goods, hardware, provisions, and sundries; is backed by a fine range of hills, on whose heights flash the gilded spires of innumerable pagodas; and here, too, are built many pretty residences, commanding a fine view of the town, river, and adjacent country, which for picturesque beauty and varied scenery has few equals. Pop. (1901) 58,446, of whom about 27,000 were Buddhists, 11,000 Hindus, 6,000 Mussulmans, and 2,000 Christians.

Maulo, the daughter of Tiresias, a famous prophetess, and priestess of Apollo.

Mauna Loa (mou′nä lō′ä), a volcano in the Sandwich Islands near the center of Hawaii; height, 13,600 feet.

Maundy Thursday, or **Maunday Thursday,** the Thursday in Passion week, the day next before Good Friday, when it was formerly the custom for the kings and queens of England to wash the feet of as many poor men and women as they were years old, and afterward give them meat and clothes. This ceremony is now obsolete, but on Maundy Thursday the king's or queen's almoner distributes to as many poor men and women as their sovereign is years old certain coins called Maundy money, consisting of a silver four-penny piece, a three-penny piece, a two-penny piece, and a penny piece. The name is derived from the anthem which was sung during the ceremony, and which began with the words *Mandatum novum* (John xiii: 34), the notion being that the washing of the feet was a fulfilling of this command.

Maupassant, Guy de (mō-pä-so*ng*′), a French novelist; born in the Château Miromesnil, Seine-Inférieure, France, Aug. 5, 1850. He was for some time clerk at the navy department, Paris. He published over 20 volumes, among them the collections of short stories, "The Sisters of Rondoli" (1884), "Tales of Day and Night" (1885), "The Left Hand" (1889); the novels "Peter and John" (1888); "Strong as Death" (1889, "Our Heart" (1893); the books of travel "In the Sunshine" (1884), "On the Water" (1888). "A Wandering Life" (1890). Unsettled by the insanity and death of a brother, he himself died in an ayslum in Paris, July 6, 1893.

GUY DE MAUPASSANT.

Maupertuis, Pierre Louis Moreau de (mō-pār-twē), a French mathematician and philosopher; born in St. Malo, France, Sept. 28, 1698. After four years' service in the army he was in 1723 received into the Academy of Sciences. He then visited England and Switzerland, and became a pupil of Newton. In 1736 he conducted a scientific expedition to Lapland for the purpose of measuring an arc of the meridian. In 1740 he accepted an invitation from the King of Prussia to settle at Berlin, where in 1746 he was declared president of the Academy of Sciences. He died in Basel, Switzerland, July 27, 1759.

PIERRE L. MAUPERTUIS.

Maurepas (mō-ruh-pä′), **Jean Frédéric Phélippeux, Comte de,** a French statesman; born in Paris, France, July 9, 1701. He was brought up for public life, and was early intrusted with office, but contrived to displease the all-powerful Pompadour and was banished from court in 1749. He was recalled and made first minister at the accession of Louis XVI. (1774), and it was

on his initiative and by his advice that France recognized the independence of the United States and came to the aid of the struggling young nation in its Revolutionary War. He brought into the ministry Turgot, Malesherbes, and Necker. He died in Versailles, France, Nov. 21, 1781.

Maurice, Prince of Orange and Count of Nassau, son of William the Silent; born in Dillenburg, Prussia, Nov. 13, 1567. After his father's assassination in 1584, the provinces of Holland and Zealand, and afterward Utrecht and the others, elected him their stadtholder. A great portion of the Netherlands was still in the hands of the Spaniards; but, under the leadership of Maurice, the Dutch, aided by an English contingent under the Earl of Leicester and Sir Philip Sidney, rapidly wrested cities and fortresses from their enemies. In 1590 Breda, and in 1591 Zutphen, Deventer, Nimeguen, and other places fell into their hands, in 1593 Geertruidenberg, and in 1594 Groningen. In 1597 he defeated the Spaniards at Turnhout in Brabant, and in 1600 won a splendid victory at Nieuwpoort. Then for more than three years he baffled all the power of Spain by his defense of Ostend. Finally, in 1609, Spain was compelled to acknowledge the United Provinces as a free republic. But from this time keen dissension grew up between the Orange party, who favored the Gomarists, and the Remonstrants or Arminians, who found their chief supporters in aristocratic republicans, like Olden Barneveldt. The former emerged victors from the struggle, and Maurice at once (1621) renewed the war with Spain. He died in The Hague, April 23, 1625.

Maurice, Frederick Denison, an English philosopher; born in Normanston, England, Aug. 29, 1805. He was educated at Cambridge and Oxford; became Professor of Theology in King's College, London (1846), where he distinguished himself by the breadth of his religious views; edited the "Educational Magazine" (1839–1841); was one of the founders of Queen's College, London (1848); the leader of the Christian Socialists in 1848; principal of the workingmen's college, St. Martin's Hall, Queen Square; Professor of Moral Philosophy at Cambridge. He wrote: "Eustace Conway" (1834), a novel; "Ancient Philosophy" (1850); "Philosophy of the First Six Centuries" (1853); "Theological Essays" (1853); "Mediæval Philosophy" (1857); "Modern Philosophy" (1862); etc. He died in London, England, April 1, 1872.

FREDERICK D. MAURICE.

Mauricius, Emperor of Constantinople; born in Cappadocia in A. D. 539. He rendered great services to the empire under Justin and Tiberius, especially in his four campaigns in Persia, 578–581; and on his return to Constantinople, in 582, was declared Cæsar, and soon after crowned emperor, and married the daughter of Tiberius. His reign of 20 years was occupied almost constantly with wars — wars with the Persians, terminated by the defeat of Bahram, and the restoration of Chosroes in 591; and wars with the Avars, which lasted from 592–599. These were, however, mostly carried on by his generals. In 599 Comentiolis was defeated, and an immense number of his troops captured by the Avars, who, on the refusal of Mauricius to ransom them, put them all to death. In 602 a mutiny broke out in the army on the Danube, Phocas was proclaimed emperor, and Mauricius, with his five sons, was murdered at Chalcedon. Three years later his wife and daughters were put to death by Phocas.

Maurists, the members of the Congregation of St. Maur, to whom literature owes the stately tomes known as "Benedictine Editions." The Congregation had its origin in a reform of the Benedictines in the early part of the 17th century; it was supported by De Retz and afterward by Richelieu, and in 1720 possessed in France six provinces, containing 180 abbeys and priories. Among the most celebrated of the Maurists are Mabillon, Martene, Montfaucon, the founder of the science of archæology, Ruinart, Lami, Le Nourri, and Martianay. Jansenism seems to have affected some of the convents, and, according to Badiche, a Masonic lodge was established at Glanfeuil in 1755, over which the prior of the monastery in that place presided. The Congregation was suppressed in 1792.

Mauritania (-tā′ni-ä), in ancient history, a country or kingdom of Northern Africa, embracing nearly all the points now known as Fez, with parts of Algeria and Morocco; bounded on the N. by the Mediterranean; S. by Getulia or Libya; E. by Numidia; and W. by the Atlantic Ocean. It was divided by Claudius into two provinces, Mauritania Cæsariensis and Mauritania Tingitana. That the country was originally inhabited by a people from Phœnicia, is borne out by a passage in the writings of Procopius, a Greek historian of the 6th century, who says that in his time there

were standing two white pillars, bearing the following inscription in the Phœnician characters: "We are the Canaanites who fled from Joshua, the son of Nun, that notorious robber." The early history of Mauritania has afforded abundant material for Greek and Roman mythological tables. Neptune, Atlas, and Antæus were some of their earlier kings. From the defeat of the last named monarch little is known of Mauritania till it fell under the dominion of the Romans, who doubtless succeeded the Carthaginians as masters of the country. Mauritania was subdued by the Mohammedan Arabs in the latter part of the 7th century.

Mauritia (-rish'i-ä), a genus of palms, tribe *Calameæ*. They are natives of tropical parts of South America. The leaves are fan-shaped. Some species rise to the height of 100 or even 150 feet. The juice of *M. vinifera* is made into a kind of wine, or what in the East would be called "toddy." The outer rind of the young leaves of *M. flexuosa* is made into string; the soft pith furnishes a kind of sago. It is the moriche, or sea palm, and grows along the Amazon, Orinoco, etc.

Mauritius, (mâ-rish'ius), or **Isle of France,** an island in the Indian Ocean, a colony of Great Britain, 500 miles E. of Madagascar; of an oval form, about 40 miles long from N. E. to S. W., and 25 miles broad, and surrounded by coral reefs; area, 705 square miles; pop. (1901) 378,195, two-thirds originally coolies imported to work the sugar estates. It is composed chiefly of rugged and irregular mountains, the highest, the Montagne de la Rivière Noire, 2,700 feet, and the isolated rock Peter Botte, 2,600 feet. Between the mountains and along the coast there are large and fertile plains and valleys, having a rich soil of black vegetable mould or stiff clay. The climate is pleasant during the cool season, but oppressively hot in summer, and the island is occasionally visited by severe epidemics. In its vegetation Mauritius resembles the Cape in the number of succulent plants, cactuses, spurges, and aloes. The principal objects of cultivation are sugar, rice, maize, cotton, coffee, manioc, and vegetables. The exports include sugar (much the largest), rum, vanilla, aloe fiber, cocoanut oil. The imports consist of rice, wheat, cattle, cotton goods, haberdashery, hardware, etc. The exports and imports are each valued at over $10,000,000 annually; the revenue is about $3,500,000. The government is vested in a lieutenant-governor and legislative council. The island has two railways crossing it, in all 87 miles. Mauritius was discovered in 1505 by the Portuguese. The Dutch took possession of it in 1598, and named it after Prince Maurice. After occupation by the French it was captured by Great Britain in 1810. Principal towns, Port Louis and Mahébourg. May, 1892, it was visited by a terrible hurricane, one-third of Port Louis being destroyed.

Maurocordatos, or **Mavrocordatos** (mäv-rō-kor-dä'tos), a Fanariote family, distinguished for ability and political influence, and descended from Greek merchants of Chios and Constantinople. Alexander Maurocordatos (1637–1709) studied medicine in Italy, and, having a talent for languages and diplomacy, became a dragoman or interpreter to the Porte in 1681, and rendered valuable service in the negotiations with Austria of the immediately following years, his labors finding their culmination in the treaty of Carlovitz (1699). For some time after that he was one of a triumvirate in whose hands all power in the Ottoman empire rested. His son, Nicholas (died 1730), was the first Greek who was hospodar of Moldavia and Wallachia. Constantine, son of Nicholas, became hospodar of Wallachia in 1730, and abolished serfdom in that country. His brother's grandson, Alexander Maurocordatos, born in Constantinople, Feb. 15, 1791, took an active part in the Greek struggle for liberty, and prepared the declaration of independence and the plan of a provisional government, being himself elected president of the executive body. Then he undertook in 1822 an expedition to Epirus, which ended in the unsuccessful battle of Peta; but he saved the Peloponnesus by his resolute defense of Missolonghi (1822–1834). Notwithstanding the opposition of Colocotroni, and Dimitrios Ypsilanti, he labored earnestly in the cause of Greek independence and union. But unpopularity dogged his efforts, because he was a steadfast admirer of English policy and institutions, and a fierce opponent of the pro-Russian government of Capo D'Istria. After the accession of King Otho he was at different times cabinet minister and ambassador to Greece at various courts. At the outbreak of the Crimean War he was placed once more at the head of the government — a dignity, however, which he soon resigned. He died in Ægina, Aug. 18, 1865.

Maury, Dabney Herndon, an American military officer; born in Fredericksburg, Va., May 21, 1822; was graduated at the United States Military Academy in 1846; served with distinction in the Mexican War; and was instructor in the United States Military Academy in 1847–1852. When the Civil War broke out he resigned his commission in the United States army and joined the Confederate forces; was made colonel and adjutant, and subsequently was department commander of the Army of the Gulf, in which capacity he served till the

surrender of General Lee. Under President Cleveland's first administration he was minister to Colombia. He died in Peoria, Ill., Jan. 11, 1900.

Maury, Jean Siffrein, a French orator and prelate; born in Valréas, Vaucluse, France, June 26, 1746. His studies completed at Avignon, he went to Paris. Eloquent eulogies on the dauphin, Charles V. of France, St. Louis, St. Vincent de Paul, and others gained him the abbacy of Frinade, and in 1784 admission to the Academy. In 1786 he was made prior of Lihons-en-Santerre, and in 1789 was sent by the neighboring clergy to represent them in the States General. Bold, confident, vehement, gifted with a magnificent voice and an imposing presence, and master of the resources of the skilled orator, Maury was the worthy rival of Mirabeau, and sometimes got the better of him in a parliamentary bout. At the dissolution of the Constituent Assembly, he withdrew from public life, and even from France. The Pope, admiring his devotion to Louis XVI., summoned him to Rome, made him Archbishop of Nicæa *in partibus*, then cardinal (1794), and besides bestowing on him a valuable living, sent him as his nuncio to witness the coronation of the Emperor Francis II. In spite of his zeal for the Bourbons, Maury made his submission to Napoleon in 1804, and Napoleon in return appointed him grand almoner to his brother Jerome, and in 1810 chose him to be Archbishop of Paris. This step cost Maury the favor of the Pope; that of the Bourbons he had of course already lost. He died in Rome, May 11, 1817.

Maury, Matthew Fontaine, an American scientist; born in Spottsylvania co., Va., June 14, 1806; joined the United States navy in 1825; met with an accident in 1839 which crippled him for life, and was then given charge of the Hydrographic Office in Washington. In 1844, when that office was united with the Naval Observatory, he became superintendent. In 1861 he resigned his post; entered the Confederate navy; established the naval submarine battery service at Richmond; and was engaged in Europe in perfecting a torpedo system till the end of the war. In 1865 he went to Mexico, was appointed a member of Maximilian's cabinet, and was sent to Europe on a special mission by the emperor. After Maximilian's fall he resumed his scientific and literary work. On leaving the National naval service he had been invited by the governments of Russia and France to continue in those countries his scientific work, and now, when the overthrow of the Mexican empire left him free for other service, he was invited by the Emperor Napoleon to become superintendent of the Imperial Observatory at Paris. In 1871, however, he accepted the presidency of the University of Alabama. In 1902 a movement was started in Paris, France, to erect an international monument to his memory. His scientific works include "Navigation"; "Letters on the Amazon and Atlantic Slopes of South America" (1853); "Physical Geography" (1855); etc. He died in Lexington, Va., Feb. 1, 1873.

Mausoleum (-lē′um), a magnificent tomb, or stately sepulchral monument. The name is derived from Mausolus, King of Caria, to the memory of whom his queen, Artemisia, erected a splendid monument at Halicarnassus, 353 B. C. The mausoleum is described by Pliny. Its site was discovered at Boodroom, in 1856, by C. T. Newton, keeper of the Greek and Roman antiquities in the British Museum, and extraordinary statues and sculptures were obtained from the excavations made under his direction.

Mauthner, Fritz (mout′ner), a German novelist; born in Horitz, Bohemia, Nov. 22, 1849. His home after 1876 was in Berlin. Among his works are: "After Famous Models" (27th ed. 1894; new series, 16th ed. 1883), a collection of witty parodies; "The Baroness's Sundays" (3d ed. 1884); "The New Ahasuerus" (1882); "The Last German of Blatna" (5th ed. 1890); "Hypatia" (2d ed. 1892); "The Ghost-Seer" (1894), a humorous novel.

Mautner, Eduard (mout′ner), a Hungarian poet; born in Budapest, Hungary, Nov. 13, 1824. He wrote: "The Prize Comedy," which took the prize offered by the Hofburg Theater in Vienna (1851); "Countess Aurora" (1852); "A Stratagem" (1878), comedies; the plays "Eglantine" (1863) and "The Hour Glass" (1871); "Short Stories" (1858); "Poems" (1847 and 1858); etc. "Select Poems" appeared in 1889. He died near Vienna, July 2, 1889.

Mauvaises Terres (mō-vāz tār′), ("bad lands"), the name given to desolate tracts of land in various parts of the W. States of North America; more especially to a barren region in the two Dakotas, Wyoming, and Nebraska.

Mauve (mōv), aniline purple, or Perkin's purple, the sulphate of the base mauveine occurring in commerce in crystalline masses, as a paste, and in solution. It is soluble in water, and dyes silk and wool a beautiful purple color.

Mavrocordatos. See MAUROCORDATOS.

Maxentius (mak-sen′shius), **Marcus Aurelius Valerius,** a Roman emperor, the son of Maximianus Herculius. He declared himself emperor in 306. He was opposed to Galerius Maximianus, who was defeated, and slew himself. Maxentius then marched into Africa, where he became odious by his cruelties. Constantine afterward defeated

him in Italy, and he was drowned in crossing the Tiber, in 312.

Maxilla (-il′-), plural **Maxillæ** (-lē), two bones of the face — *maxilla superior*, the upper jaw, and *maxilla inferior*, the lower jaw or mandible. The term "maxilla" is specially applied to the superior maxillary bones, except the incisor part. In vertebrata, the bone corresponding to the superior maxilla in man. In Arthropoda, the one or two pairs of limbs next the mandibles that are modified as jaws. In the Crustacea the maxillæ are in front of the somites forming the maxillipeds and behind that somite which has the mandibles. In the Arachnida there is a pair of maxillæ, each of which is provided with a jointed appendage. They are just behind the mandibles, as they are also in Insecta. They are the inferior pair of jaws, and are furnished with one or more pairs of maxillary palpi.

Maxim, Sir Hiram Stevens, an American inventor; born in Sangerville, Me., Feb. 5, 1840; received a common school education; secured his scientific knowledge by reading and attending lectures; was employed in various iron works; and removed to England in 1881. He patented numerous inventions, including incandescent lamps, self-regulating current machines, the "Cordite" smokeless powder, etc.; devoted much attention to the problem of aërial navigation; but was best known as the inventor of the Maxim gun. He was manager of the firm of Vickers, Sons & Maxim, and a member of numerous American and European scientific and engineering societies. Early in 1901 he was knighted by Queen Victoria.

Maxim Gun. See AUTOMATIC GUN.

Maximianus, Galerius Valerius, Emperor of Constantinople, was originally a shepherd in Dacia, afterward a soldier, and was raised to the imperial dignity by Diocletian, who also gave him his daughter in marriage. In 305 he compelled Diocletian to abdicate the throne; but his cruelty soon rendered him odious to the Romans, who raised Maxentius to the throne. He died in 311.

Maximianus (-ā′nus), **Marcus Aurelius Valerius,** surnamed HERCULIUS, a Roman emperor; born near Sirmium, in A. D. 250. From being a common soldier, he was associated in the government by Diocletian. When that emperor abdicated the crown, in 304, he compelled Maximianus, much against his will, to do the same; but about a year afterward the latter resumed the dignity, and opposed his son Maxentius. The troops, however, mutinied against Maximianus, who fled into Gaul, where he was put to death by order of Constantine in 310, aged 60.

Maximilian I., Emperor of Germany, son of Frederick III.; born in Neustadt, March 22, 1459. At the age of 18 he married Mary, heiress of Charles the Bold, Duke of Burgundy, and was involved in a war with France. Mary dying in 1482, he obtained the promise of the hand of Anne, heiress of Brittany, but she was afterward married to Charles VIII. of France. In 1486 Maximilian was elected King of the Romans, and in 1493 he succeeded his father in the empire. He was the first who took the title of emperor without being crowned at Rome. For the sake of a large dowry, he married Blanche, daughter of Lodovico Sforza, whom he made Duke of Milan; and soon after married his son Philip to Joanna, daughter of Ferdinand and Isabella, and thus brought Spain into the power of the House of Hapsburg. He invaded Burgundy,

MAXIMILIAN I.

but was abandoned by the Swiss who formed part of his army; he then made war on the Swiss, but was several times defeated, and had to make peace with them. In 1508 he set out for Rome, was refused a passage through the Venetian territories, and, attempting to force his way, was defeated. The same year he joined in the famous league of Cambray against the Venetians; from which he withdrew in 1513 and formed another league against France. He served in the English army as a volunteer at the siege of Terouenne, and contributed to the victory of Guinegate. In 1516 he made an unsuccessful attempt on the Milanese. Two years later he assembled the Diet at Augsburg, at which Luther appeared on citation, and appealed to the Pope. Maximilian was not only ambitious of dominion, and successful in his schemes of aggrandizement, but he had the desire to be Pope and to be canonized. He died in Wels, Upper Austria, Jan. 12, 1519.

Maximilian II., Emperor of Germany; born in Vienna July 31, 1527, was the son of the Emperor Ferdinand I. He was elected King of the Romans in 1562, and was soon after advanced to the thrones of Hungary and Bohemia; and on the death of his father in 1564 was crowned emperor. The 12 years this monarch reigned were chiefly devoted to the internal welfare of the country and happiness to his people. He died Oct. 12, 1576.

Maximilian, Emperor of Mexico, known in his earlier life as FERDINAND MAXIMILIAN JOSEPH, Archduke of Austria; born in Vienna July 6, 1832; was the second son of the Archduke Francis Charles, and younger brother of Francis Joseph I., Emperor of Austria. After receiving a careful education he entered the Austrian navy in 1846, and after holding various subordinate commands he obtained the rank of rear-admiral, and was placed at the head of the Austrian marine. Quitting the naval service he was appointed Governor of the Lombardo-Venetian kingdom, February, 1857, and on July 27 following he married Princess Charlotte of Belgium, daughter of King Leopold I. He discharged the duties of his governorship with so much care and judgment that he was deservedly popular. On his return from a voyage made to Brazil for scientific purposes he fixed his residence at Miramar, in the vicinity of Trieste, and there, Oct. 3, 1863, he received a deputation from the Mexican Assembly of Notables, who offered him the crown of their country in virtue of a decree of July 10 preceding. These notables, however, were merely puppets in the hands of the French, who had interfered in the affairs of Mexico. Considerations of duty and the romantic ardor of his disposition induced him to accept the offer on the conditions that his brother should sanction his choice and that he should have evidence that the people were in his favor. His scruples having been overcome, and having conditionally renounced his rights as an Austrian prince, he formally accepted the Mexican crown, April 10, 1864. Embarking in an Austrian frigate a few days later he landed at Vera Cruz on May 29, and entered Mexico on June 12. Both Maxmilian and the empress were extremely popular. He set himself energetically to consolidate and develop his dominions, granted an amnesty to political offenders, and exhibited a parental solicitude in the matters of faith, worship, and education. But he failed to conciliate the Republican party, or to induce them to acquiesce in the form and personality of a government forced on the country by France; and as he could not restore to the clergy their confiscated estates they pronounced him a traitor. Meanwhile there were incessant conflicts between the partisans of President Juarez and the allied French and Imperial troops; and the decree of Oct. 3, 1865, in virtue of which the members of the Juarist bands and those who abetted them were shot, alienated the party of the Liberals. Juarez raised the standard of independence, and came into collision with the French troops; jealousies and misunderstandings arose with Bazaine; the impatience of the French people under the cost of the expedition, and the representations at the cabinet at Washington, which reprobated the idea of European interference in attempting to establish a monarchy on the continent of North America, and urged the Emperor Napoleon to withdraw his troops; — all these complications and misfortunes thickening around Maximilian rendered his position critical in the extreme. The empress in vain undertook a mission to Europe to enlist support for her husband, and grief and disappointment overthrew her reason. The French were forced to retire; but Maximilian, in compliance with the prayer of a Convention of Notables, decided to remain in the hope of being able to maintain the empire. While bravely defending Queretaro against a Liberal force under Escobedo, he was betrayed by General Lopez on the night of May 14, 1867. By order of the Liberal minister of war he was, along with two of his generals, tried by court-martial and condemned to be shot. The representations and protests of the various European powers against this breach of the laws of civilized warfare failed to arrest the execution of the sentence, which was carried into effect at seven in the morning of July 19. His body was after some delay surrendered to his relatives, and his funeral was celebrated with great pomp in the cathedral of Vienna on Jan. 18, 1868. Maximilian was a man of eminent abilities, and high and varied culture. His collected writings are contained in a posthumous publication entitled "From My Life: Sketches of Travel, Aphorisms, Marine Pictures" (7 vols. 1867), which gives ample testimony to the vigor of his intellect, the variety of his attainments, his good sense, candor, and generosity. See MEXICO.

Maximilian, Duke of Bavaria; born in Munich April 17, 1573. He was styled "Defender of Germany" and was opposed to the Protestants. He died in Ingolstadt Sept. 27, 1651.

Maximilian, Emanuel, Elector of Bavaria; born July 11, 1662. He signalized himself at the siege of Neuhaüsel, in 1685; at that of Buda, in 1686; and the year following in the battle of Mohacz. He commanded, about this time, the army of Hungary, and took Belgrade in 1689. He was afterward Governor of the Low Countries; but, taking part with France in the war of

the Spanish succession, he was put under the ban of the empire, and, in 1706, deprived of his estates, regaining them, however, at the general peace. He died in Munich, Feb. 26, 1726.

Maximilian, Joseph, King of Bavaria; born in Schwetzingen, Baden, May 27, 1756. He succeeded his uncle, Charles Theodore, in 1799. Attaching himself to the fortunes of Napoleon, he gave his daughter in marriage to Eugene Beauharnais in 1806. In the same year his duchy was erected into a kingdom. In 1813, however, he formed a member of the league against the emperor, and by that proceeding retained his throne after the fall of Napoleon. His reign was marked by a great number of reforms in the administration of his kingdom. He died in Nymphenburg, near Munich, Oct. 13, 1825.

Maximinus (-mī′nus), **Caius Julius Verus,** a Roman emperor. He was of barbarian origin, and was at first a shepherd in Thrace. He was a monster in size, strength, voracity, and ferocity, and when about 20 years of age became a soldier in the Roman armies. His capacity for fighting procured him rapid advancement, and under Alexander Severus he had the command of a legion with which he served on the Rhine. In A. D. 235 he took part in a conspiracy against Alexander, and on his murder by the soldiers was proclaimed emperor. He continued the war in Germany and devastated a large tract of country. The Gordiani having been proclaimed in Africa, Maximinus hastened to Italy and laid siege to Aquileia, which made heroic resistance to the hated tyrant. He was there murdered by his soldiers, together with his son, in 238. It is said that Maximinus was eight feet high, that he could eat 40 pounds of meat a day, and could break the leg of a horse with a kick.

Maximinus, Caius Galerius Valerius, Illyrian peasant, known by the name of DAIA, or DAZA, who was named Cæsar by the influence of his uncle Galerius, 305, and proclaimed emperor when five others had already assumed the purple, in 308. He poisoned himself after his defeat by Licinius in 313.

Maximum, the greatest quantity or degree fixed, attainable, or attained, in any given case, as opposed to minimum, the smallest. In mathematics and physics maximum is used also for the value which a varying quantity has at the moment when it ceases to increase and begins to decrease.

Maximus (max′-), **Clodius Pupienus,** a Roman general, proclaimed emperor by the Senate with Decimus Cælius Balbinus, in opposition to Maximinus, in 237; he was killed along with Balbinus in 238.

Maximus, Magnus, a Roman emperor, and a Spaniard. He was general of the Roman army in Britain, where he proclaimed himself emperor in 383. Gratian marched against him, but was defeated and assassinated. Maximus having made himself master of Gaul, Britain, and Spain, fixed the seat of his empire at Treves. He next marched into Italy, where he committed dreadful cruelties, but was at last besieged in Aquileia by the Emperor Theodosius. His soldiers delivered him up to Theodosius, who caused him to be beheaded, in 388.

Maximus, Petronius, a noble Roman, who became emperor in 455. In less than three months afterward he was slain in the streets for attempting to fly on the appearance of the fleet of Genseric, King of the Vandals.

Maximus of Tyre, a Platonic philosopher, who visited Rome in 146, but died in his own country, in the reign of Commodus. Forty-one of his discourses are extant.

Maximus the Cynic, tutor of Julian the Apostate; a native of Ephesus. He professed magic, initiated Julian into the Eleusinian mysteries, and assured him of success in his Persian expedition; he also flattered that prince by saying that the soul of Alexander had passed into his body. Maximus was put to death by the Emperor Valens in 366.

Max Müller. See MÜLLER, F. M.

Maxwell, Sir Herbert Eustace, an English writer; born Jan. 8, 1845. He was a member of Parliament after 1880; lord of the treasury, 1886–1892, member of the Royal Commission on the Aged Poor in 1893. He wrote: "Passages in the Life of Sir Lucian Elphin," "The Art of Love," "The Letter of the Law," all novels; "Meridiana: Noontide Essays"; etc.

Maxwell, James Clerk, a British scientist; born in Edinburgh, Scotland, Nov. 13, 1831. He was educated at Edinburgh and Trinity College, Cambridge, where in 1854 he was second wrangler; was Professor of Natural Philosophy in Marischal College, Aberdeen, 1856–1860; of Physics and Astronomy in King's College, London, 1860–1868; and of Physics in Cambridge from 1871. He published treatises on "Electricity and Magnetism," "The Theory of Heat," "Matter and Motion," etc. He died Nov. 5, 1879.

Maxwell, William Hamilton, an Irish novelist; born in Newry, County Down, Ireland, in 1792. He may be called the father of the military novel. After serving as an infantry captain in the Peninsular War and at Waterloo, he became rector of Ballagh. There not being a Protestant in his parish, he devoted his ample leisure to field sports and literature. Among his

best works are: "O'Hara, or 1798" (1825), a novel; "Sports of the West" (1832); "Stories of Waterloo" (1834); "Life of the Duke of Wellington" (1839–1841). He was editor of the "Military and Naval Almanac" for 1840. He died near Edinburgh, Scotland, Dec. 29, 1850.

Maxwell, Sir William Stirling, a Scotch writer; born near Glasgow, Scotland, in 1818. Having graduated from Trinity College, Cambridge, in 1839, he spent some time traveling in Italy and Spain, one outcome of which was "Annals of the Artists of Spain" (3 vols. 1848). He always retained his interest in Spanish subjects: in 1852 was published from his pen "Cloister Life of the Emperor Charles V.," in 1885 "Velasquez and his Works," in 1856 "Notices of the Emperor Charles V. in 1555 and 1556," and in 1883 the sumptuous "Don John of Austria" (previously printed for private circulation). He died in Venice Jan. 15, 1878.

May, the 5th month of the year, having 31 days. It was 2d in the old Alban calendar, 3d in that of Romulus, and 5th in that of Numa Pompilius. In the Alban calendar it only had 26 days, in the calendar of Romulus 31 days, and in that of Numa 30 days. The odd day of which Numa deprived it was restored by Julius Cæsar. The etymology of the word is doubtful. It was called Maius by Romulus, in respect to the senators and nobles of his city, who were called Majores, as the month following was called Junius, in honor of the youth of Rome who served him in war and were named Juniares. Some etymologists are of opinion that it was called Maia, from the goddess of that name, the mother of Mercury, to whom they offered sacrifices on the first day of the month. The sun enters Gemini during May, and the plants of the earth generally begin to flower.

May, Isle of, a Fife islet in the Firth of Forth, 5¼ miles S. S. E. of Crail, rising 150 feet; area, 146 acres; has a lighthouse, whose electric light is visible 22 nautical miles. It was the seat of a priory.

May, Caroline, an American poet; born in England about 1820. She went to New York in 1834. She was author of "American Female Poets" (1848); "Treasured Thoughts from Favorite Authors" (1850); "Poems" (1864); and "Lays of Memory and Affection."

May, Samuel Joseph, an American reformer; born in Boston, Mass., Sept. 12, 1797. He was a Unitarian minister, his longest settlement being at Syracuse (1845–1868). One of the first and stanchest abolitionists, his best-known publication was "Recollections of the Anti-Slavery Conflict" (1869). He died in Syracuse, N. Y., July 1, 1871.

May, Thomas, an English dramatist and historiographer; born in 1594. Educated at Cambridge, he became a member of Gray's Inn and a courtier. He produced several dramas ("Antigone," "Cleopatra," "Agrippa," etc.), and comedies, poems, and translations of the Georgics and Lucan's "Pharsalia." During the English Civil War he was made secretary and historiographer to the Parliament, and in that capacity produced a "History of the Parliament of England, 1640–1643" (1650; several times republished), and a "Breviary" of the same history (1650). He died Nov. 13, 1650.

May, Sir Thomas Erskine, Baron Farnborough, an English historian; born in London, England, Feb. 8, 1815. He was educated at Bedford School, became assistant librarian of the House of Commons in 1831, clerk assistant in 1856, and clerk of the House in 1871. He was called to the bar in 1838, was made in 1860 Companion, in 1866 Knight-Commander of the Bath, and shortly after his retirement from office in 1886 was raised to the peerage as Baron Farnborough. His most important works are "A Treatise on the Law, Privileges, Proceedings, and Usage of Parliament" (1844), which, acknowledged as the parliamentary text-book, had gone through six editions before his death and been translated into German and Hungarian; "Constitutional History of England since the Accession of George III., 1760–1860" (1861–1863; 3d ed., with supplementary chapter, 3 vols. 1871), a continuation of Hallam's work, and of which French and German translations have appeared; and "Democracy in Europe: a History" (2 vols. 1877), a work characterized by great learning and impartiality. He died in Westminster Palace, May 18, 1886.

Maya (mä'yä) **Indians,** a race of aborigines of Yucatan, supposed to be the builders of Uxmal, Palenque, Chichen Itza, etc. Their history is important as throwing light on the civilization of the Central and South American races. The Mayas were the most advanced of the North American aboriginal races, but today they are sadly degraded on account of contact with the Spaniards. Old Spanish records, a very few Maya books with old picture-writing, several MSS. written by Mayas in Maya, but with Spanish letters, very soon after the Conquest, and ruined towns and cities, grave-mounds, and relics attest their former condition. Were they civilized? Morgan understands "civilized" to mean three things: (1) Cultivation of land with help of domestic animals. (2) A written language representing sounds by characters. (3) A knowledge of the smelting of iron. The Mayas had none of these, but they did have books with covers of wood; the paper

from leaves or vegetable fiber, joined edge to edge and folded like a fan. Over the whole page were pictures painted in all sorts of colors, which was their way of writing. Out of the thousands of books among the Mayas when the Spaniards came very few are left. The Mayas and Aztecs were a good deal alike. Their religions were related; both adored many of the same deities — especially, perhaps, the sun. Both worshiped idols carved from stone, and both sometimes sacrificed human victims. Among the Mayas there may have been a greater tendency toward a monarchical government than among the Aztecs; but here, too, an elected council was the real power. In method of warfare the two people were much alike, but the Mayas, though brave, were not so warlike as the Aztecs and paid more attention to agriculture and the arts. The people lived well. They dressed in cotton of their own raising and weaving. They made many ornaments of gold and green stone, and were expert feather-workers. They made good pottery, too. They raised queer little dogs, which became very fat, which they used as food. They paid a great deal of attention to bees and gathered much honey, raised poultry, and though not roving hunters, like some tribes, they were skilled in trapping and snaring game. They surpass all American tribes in their architecture and in their carving in stone. Though without iron tools, these people were able to erect fine buildings of stone, carved with remarkable and beautiful designs. In the wild forests of Yucatan and Central America, in the midst of dense tropical woods, overgrown with trees and tangled vines, are the deserted ruins of upward of 40 ancient towns. These different towns were connected by paved roads of stone, over which couriers ran, carrying letters, along which traders bartered and dickered, and on which the forces of one town would often march out to capture and sack some other town. In many cases the buildings were set upon a great flat-topped mound, with sloping sides and rectangular base and summit, strikingly like some of the "temple mounds" of the Southern States. Up one side of these mounds was a flight of stone steps, guarding the base of which were frequently a pair of great serpents or some wild beast carved in stone. The buildings themselves are very long, flat-topped, one story high, and contain many rooms. The rooms might be single, each opening out of doors, or they might be arranged in suites of two or three, opening into one another by inner doors. These buildings were sometimes constructed around the sides of a square court, the doors all opening into the court. Such buildings were doubtless the houses in which dwelt many families, as in the pueblo houses in New Mexico. There are also temples for purposes of worship. In such there is usually found a tablet in the wall and an altar for sacrifice. The interior decoration of rooms was often elaborate, the walls being covered with stucco, on which were painted in brilliant colors paintings which furnish us much information of the dress, manners, gods, and worship of the people. Often these designs are in low relief. One of the most famous Mayan works of art is in the temple at Palenque, where is a remarkable tablet on which is represented a sacrificial scene. Copan is a most interesting Mayan town, though not really in Yucatan. Stephens found there a score of soap-stone idols — great pillars of stone carved into most elaborately designed human forms. They were usually four-sided, and the front and back represented a human figure, finely dressed with feather headdress, earrings, and ornamental jewelry of all sorts. The sides were generally covered over with the queer hieroglyphics so common in all Maya carvings, called "calculiform characters."

May Apple, the fruit of *Podophyllum peltatum*, a ranunculaceous plant growing in New Mexico. It is a low herbaceous plant, having the white flowers hidden by the overshadowing broad leaves. Also *Passiflora incarnata*, which has sweet-scented flowers variegated with purple. The fruit is of the size of an apple, orange-colored, with a sweetish, yellow pulp.

Maybrick, Michael, an English composer; born in Liverpool about 1845. He studied music in Italy and Germany, and for many years was a leading baritone vocalist in concerts and English opera. Under the pseudonym of "Stephen Adams" he has written many popular songs, among which are: "Nancy Lee"; "Midshipmite"; "Alsatian Mountains"; "Star of Bethlehem"; "The Holy City"; "A Warrior Bold"; etc.

May=day, the first day of May, for centuries associated among Latin and Germanic peoples with religious and other festal observances, and still so observed by Celtic and other races. The usual festivities include singing, games, symbolic use of flowers, trees, fruits, etc. Formerly in Great Britain the May-pole dance and the crowning of the May-queen were chief features.

Mayence. See MAINZ.

Mayenne, a river in N. W. France; after a course of 127 miles in a S. direction, joining the Sarthe at Angers, to form the Maine, a tributary of the Loire. It is navigable up to Laval.

Mayenne (mä-yen'), a French department formed out of the old provinces of Maine and Anjou, now containing the arrondissements of Laval, Château-Gontier, and Mayenne; area, 1,996 square miles; pop. (1906) 305,457. The valleys of the

Mayenne, Vilaine, and Sarthe are fairly fertile, and yield wheat, barley, flax, potatoes, hemp, and fruit (especially apples for cider). Cattle breeding, coal and slate mining, and cotton spinning and weaving are the other chief industries. Chief town, Laval. The town of Mayenne, on the Mayenne river, 78 miles S. by W. of Caen, has a picturesque ruined castle (taken by the English in 1424), steep narrow streets, and manufactures of calico and linen.

Mayer, Alfred Marshall, an American physicist; born in Baltimore, Md., Nov. 13, 1836. From 1871 till his death he was Professor of Physics in Stevens Institute of Technology, Hoboken, N. J. Besides his editorial work on the "American Journal of Science," and numerous contributions to other journals, he published "The Earth a Great Magnet" (1872); "Light" (1877); "Sound" (1878); "Sport with Gun and Rod in American Woods and Waters" (1883); "Researches on the Röntgen Rays" (1896), etc. He died in Maplewood, N. J., July 13, 1897.

Mayer, Brantz, an American journalist; born in Baltimore, Md., Sept. 27, 1809. He was a lawyer by profession; became editor of the Baltimore "American"; was attached to the American legation in Mexico, 1841–1842; served in the Civil War. He wrote several works on Mexico, including "Mexico: Aztec, Spanish, and Republican" (2 vols. 1853), his best work; "Captain Canot" (1854), a novel; etc. He died in Baltimore, Feb. 23, 1879.

Mayer, Julius Robert von (mī'er), a German physicist; born in Heilbronn, Würtemberg, Nov. 25, 1814. He studied medicine at Tübingen, Munich, and Paris, began life as a ship's surgeon, and settled in his native town to practise his profession in 1841. While at Batavia in 1840 his attention was first attracted to the studies he afterward pursued in every interval of leisure. In 1842 he published in Liebig's "Annals" a preliminary statement of the mechanical theory of heat, in which he clearly determined the numerical relation between heat and work. Three years later he restated his views, and at the same time gave a forecast of his theory of the meteoric origin of the sun's heat, elaborated in 1848. Contemporaneously with Mayer the mechanical theory of heat was worked out independently by Joule in England. Nevertheless a controversy arose as to the priority of discovery. The Royal Society gave him the Copley medal in 1871, and he was ennobled by the King of Würtemberg two years before his death, in Heilbronn, March 20, 1878.

Mayer, Karl, a German poet and biographer; born in Neckarbischofsheim, Würtemberg, March 22, 1786. A student of jurisprudence originally, he held several important legal and political positions in his native country. He belonged to the "Suabian School" of poets. He wrote: "Lenau's Letters to a Friend" (2d ed. 1853); "Songs" (3d ed 1864); "Uhland, his Friends and Contemporaries" (2 vols. 1867); etc. He died in Tübingen, Feb. 25, 1870.

Mayfair, a fashionable neighborhood at the "West End" of London, adjoining Belgravia.

Mayflower, the vessel in which the Pilgrim Fathers sailed to this country. The following is a copy of the covenant agreed on on board the "Mayflower," and subscribed to at Cape Cod on Nov. 11, 1620:

"In the name of God Amen! We whose names are under-written, the loyal subjects of our dread sovereign Lord, King James, by the grace of God, of Great Britain, France and Ireland, King, Defender of the Faith, etc., have undertaken for the glory of God and the advancement of the Christian faith, and honor of our King and Country a voyage to plant the first colony in the northern parts of Virginia; do by these presents, solemnly and mutually, in the presence of God and of one another covenant and combine ourselves together into a civil body politic for our better ordering and preservation, and furthermore of the ends aforesaid; and by virtue hereof to enact, constitute and frame just and equal laws, ordinances, acts, constitutions, and offices from time to time, as shall be thought most mete and convenient for the general good of the colony; unto which we promise all due submission and obedience. In witness whereof we have hereunto subscribed our names, at Cape Cod, the 11th of November, in the year of the reign of our sovereign Lord, King James of England, France and Ireland, the Eighteenth, and of Scotland the Fifty-fourth, Anno Domini, 1620."

May Fly. See EPHEMERA.

Mayhew, Henry, an English author; born in London, England, Nov. 25, 1812. He was educated at Westminster School; made a voyage to Calcutta on a ship of war; returned and entered the law office of his father; joined the literary profession as author of the farce, "The Wandering Minstrel"; and started a comic paper called "Figaro" in London, which was succeeded by "Punch" (1814), of which he was one of the promoters. He was a versatile writer of tales, farces, and humorous fictions, but his best known work is "London Labor and the London Poor." He died July 25, 1887. His brother HORACE (1819–1872) was on the "Punch" staff, and published several humorous works. Three other brothers, Thomas, Edward, and Augustus, were known in the literature of their day.

Maynard, Edward, an American inventor; born in Madison, N. J., April 26, 1813; appointed a cadet in the United States Military Academy, but resigned owing to poor health. In 1835 he graduated in dental surgery and moved to Washington, where he practised till 1890, inventing meanwhile many surgical instruments. Though preeminent in dentistry, he is best known for his inventions of firearms, for which he re-

ceived high honors from Prussia, Belgium, and Sweden. His breach-loading rifle, patented in 1851, and known by his name, was the forerunner of the modern improved rifle. He died in Washington, D. C., May 4, 1891.

Maynard, François (mā-när′), a French poet; born in Toulouse, France, in 1582. He was for several years secretary of Queen Margaret of Navarre; later a magistrate of Aurillac; toward the end of his life a councillor of state. One of the most correct and elegant poets of his day, his talent lay in elaboration of form rather than force of matter. Malherbe used to say that of him and Racan together a great poet might be made. His specialty was epigrams. He died in Aurillac in 1646.

Maynard, Horace, an American statesman; born in Westboro, Mass., Aug. 30, 1814; was graduated at Amherst College, in 1838; became a professor in East Tennessee University; was admitted to the bar in 1844; and member of Congress from Tennessee in 1857-1863. He was a Union man during the Civil War and suffered heavy losses of property; was again in Congress in 1866-1875. In 1875 he was appointed minister to Turkey and in 1880 Postmaster-General. He died in Knoxville, Tenn., May 3, 1882.

Mayne, Jasper, an English clergyman; born in Devonshire, England, in 1604. He was archdeacon of Chichester, and chaplain in ordinary to Charles II. Besides sermons and poems, he wrote "The City Match" (new ed. 1659), one of the best of early English comedies; "The Amorous Warre" (new ed. 1659), a tragicomedy; etc. He died in 1672.

Mayo, Mrs. Isabella (Fyvie), pseudonym EDWARD GARRETT, a British novelist; born in London, England, Dec. 10, 1843. She resided in Aberdeen after 1877. Among her works are: "Occupations of a Retired Life" (1868); "Friends and Acquaintances" (2d ed. 1872); "By Still Waters" (new ed. 1886); "The Capel Girls" (new ed. 1877); "The House by the Works" (new ed. 1881); "Equal to the Occasion" (1887); etc.

Mayo, Richard Southwell Bourke, Earl of, a British statesman; born in Dublin, Ireland, Feb. 21, 1822. He was educated at Trinity College, Dublin; entered the House of Commons as a Conservative in 1847, and was appointed chief secretary of Ireland by Lord Derby in 1852, 1858, and 1866. In 1868 he succeeded Lord Lawrence as Viceroy of India. He discharged the duties of his office with earnest zeal and uniform courtesy, maintained friendly relations with the neighboring states, treated the feudatory princes and the native people with impartial justice tempered by great kindness, and effected considerable improvements in the economic management of the Indian government, in gaol discipline, in irrigation works, and in providing education facilities for the native Mohammedan population. While inspecting the convict settlement at Port Blair on the Andaman Islands, Feb. 8, 1872, he was fatally stabbed by a Punjab fanatic.

Mayo, Robert, an American historian; born in Powhatan co., Va., April 25, 1784. Among his publications are: "View of Ancient Geography and History" (1813); "New System of Mythology" (4 vols. 1815–1819); and "The Treasury Department: its Origin, Organization, and Operations" (1847). He died in Washington, D. C., Oct. 31, 1864.

Mayonnaise (mā-yo-nāz′), a thick cold sauce for salads, cold meat, poultry, fish, vegetables, etc., made of the yolks of eggs, salad oil, and vinegar, with a little salt, cayenne pepper, and meat jelly; it is sometimes colored red with powdered lobster shell, or green with spinach or parsley.

Mayor, the chief magistrate of a city or corporate town in England, Ireland, and the British colonies; in Scotland called provost. In the United States the mayor is elected by the qualified voters of the city for a certain term of years, and the chief executive of a town or village is usually termed president. The power and authority which mayors possess, being given to them by local regulations, vary in different places. The mayors of London, York, and Dublin are each called "lord-mayor"; the lord-mayor of London having the further title of "right honorable," first allowed in 1354 by Edward III.

Mayo-Smith, Richmond, an American educator; born in Ohio in 1854; was graduated at Amherst College in 1875; studied at Berlin University in 1875–1877; then returned to the United States and became a teacher of history in Columbia University. In 1878 he was made an adjunct professor there, and in 1883 accepted the chair of Political Economy and Social Science. He was a member of the National Academy of Sciences, and an honorary fellow of the Royal Statistical Society of Great Britain. His publications include "Emigration and Immigration" (1890); "Sociology and Statistics" (1895); and "Statistics and Economics" (1899). He died in New York city, Nov. 11, 1901.

Mayotte (mä-yot′), or **Mayotta** (mä-yot′-tä), an island in the Indian Ocean, one of the Comoros, at the N. E. entrance of the Mozambique Channel, and a French colony; length, about 30 miles; breadth, 20 miles; area, 140 miles; pop. (1901) est. 12,000. Some of its volcanic peaks are nearly 2,000 feet high.

Maysville, a city and county-seat of Mason co., Ky.; on the Ohio river and on the Louisville and Nashville and the Chesapeake and Ohio railroads; 63 miles S. E. of Cincinnati. There are the Hayswood Female Seminary, St. Francis de Sales Academy, a high school, the Maysville and Mason County Library, Odd Fellows' Library, electric light and street railroad plants, and National and State banks. It has cotton, flour, saw, and planing mills, shoe, furniture, ice and cigar factories, plow works, daily and weekly papers, and an assessed property valuation of nearly $3,500,000. Pop. (1890) 5,358; (1900) 6,423; (1910) 6,141.

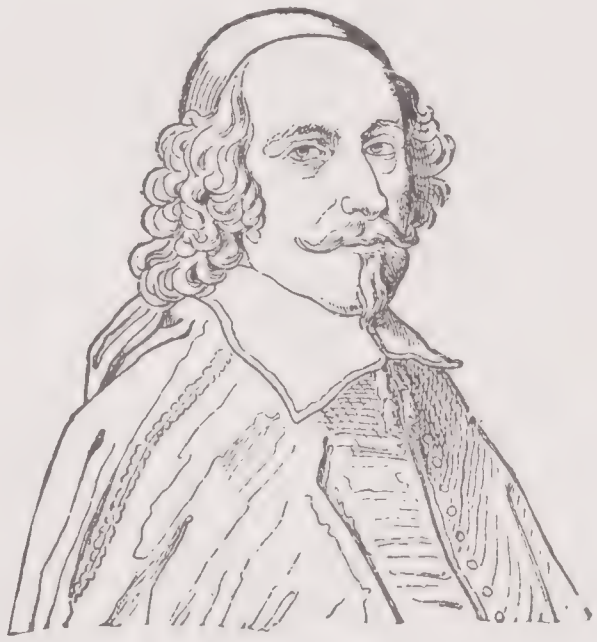
Mayweed, a European plant (*Anthemis Cotula*), order *Compositæ*. It is a troublesome weed in corn, and difficult to eradicate. It has daisy-like flowers, finely divided leaves, and an unpleasant smell, and sometimes blisters the hands of reapers.

Mazaca. See KAISARIAH.

Mazade, Charles de (mä-zäd'), a French author; born in Castel-Sarrazin, France, March 19, 1820. He was one of the most tasteful of French prose-writers. He wrote: "Contemporary Spain" (1855); "Modern Italy" (1860); "Two Women of the Revolution" (Marie Antoinette and Madame Roland: 1866); "Lamartine's Literary and Political Life" (1872); "The War of France" (2 vols. 1875); "Character Studies in the Moral and Political History of the Time" (1875); "The Royalist Opposition" (1894); etc. He also edited "Marshal Davoust's Correspondence" (4 vols. 1885). He died in Paris, April 27, 1893.

Mazanderan (ma-zen-de-rân'), a province of N. Persia, bordering the Caspian Sea for about 200 miles, and lying between the provinces of Ghilan and Astrabad; consists of a belt of low marshy coast land, 10 to 20 miles wide, backed by the well-wooded slopes of the Elburz. The climate is very changeable, in summer both rainy and unhealthy, but on the uplands fairly salubrious. Owing to the fertility of the soil, which is watered by numerous small rivers, the Persians call the province the "Garden of Iran." Rice, wheat, and other cereals, cotton, mulberry trees, and a variety of fruits are produced; horses, asses, and camels are extensively bred; and iron ores and mineral oils very abundant; area of province, 10,400 square miles; pop. (1901) over 300,000. Chief town Sari, though Barfurush is the seat of trade with Russia.

Mazarin, Jules (mä-zä-ra*ng*'), an Italian ecclesiastic; born in Pescina, Italy, July 14, 1602. He studied at Alcala, in Spain, after which he went to Rome, and became attached to the service of Cardinal Sachetti, whom he accompanied on a mission into Lombardy. Mazarin rendered important assistance in the negotiations which effected a peace between the French and Spaniards. This procured him the esteem of Cardinals Richelieu and Barberini, by the latter of whom he was recommended to the Pope, who sent him, in 1634, as nuncio-extraordinary to the court of France. Recalled two years later, he entered the service of the French king in 1639, and was sent ambassador to Turin. In 1641 he was made a cardinal, and on the death of Richelieu, at the end of the following year, succeeded him as prime minister. Mazarin had to support the crown and the camp of Anne of Austria, during the miserable War of the Fronde, and he was at one juncture obliged to fly for personal safety. Had he been even as able a man as his predecessor, it could not have been expected that he should govern as a native Frenchman could, and perhaps nothing better proves how effectively Richelieu had subdued the discordant elements in France than that an Italian should be able to govern the country. Under Mazarin, nevertheless, the influence of France among the nations was increased, and in the internal government of the country those principles of despotism were established on which Louis XIV. afterward acted. The administration of justice, however, became very corrupt, and the commerce and finances of the country sank into deep depression. It is admitted that as a financial administrator he was far inferior to Richelieu. Mazarin was privately married to Anne of Austria. He was very niggardly and avaricious, and had acquired in various ways, fair and foul, an immense fortune, amounting to $60,000,000, which he offered to the king shortly before he died; afraid, it is thought, that it might be rudely seized from his heirs Louis declined the restitution, which was perhaps what the wily minister expected. He died in Vincennes, France, March 9, 1661.



JULES MAZARIN.

Mazatlan (mä-sät-län′), a fortified seaport of Mexico, at the entrance of the Mazatlan river, which falls into the Gulf of California 230 miles S. E. of Sinaloa; is a well-built, picturesque town, the houses nearly all of one story, and possesses a cathedral, custom house, barracks, cotton factory, foundries, etc.; chief exports, gold and silver, archil, and mother-of-pearl.

Maze, Hippolyte (mäz), a French historian; born in Arras, France, Nov. 5, 1839. He was twice deputy for Versailles (1879 and 1881), and twice senator (1886 and 1891). He wrote: "The Governments of France from the 17th to the 19th Century" (1864); "The Republic of the United States" (1869); "The Struggle against Want" (1883); "The Generals of the Republic" (1889); etc. He died in Paris, Oct. 25, 1891.

Mazeppa, Ivan Stephanovich (mä-zep′-pä), hetman of the Cossacks; born in Mazepintzi in 1644. He was descended from a poor but noble family of Podolia, and became a page at the court of John Casimir, King of Poland. A Polish nobleman, having surprised him in an intrigue with his wife, caused him to be stripped naked and bound on his own horse, lying on his back, and with his head to its tail, and let the animal loose, leaving Mazeppa to his fate. The horse carried him, senseless from exhaustion, to its native wilds of the Ukraine, according to the usual account. A more credible story is that his horse carried him through woods and thickets and brought him back torn and bleeding to his own home. Mazeppa now joined the Cossacks, became secretary to their hetman, Samoilovich, and in 1687 was elected his successor. He won the confidence of Peter the Great, who loaded him with honors and made him Prince of the Ukraine; but, on the curtailment of the freedom of the Cossacks by Russia, Mazeppa conceived the idea of throwing off the sovereignty of the czar, and for this purpose entered into negotiations with Charles XII. of Sweden. His treason was revealed to Peter the Great, who long refused to credit it, but after Pultowa ordered his effigy to be hanged on the gallows, and his capital, Baturin, to be razed to the ground. Mazeppa's hopes perished in the disaster of Pultowa, and he fled with Charles to Bender, where he died miserably, Sept. 22, 1709. His story is the subject of a famous poem by Byron, of a novel by Bulgarin, and a drama by Gottschall, of two paintings by Vernet, and of a masterly historical work by Kostomaroff (1882).

Mazères, Edouard (mä-zār′), a French dramatist; born in Paris, France, Sept. 11, 1796. When a young man he was in the army; became prefect of the department at Le Cher. He wrote the comedies "The Young Husband" (1826); "Each for Himself" (1828); "The Friendship of Women" (1849); "The Pearl Necklace" (1851); etc. His greatest successes came from plays written in collaboration: as "The Foundling" (1824); "Three Quarters" (1827), which was very popular, with Picard; "The Uncle from America" (1825); "Quackery" (1828), etc., with Scribe; "Mother and Daughter" (1830), etc., with Empis. He died in Paris, March 19, 1866.

Mazuranic, Ivan (mä-zhö-rän′yich), a Croatian poet; born in Novi, Croatia, about 1813. He was procurator-general in 1850; president of the Croat-Slavonian high court of justice, 1861; governor, 1873–1880. His chief work is the epic "Death of Smail-aga Cengic" [Jenghiz Khan] (1840; several editions), translated into Bohemian, Polish, Russian, Slovenic, and German. He wrote the notable political pamphlet "The Croats to the Magyars" (1848).

Mazurka, or **Mazourka** (-zör′kä), a Polish dance of lively grotesque character, the music being in 3-8 or 3-4 time with a peculiar rhythm. It is generally performed by four or eight pairs of dancers, is popular in Germany as well as in Poland. The mazurka, like the waltz, has been treated in a classical manner, notably by Chopin.

Mazzara, a town of Sicily, near the mouth of the Salemi, 25 miles S. of Trapani. It is surrounded by Moorish walls flanked with small square towers and defended by an old castle, but is very poorly built. Its principal edifices are a cathedral with a fine cupola, several other churches and convents, a bishop's palace, court house, college, and hospital. The harbor, though capacious, is very shallow. It furnished a landing place to the Saracens who invaded and conquered Italy, and has still a considerable export trade in corn, wine, brandy, soda, oil, etc. Pop. (1901) 20,130.

Mazzini, Giuseppe (mät-sē′nē), an Italian patriot; born in Genoa June 28, 1805; was graduated at the University of Genoa (1826); admitted to the bar there; joined the CARBONARI (*q. v.*); was arrested by the authorities of Piedmont on the charge of conspiring against the government but after being imprisoned for six months, was released for lack of evidence. He then left Italy, and resided in succession in Marseilles, Paris, and London, whence he agitated for the liberation of Italy. About 1832 he founded the famous secret revolutionary society "Young Italy," the aim of which was to establish the unification of Italy as a republic. At the outbreak of the revolution of 1848 he returned to Italy, where he became a member of the triumvirate in the republic of Rome, but was again exiled at the restoration of the papal power (1849). He afterward organized risings in Mantua (1852), Milan (1853), and Genoa (1857), though in the unifica-

tion of Italy (except Venice and the "Patrimony of Peter") under Victor Emmanuel (1861) his part was subordinate. Being unwilling to take the oath of allegiance under a monarchy, he remained abroad. In 1870 he engaged in an insurrection at Palermo and was captured, but afterward released at the general amnesty after the occupation of Rome. He wrote much in English and French. His commentaries on Dante's works are very important, and his essays on affairs in Europe and criticisms on the great writers of Europe are most eloquent and discerning. His "Memoirs" were printed in 1875; "Complete Works" (18 vols. 1861–1891). He died in Pisa, Italy, March 10, 1872.

Mazzoni, Guido (mät-sō'nē), an Italian scholar; born in Florence, Italy, June 12, 1859; became Professor of Italian Literature in the University of Padua, 1887. He wrote: "Epigrams" (1880); "Experiments in Metre" (1882); "Poems" (1883); "New Poems" (1886); "Literary Reviews" (1887); "Among Books and Papers" (1887); etc.

Mazzola, Girolamo Francesco Maria. See PARMIGIANO.

Mead, a fermented liquor made from honey. The honey is mixed with water and fermented. Mead has been in use from very ancient times, and was known equally to the polished nations of Southern Europe and the barbarous tribes of more N. regions. The Latin name is *Hydromel.*

Mead, Edwin Doak, an American historical writer; born in Chesterfield, N. H., Sept. 29, 1849; spent his boyhood on a farm and in a country store; was employed by the Boston publishers, Ticknor & Fields (1866); studied in English and German universities (1875–1879). He was the author of "The Philosophy of Carlyle"; "Martin Luther: a Study of the Reformation"; "The Roman Church and the Public Schools." He was editor of the "New England Magazine."

Mead, Larkin Goldsmith, an American sculptor; born in Chesterfield, N. H., Jan. 3, 1835; studied sculpture with Henry K. Brown in Brooklyn, N. Y. His first work was the "Recording Angel" (1855), and soon after he produced the colossal statue of "Vermont" for the State-house at Montpelier. While serving in the army in 1861 he sent graphic sketches of camp and battlefield to a New York illustrated paper. In 1862 he went to Florence, and in 1865 exhibited several works at New York. He executed the statue of Lincoln for the monument at Springfield, Ill., that of Ethan Allen in the Capitol at Washington, and a group of the Stanford family in Stanford University. He died Oct. 15, 1910.

Meade, George Gordon, an American military officer; born in Cadiz, Spain, where his father was United States naval agent, Dec. 31, 1815; was graduated at the United States Military Academy in 1835; served for a time against the Seminole Indians and in the Mexican War, but was mostly employed on survey duty and in the construction of lighthouses till the Civil War, becoming captain of engineers in 1856, and major in 1862. In 1861 he obtained a brigade of volunteers, and during the Peninsular campaign received a severe gunshot wound. He distinguished himself at Antietam and at Fredericksburg, and was promoted Major-General in November, 1862. In June, 1863, he was placed in command of the Army of the Potomac, superseding Gen. JOSEPH HOOKER (*q. v.*) on the night of the 27th. A week later the battles of Gettysburg had been fought under his command, and Lee's effort to carry the war into the country N. of the Potomac had been defeated. Meade became Brigadier-General in the regular army on July 3, and Major-General in 1864. After the war he commanded various military departments till his death, in Philadelphia, Nov. 6, 1872. There is an equestrian statue of him in Fairmount Park, and another outside of the City Hall, both in Philadelphia.

Meade, Richard Worsam, an American naval officer; born in New York city, Oct. 9, 1837; entered the navy Oct. 2, 1850; served on the "St. Louis" and was with Commodore Ingraham, in Smyrna, in 1853; was promoted lieutenant-commander in 1862 and placed in command of the "Louisville"; commanded the naval battalion during the New York riots in July, 1863; captured seven blockade runners while in command of the "Chocorua," of the West Gulf squadron; was in charge of the American yacht "America" in her famous race with the British "Cambria" in 1870; and commanded the "Narragansett" 1871–1873, when his cruises covered 60,000 miles in the Pacific, in which he visited every important island, negotiating the famous Sampson treaty. He was promoted captain in 1880; commodore in 1892; rear-admiral in 1894; and was retired at his own request May 7, 1895. He died in Washington, D. C., May 4, 1897.

Meadow, a level tract of land under grass, and generally mown for hay; grassland; low-lying, level land on the banks of a river or lake, but sufficiently dry to produce herbage of a superior quality. In the United States the term is generally applied to the low ground on the banks of rivers formed of rich mold or alluvial soil. In the Western States these lands are known as bottom-land or bottoms.

Meadow Grass, the common name of several British grasses of the genus *Poa.*

The *P. pratensis*, or smooth meadow grass, is one of the most common of agricultural grasses.

Meadow Hen, a name commonly given to the American coot.

Meadow Lark, a beautiful American species of lark, *Orlanda Magna*, found in Eastern United States to the high central plains. It is about 11 inches long, and the tail 5 inches. The body is thick and stout, the legs large; the bill is nearly straight, and three times as long as high; inner lateral toe longer than the outer; feathers of head stiffened, the shafts above extended into a black bristle. The upper parts are brown, marked with brownish-white, and the exposed portions of the wings and tail with transverse dark-brown bars; the under parts yellow, with a black pectoral crescent.

Meadowsweet, a well-known handsome British plant, *Spiræa Ulmaria*, natural order *Rosaceæ*. It grows by the sides of streams and in damp places, has pinnate leaves, and stems two feet high bearing corymbs of white fragrant flowers. In the United States, the roughish meadow-grass, *Poa trivialis*, is an excellent and abundant grass, both for hay and pasturage.

Meadville, a city and county-seat of Crawford co., Pa.; on the Venango river, and the Erie and the Pittsburg, Bessemer and the Lake Erie railroads; 120 miles N. of Pittsburg. It contains Allegheny College, the Meadville Theological Seminary, City and Spencer Hospitals, public library, street railroad and electric light plants, waterworks, National banks, and several daily and weekly newspapers. It is in the heart of an agricultural region, and is a market and shipping point for the oil regions. The city has the Erie railroad shops, Phœnix Iron Works, a furniture factory, a vise and tool factory, flour mills, tanneries, machine shops, etc., and an assessed property valuation of nearly $3,000,000. Pop. (1900) 10,291; (1910) 12,780.

Meagher, Thomas Francis (mä′hur), an Irish-American patriot; born in Waterford, Ireland, Aug. 3, 1823. He was the son of a wealthy merchant, and educated at the Jesuit College of Clongowes Wood, Kildare, and at Stonyhurst. He early devoted himself to the patriotic cause as a prominent and fearless member of the Young Ireland party. In 1848 he was sentenced to death under the "Treason-felony" Act, but was sent for life to Van Diemen's Land instead. He made his escape in 1852, studied law in the United States, but on the outbreak of the Civil War volunteered as a Union soldier. In 1861 he organized the "Irish brigade" and distinguished himself by his courage in the seven days' battles around Richmond, at the second battle of Bull Run, Fredericksburg, and Antietam. After the war he became secretary of Montana Territory, and while taking measures as temporary governor to keep the hostile Indians in check, fell from the deck of a steamboat into the Missouri, near Fort Benton, and was drowned, July 1, 1867.

Meal-tub Plot, an alleged conspiracy, concocted in 1679 by an informer, Dangerfield, with the view of cutting off those who were opposed to the succession of James II. after he had embraced Roman Catholicism. Dangerfield also intended to make money by his revelations. It was the year after the infamous Titus Oates had sworn to a Roman Catholic plot quite as fictitious. The false charges to which Dangerfield was prepared to swear were found in the meal-tub belonging to a Mrs. Cellier, one of his friends. Ultimately he confessed his crime, was whipped, and condemned to stand in the pillory. On Jan. 1, 1685, he was mortally injured by a lawyer named Robert Frances, for which the assailant was executed.

Meal Worm, a popular name for the larva of *Tenebrio molitor*, a coleopterous insect allied to Blaps, but possessing wings and wing-covers. The perfect insect is pitchy or dark chestnut in color, about half an inch long, with short, eleven-jointed antennæ and stout legs. The larva is about an inch long, thin and round, ocherous, with bright, rusty bands, six small feet, and two very small antennæ. *T. obscurus* is most common in American flour.

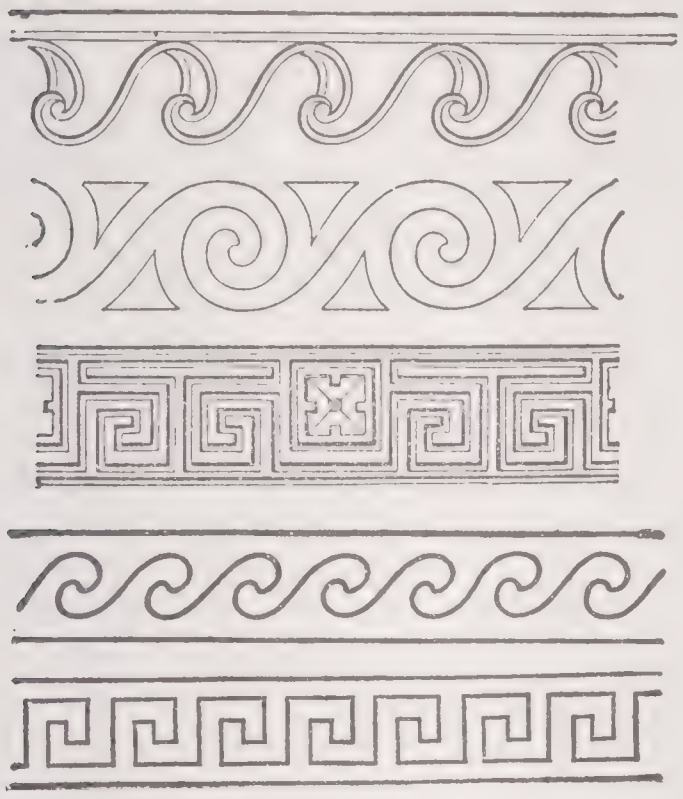
Mealy Bug, an insect very injurious to pineapples and other exotics. It is reddish, and covered with a white powdery substance.

Mean, having a value intermediate between two extremes, or between the several successive values of a variable quantity during one cycle of variation. In music, the name formerly given to the tenor part as being the mean in pitch between the bass and treble. The middle strings of instruments were also called mean.

Meander, in art, a peculiar style of ornamental design, in which the lines interlace; it is often used in decorating vases, and is also sometimes met with in architecture.

Measles, an infectious disease, called also rubeola, most frequently attacking children, though sometimes occurring in old age, as in the case of George III. and of Otho, ex-King of Greece, who died of this affection. The period of incubation is about eight days, when the rash appears, accompanied by catarrh, watery eyes, acrid watery discharge from the nose, sneezing, and often pain in the forehead, with, occasionally, bleeding at the nose. The bronchi are frequently affected, this forming the

chief danger. The spots are small red, papular, and crescent-shaped, commencing on the face and passing downward, disappearing in the same order. The old-fashioned remedy is saffron-tea, but the chief necessity is to ward off any respiratory mischief, or to combat it when present. A form of measles known as rötheln, or Ger-



MEANDER DESIGNS.

man measles, is distinct from measles or from scarlatina with which it has often been confounded. The eruption lasts longer never less than four or five days, sometimes 8 or 10, and differs slightly from that of measles or scarlatina. It is usually a very mild disease, requiring only an aperient saline, with liquid food, and keeping in bed for a few days.

Measure, a standard of measurement; a definite unit of capacity or extent, fixed by law or custom, in terms of which the relative sizes and capacities of things are ascertained and expressed; as, a foot, a yard, a mile are measures of length; a pint, a gallon, measures of capacity; a square foot, a measure of area; a cubic foot, a measure of volume, etc. See WEIGHTS AND MEASURES.

In Music.—The quantity of notes which are placed in the bar, and which is generally called the time, of which there are but two kinds, viz., common time, containing an equal quantity of notes in the bar, and triple time, containing an unequal quantity. Common time is generally marked with a C at the beginning, which means that every bar contains four crotchets, or their value in other notes. There are also other kinds of common time which are marked $\frac{2}{4}$, $\frac{6}{4}$, $\frac{6}{8}$. Triple time is marked $\frac{3}{2}$, $\frac{3}{4}$, $\frac{3}{8}$, $\frac{9}{8}$, $\frac{9}{4}$. Sometimes, in common time, we have $\frac{12}{4}$, $\frac{12}{8}$. The lower figure indicates the parts of the semibreve, and the upper figure shows how many of these parts there are in the bar.

Lineal Measure.—The measure of lines or distances; the standard unit of lineal measure in the United States and in England is the yard. The system is based on the law of nature that the force of gravity is constant at the same point of the earth's surface, and consequently that the length of a pendulum which oscillates a certain number of times in a given period is also constant. It is accordingly decreed by the law that the $\frac{1}{39\,26\,1\,59}$ part of the length of a single-second pendulum in a vacuum at the Tower of London shall be regarded as the standard English foot, and from this, by multiplication and division, the entire system of lineal measures is established. The French system of measures is founded on the length of an arc of the meridian. By a very minute survey of the length of an arc of the meridian from Dunkirk to Barcelona, the latitude of both places being determined by exact observation, the length of a quadrant of the meridian was computed, and it has been decreed by French law that the ten-millionth part of this length shall be regarded as a standard French meter, and from this by multiplication and division, the entire system of linear measures has been established.

Unit of Measure.—A given quantity, used as a standard of comparison in measuring a quantity of the same kind. Every kind of quantity has its own unit of measure, and under different circumstances the same kind of quantity may have different units of measure.

Line of Measures.—The line of intersection of the primitive plane, with a plane passing through the axis of the primitive circle and the axis of the circle to be projected.

Measure of Angles.—The right angle being taken as the angular unit, its subdivisions are degrees, minutes and seconds. The right angle contains 90 degrees, the degree 60 minutes, and the minute 60 seconds. All smaller fractions are expressed decimally in terms of the second. The French have proposed to divide the right angle into 100 equal parts, called grades, but the suggestion has not been extensively adopted.

Measure of Magnification.—The measure of magnification, or magnifying power of any optical instrument, is the ratio of the magnitude of the image to the magnitude of the object, or, more precisely, the ratio of the apparent diameter of the image to that of the object.

Measure of a Ratio.—Its logarithm, in any system of logarithms, or the exponent of the power to which the ratio is equal, the exponent of some given ratio being assumed as unity.

Mecca, or **Mekka,** the most celebrated city of Arabia; about 60 miles from Jidda, its port on the Red Sea; long the capital of an independent State in the Hejáz, and the birthplace of Mohammed. It is styled by Mohammedans Om-el-Kora (the mother of towns). It stands in a narrow sandy valley, inclosed by sterile hills from 200 to 500 feet high, without tree or verdure; and is ill supplied with water. In its center is the Beitu-'llah (house of God), or El-Haram (The Inviolable)—the great mosque inclosing the Caaba, occupying a square dividing the whole into the upper (N.) and lower (S.) towns. The streets are wider than is usual in Eastern towns, the houses of stone, often three stories high, and well lighted with windows looking toward the street, which gives them a European appearance. The streets are unpaved. The stationary population of Mecca was formerly 100,000, though now not more than 60,000; but the city is large enough for more than three times that number, and is annually filled at the time of the Hadj or pilgrimage to the Caaba, when apartments in almost every house are hired by straners. This pilgrimage, customary among the Arabs in early and idolatrous ages, and subsequently enjoined by Mohammed on all his followers, is the sole foundation of Mecca's fame, and the only source of its wealth and occupation. The great temple of the Caaba, the Beitu-'llah, or El-Haram, is an unsymmetrical, modern-looking patchwork of ancient fragments without any pretension to unity or style. It may be entered by 19 doors and is adorned externally with seven minarets. Within, the great four-sided court of the temple, surrounded by colonnades of irregular pillars, is about 1,250 feet long and 1,000 wide; and nearly in the middle of it, in a hollow, stands the Caaba or sacred house, measuring in length about 90 feet, in width 70 feet, and in height not exceeding 40 feet. The sides of the Caaba are completely covered by the *keswa*, that is, the veil or curtain of rich black silk, which is renewed every year at the expense of the Ottoman Porte. At two spots only is this covering removed, for the curtain is cut so as to expose a gray stone at the S. E. angle of the building, which it is thought meritorious to touch; and in like manner at the N. E. angle is exposed the celebrated black stone, the kissing of which is a chief object of the pilgrimage. At present the exposed surface of this stone, worn smooth by the lips of its worshipers, does not exceed 7 inches in diameter.

There are several irregular and in some measure unsightly buildings around the Caaba. In one of these is the famous well of Zemzem, alleged to be the one whence Hagar obtained water for Ishmael. The water of Zemzem is perfectly fresh, though every other spring in the neighborhood is brackish; at the same time it is whitish, lukewarm, and difficult of digestion. A great deal of disease and mortality among the pilgrims is caused by drinking it immoderately. They devoutly believe it to be a sure remedy for all bodily ailments, and even salutary for the soul. Winding sheets, duly dipped in this water, may be reckoned among the most profitable and most characteristic specimens of the industry of Mecca. Few pilgrims leave the holy city without taking with them some flasks filled from the sacred well. The Meccáwí, or inhabitants of Mecca, are, with the exception of a few Hejází Bedouins, all strangers by birth or parentage. They are, in fact, settlers or children of settlers, attracted hither by the love of gain, and as they care nothing for learning, the colleges of Mecca have fallen to decay, and the libraries, once rich, have totally disappeared. As Mecca during the pilgrimage is visited by 100,000 strangers on an average, it becomes for three or four months in the year, the greatest market in the East. The Sherífs, or direct descendants of Mohammed, are now a numerous and widely spread body. They all wear the same costume, priding themselves on the green robe which marks their descent. These nobles, as they may be called, elect the Sherif of Mecca, and their choice is formally confirmed by the Ottoman Sultan. Ptolemy mentions Mecca under the designation of Macoraba. The Wahabees took it in 1803; but in 1833 it was given up to Mehemet Ali, whose son Ibrahim was made Sheik el Haram. At present it depends directly on the Sultan.

Méchain, Pierre François André, an astronomer; born August 16, 1744, at Laon, France. He went to Paris in 1772, and was favorably received by Lalande. His discovery and calculation of two comets in 1781 rendered him generally known; and he was among the first to delineate the probable orbit of the newly discovered planet Uranus. In 1782 the academical prize for the best essay on the return of the comet of 1661 was awarded to him; and when it appeared again, eight years afterwards, his calculations were proved to be correct. In the course of 18 years Méchain discovered 14 comets, the orbits of which he calculated. No important celestial phenomenon escaped his notice, and his observations were recorded in the "Connaissance des Temps," which was edited by him from 1788 to 1794. In 1787 he was associated with Cassini and Legendre in verifying the difference of the longitudes of the observatories of Paris and Greenwich.

When the constituent assembly ordered the preparation of a new system of measures, based on the meridian of the earth, Méchain was one of the astronomers appointed to measure the arc of the meridian between Dunkirk and Barcelona. He re-

ceived for his part of this difficult operation the portion of country lying between Barcelona and Rhodez, where no measurements had previously been made. Political causes also contributed to embarrass his progress; and the Spanish government not only interrupted his triangulation, but detained him prisoner for some time. He was enabled to resume his labors in 1803, with the intention of extending them to the Balearic Isles. He died in Castellon-de-la-Plana, in Spain, Sept. 20, 1804, of the yellow fever, a victim of his exertions in the cause of science. Besides his treatises in the "Connaissance des Temps," and his memoirs on the different comets, we find also the results of his observations in the "Base du Système métrique," by Delambre (Paris, 1806–1810, three vols. 4to). A sequel to the third volume was published by Arago and Biot in Paris in 1821.

Mechanics, the popular name for the science which treats of the action of force. It is divided into dynamics, which treats of motion and the forces producing it; and statics, which treats of forces compelling bodies to remain at rest. We shall employ the foot, pound, and second as units of length, mass, and time. We will here subdivide dynamics into kinematics and kinetics.

Kinematics.— Motion is change of place. A body may move in a straight or curved path. As different points in a body may move in different paths, we must at first consider the body to be very small. The motion of a body is usually stated with reference to surrounding bodies; thus when we say that a stone falls vertically in the cabin of a moving vessel, the stone's motion is defined with respect to the vessel, and this motion is the same whether the vessel is at rest or moving forward regularly; but the motion of the stone with respect to objects outside the vessel is not the same in both cases. With respect to the sun, a planet moves in an elliptic path; but the sun and planets are all moving through space, so that the absolute motion of a planet in space is really in a kind of spiral. When a body at A is so acted on that if previously at rest it would now move to B in a second, and at the very same time it is so acted on that if previously at rest it would now move to C in a second, it will really move to D in a second, where A B D C is a parallelogram and A D is the diagonal. This law, called "the parallelogram of motion," may be proved experimentally. Let readers examine the following cases: A ball is rolled from one side of a ship to the other when the ship is moving ahead; the ball has a lateral and a forward motion, find the resultant motion. A billiard ball gets two motions in the following way: while the ball proceeds from one corner of a table to the other, the table is moved across the room; find the resultant motion of the ball. When a body is moving uniformly — that is, when it passes over equal spaces in equal times, we may define its velocity or speed as the space passed over in one second. It is evident that the space passed over in any time is equal to the velocity multiplied by the time. The law may be written in the form $s = vt$, or $v = \frac{s}{t}$, where s is the distance moved over uniformly with the velocity v in the time t. The law is true, no matter how short the time may be; thus if a body moves uniformly through the space of 0.24 foot in 0.001 second its velocity is $0.24 \div 0.001$, or 240 feet per second. Even when the velocity is not uniform during a short time, if we divide the space by the time we get an average velocity which does not differ much from the velocity at any part of the time.* When a body has a variable motion, that is, when it does not pass over equal spaces in equal times, readers have at first a difficulty in getting a clear idea of what is meant by velocity or speed. If a passenger in a railway train remarks that the train has a velocity of 20 miles per hour, he does not mean that the train has passed over 20 miles in the last hour, or that it will pass over 20 miles in the next hour, but that if for one hour the train could move uniformly with its present velocity it would pass over 20 miles. Readers must acquire a clear notion of the distinction between space passed over and velocity. Acceleration is the name given to the amount of change which occurs in the velocity of a body per unit of time. Thus if the speed of a body moving in a straight path is regularly increasing; if at a certain time it has a velocity of 5 (feet per second), and if in 1, 2, 3, and 4 seconds afterward its velocity is 7, 9, 11, 13 respectively, then its velocity is increased by the amount 2 every second, and we say that it has a uniformly accelerated motion, its acceleration being 2 (feet per second). This sort of motion may be observed in a stone falling freely, or falling down an inclined plane. For the general investigation of uniform and variable motions of bodies in straight and curved paths readers are referred to special mathematical treatises. The uniform motion of a body in a circular path is a familiar and important example of motion. Harmonic motions are of great importance in physics. A pure har-

* In variable motion, to find the velocity at any instant; calculate the average velocity during a very short time after that instant; as this period is made less and less, the average velocity becomes more and more nearly equal to the answer.

In the language of the calculus, velocity $= \frac{ds}{dt}$.

Mechanics

monic motion is the projection of uniform circular motion on the diameter of the circle. If a body has a uniform velocity in a circular path, to an observer whose eye is at a great distance away in the plane of the circle the body appears to oscillate in a straight line backward and forward with a variable motion, moving rapidly in the middle of its path and slowly toward the ends; the motion which the body appears to have is approximately a pure harmonic motion. All periodic vibratory motions of bodies are reducible to the sum of a number of pure harmonic motions (this is Fourier's theorem, a law of the very highest interest to physicists). The bob of a very long pendulum swings with a motion which is approximately a pure harmonic motion. When the bob of the pendulum also swings in a direction at right angles to the first, its swings in a second direction being executed in the same or in different periods from those in the first direction, the two motions of the bob have for resultant a motion in a curved path.

Kinetics.— Anything which affects the state of rest or motion of a body is called a force. Newton's first law of motion asserts that a body at rest tends to remain at rest, and a body in motion tends to move in a straight line uniformly, and cannot stop of itself — in fact, that a body at rest remains so unless acted on by some external force, or if it be in motion it will move in a straight line with a constant velocity unless acted on by some external force. This law is called the law of inertia and expresses the entire indifference of matter to motion or rest. The proposition that a body will never begin to move of itself needs no proof. It is the conclusion of universal observation. Wherever we observe motion we conclude that a force produced it. The other part of the law, that motion is in its nature as permanent as rest, and that it is in a right line, is far from being a self-evident or even an obvious truth. Limited observation would lead to the conclusion that all matter has a tendency to rest, and such was long a common error. The same limited observation led some of the ancient astronomers to imagine that all bodies when forced into a state of motion naturally moved in curved lines. There is, however, abundant proof of the permanence of motion; and if friction and the resistance of the air, the two most universal retarders of motion at the surface of the earth, could be entirely removed, instances of apparent permanent motion would be still more numerous than they are. When the motions of bodies are less and less subjected to retardation from these two causes they are observed to become more and more permanent. We mention a few examples. A marble rolled on the grass soon stops; on a floor it rolls longer; and on a smooth, level sheet of ice, where the wind is not unfavorable, it continues very long in motion. In a vacuum, where there is no resistance of air, two similar toy windmills, whose pivots have equal friction, and which are set in motion by equal forces, continue to move equally long whatever be the position of the vanes. In the air the one whose vanes cut the air will move much longer than the one whose vanes are opposed to it. A pendulum in a vacuum having only the stiffness of the thread by which it is suspended to overcome will vibrate for a whole day. A spinning top in the same situation, retarded only by the friction of its point, may continue spinning for hours. Thus we can hardly avoid the conclusion that a body once put in motion would, if left to itself, forever move uniformly. When we learn that Newton came to this opinion, that his other results depend on its truth, and that from his results eclipses have been predicted with wonderful accuracy, and astronomers have been directed by calculation to the position in the heavens of new planets invisible before, we discover the foundation of the above law.

The nearest approach to a perpetual motion, such as is implied in the law, is that of a planet around the sun; any resisting medium, such as air, would tend to stop the planet and cause it ultimately to fall into the sun. We believe that there is such a medium, but that it will require a long series of ages to create a sensible change in a planet's orbit. We see that the first law of motion, like all other mathematical laws, supposes a hypothetical state of things which does not really exist. This actual state of things is represented by one of the laws of energy. When a body moves in a curved path the direction of its motion at any instant is the tangent to the curve; now this direction is continually changing, so that by the first law of motion there must be a force continually acting on the body at right angles to its direction of motion. The resistance it opposes to this force, or its tendency to move in a straight line, is called centrifugal force. Newton's second law asserts that if any number of forces act together on a moving body each force generates the same velocity as it would generate if it alone acted on the body at rest. It will presently be shown (as a theorem in statics) that when a number of forces act together on a body they produce the same effect as a certain single force called their resultant would produce. Hence we need only concern ourselves with the action of one force on a moving body. Now when the force of gravity acts on two stones set free at the same instant, one merely dropped and the other thrown out horizontally, the second stone is found to bend from its horizontal path and to fall vertically just as rapidly as the first; the

Mechanics

stones move in very different paths, but they are always to be found at the same level; both stones are 16 feet lower than the hand at the end of one second, 64 feet lower than the hand at the end of the second second, and so on. Here we find that the force of gravity produces the same downward motion in a moving body as if it had previously been at rest. In both cases it produces a downward acceleration of 32.2 feet per second. Again, if a stone is thrown vertically upward with a velocity of 32.2 feet per second the force of gravity produces the same effect as if the stone had been at rest when set free by the hand, for at the end of one second the stone is found to have lost all its velocity and to be no longer moving either upward or downward. The motion of the earth in its orbit does not interfere with the action of forces on its surface; we could jump as high as we now can (neglecting centrifugal force), or throw a stone as high, if the earth were at rest. It requires exactly the same exertion to throw a stone from the deck to the height of the mast of a vessel whether the vessel is in motion or not. If a target were carried by the bowsprit of a vessel a bullet fired from the deck would produce the same effect on the target whether the vessel were in motion or not. We must distinguish between the motion of the bullet with respect to the vessel and its motion with respect to the surrounding water. The bow gun of a vessel fired at a fort produces more effect when the vessel is approaching the fort than when it is motionless, for to the velocity of the bullet is added the velocity of the vessel. One of the best illustrations of Newton's law is furnished by the motion of bodies falling freely. The force of gravity produces such a motion in a body free to fall that its velocity at the end of a second is 32.2 (feet per second); but it is found that the velocity at the end of two seconds is 64.4, and at the end of three seconds 96.6; thus the force of gravity gives the same additional velocity to the body in the second second as it gave in the first, though at the beginning of the second second the body was already moving. The law for bodies falling freely from rest may be written in the form $v = gt$, where v is the velocity at the end of t seconds and g is the acceleration (32.2 feet per second) due to gravity. It is found that the body falls 16.1 feet in the one second, 64.4 feet in two seconds, 144.9 feet in three seconds from rest, and so on, the space fallen through from rest always being equal to the half of g (or 16.1) multiplied by the square of the time of falling in seconds. This law may be proved experimentally; the height of a precipice or a tower may be found by noting accurately the time taken by a stone to fall from it. The value of g at different places on the earth is measured by means of a pendulum.* The force which causes a body to fall is its weight, or the attraction of the earth for the mass of the body; this attraction is found to be greater at any place as the mass of the body is greater; in fact, the force of attraction seems to be proportional to the mass of the body, the general law of gravitation being that the attraction between two small bodies of masses m and m', the distance between them being d, is proportional to $\frac{m\,m'}{d^2}$. It will be observed that the weight of a body depends on its place on the earth; in many parts of the universe the body would be very feebly attracted by other bodies, and would therefore have very little weight, whereas its mass would be unchanged. The attraction exercised by a magnetic pole on a piece of soft iron, the attraction and repulsion of electrified bodies, and friction, which tends to destroy rubbing motion, are natural forces which may all be measured in exactly the same way.

Forces are measured by the motions which they tend to produce in the masses of matter on which they act. In acting on bodies forces must be supposed to employ some sort of communicator. When I support a body on a string it is prevented from falling by an upward force from my hand communicated by the string to the body. The downward force, which causes the body to seek the earth, is communicated from the earth in some way; the air cannot be the communicator, for the attraction of gravitation can act through a vacuum just as easily as through air, and it acts from star to star as it does on the surface of the earth. We can easily understand that a stick or string communicates force from my body to certain objects, but how is it that

*The law is of the form $s = \frac{1}{2} g t^2$, where s is the space passed over in t seconds, g, the acceleration due to gravity, being 32.2 feet per second. It may be proved from the law $v = g t$ as follows. Imagine the time t to be divided into n short intervals, each being equal to τ (where n is a large number). At the beginning of any interval the velocity is known by the law $v = g t$; for instance, at the beginning of the 20th interval the velocity is $19\tau g$, and the space passed through in the 20th interval is (by the law $s = v t$, if we may suppose the velocity constant during this short interval) $19\tau^2 g$. Thus the whole space passed over in the time t is equal to $g\tau^2 + 2 g \tau^2 + 3 g \tau^2 +$ etc. $+ (n\text{-}1) g \tau^2$, or $\frac{gt^2}{2}\left(1 - \frac{1}{n}\right)$. Now is we imagine n to become greater and greater this is in the limit equal to $\frac{1}{2} g t^2$.

The laws $v = g t$ and $s = \frac{1}{2} g t^2$ may be combined to give a third law, which is of importance, $v^2 = 2 g s$; thus if a body falls from different heights its velocities on reaching the ground are proportional to the square roots of the heights.

Mechanics

my hand causes electrified feathers to move toward it as if drawn by strings, and that a magnetic pole draws another pole to it or repels it, even in a vacuum, as if drawing it with a string or pushing it with a stick? Again we may push objects with a stick or rod of metal, but it is known that bodies of wood and metal consist of little particles which are not in contact; how is force communicated from each particle to the next? We are here led to the idea of there being a communicator of force between the particles of all bodies, something which exists in the receiver of an air pump when the air has been removed, something which communicates force from star to star. Phenomena of light are explainable on the hypothesis of an interstellar ether. Radiant heat and light seem to be vibrations propagated through this medium and it appears likely that these vibrations are a kind of electro-magnetic disturbance. We have very little data as yet for determining the nature of the propagation of such disturbance, but it is probable that the radiation of light and heat, the propagation of electro-magnetic induction and the attractions of magnets, of electricity and of particles of matter (gravitation), are allied phenomena. When rods and strings communicate force they are subjected to certain equal and opposite forces (called in this case stresses), which may produce strains in them, that is, shorten or lengthen or bend or twist them. Machines are communicators of force (see MECHANISM) and like rods and strings their parts are subjected to stresses which produce strains.

We proceed to consider the quantitative laws of motion, mass, and force which may be determined experimentally by means of Attwood's machine. This instrument enables us to measure the motion produced in a mass when a force acts upon it. Two equal masses, A and B, are connected by means of a fine silk cord which passes over a light pulley free to turn with very little friction. When one of these masses falls the other rises; their motions may be observed by means of an upright scale near which they move. On this upright scale, at any height, may be fixed a ring through which one of the masses may pass; somewhere below the ring a small table may be fixed to the scale to suddenly destroy the motion. Within reach of the experimenter there is a pendulum which may be set swinging at any instant and which marks seconds audibly — that is, a tick is heard at the end of every second. Let us suppose the mass A to be at zero on the highest part of the scale. Place on A a small brass plate C, of such a shape that when A passes through a ring it leaves C behind it without suffering any retardation of its own motion. Now if there were no ring or plate on the scale A would pass from zero to the bottom of the scale with a uniformly accelerated motion; the mass which moves is evidently the sum of the masses of A, B and C as well as the thread and the light pulley (which may be neglected); the force which causes motion and continually accelerates it is the weight of C The force is the same at all times so that the acceleration of the velocity in any one second is the same as in any other. Now if a ring lifts C at any instant the motion of A and B becomes uniform, the velocity remaining the same as at the instant when C was lifted; the distance passed over by A in one second after passing through the ring evidently measures the velocity. To find the velocity acquired in the first second shift the ring till the click of C as it is lifted coincides with the first tick of the pendulum (the pendulum was set free when the mass began to move), and shift the little table till the sound of A striking it coincides with the second tick of the pendulum. A few trials will enable the proper positions of the ring and table to be found. The distance between the ring and the table measures the velocity required. To find the velocity acquired in two seconds shift the ring and table till the click of C coincides with the second tick of the pendulum, and A striking the table coincides with the third tick. Proceeding in this way we can prove that the motion, so long as C remains on A, is uniformly accelerated — that is, the velocity at the end of two, three, four, etc., seconds is twice, three times, four times, etc., the velocity at the end of the first second; again, the distance passed over during the uniformly accelerated motion in two, three, or four, etc., seconds is four, nine, or 16 times the distance passed over in one second. By altering A, B, and C and in every case measuring the acceleration (or velocity at the end of the first second), we may prove the law that the acceleration is proportional to the weight of C divided by the whole moving mass (or A + B + C); or, in other words, the acceleration produced by a force on a mass is directly proportional to the force and inversely proportional to the mass (or acceleration $\propto \frac{\text{force}}{\text{mass}}$). This law is employed to determine the unit of force, for all physics calculations are much simplified by putting accel. $= \frac{\text{force}}{\text{mass}}$, and we see that the unit of force is that force which will produce unit acceleration in unit mass. This unit in the British system, called a poundal, is that force which will produce in one pound mass an acceleration of one foot per second. Let us now determine how many units of force there are in the weight of one pound avoirdupois (the unit mass) at London. The weight of the unit mass

causes it to fall (at London) with an acceleration of 32.2 feet per second; the unit force acting downward would cause the unit mass to fall with an acceleration of one foot per second; therefore there are 32.2 units of force or poundals in the weight of one pound. In fact, if m is the mass (in pounds) of a body, its weight in London in absolute units of force, that is, in poundals, is 32.2 m, and its weight at any place on the earth is gm, where g is the acceleration due to gravity at that place.* Readers will carefuly distinguish between the absolute unit of force here described and the more popular gravitation unit, which is the weight of one pound at London.

When a force causes a body to move it does work on it; work is measured by multiplying the force by the distance (in the direction of the force) through which the body moves during the action of the force. It may be shown by Attwood's machine that the work done on a mass (previously at rest) by a force is equal to half the product of the mass and the square of its acquired velocity; this half product is called by several names — the work accumulated in a moving body, the kinetic energy or visviva of the body. It may also be shown

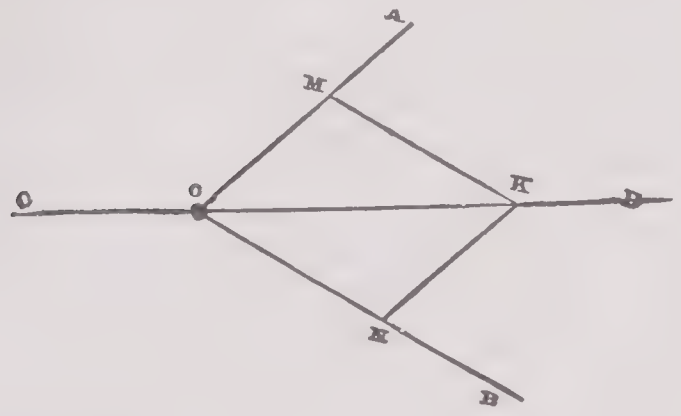
* In Attwood's machine to set free A and the pendulum at exactly the same instant, and to accurately record the time when A passes through the ring or strikes the table, as well as to reduce friction, special arrangements are adopted in good instruments which cannot here be described. The laws proved experimentally are $v = ft$, $s = \frac{1}{2} ft^2$, $f = \frac{\text{force}}{\text{mass}} = \frac{\text{weight of C}}{\text{mass of A+B+C}} = \frac{g \times \text{mass of C}}{\text{mass of A+B+C}}$, where the masses of A, B, and C are in pounds avoirdupois, v is the velocity (in feet per second) acquired in t seconds, s is the space (in feet) passed over in t seconds, f is the acceleration (in feet per second), and g is 32.2 feet per second. Employing the C.G.S. units, g is 981 centimeters per second at London, v is the velocity (in centimeters per second), and the masses of A, B, and C are in grams. The C.G.S. unit of force is called a *dyne;* it is the force which causes the mass of one gram to acquire as acceleration of one centimeter per second. We see that in one poundal there are about 13,830 dynes, and in one gravitation unit (the weight of 1 pound at London) there are about 445,160 dynes. The astronomical unit, the use of which simplifies astronomical calculations, is founded on the law of gravitation, or that the mutual attractive force between two small bodies is proportional to the product of their masses divided by the square of their distance asunder. The unit mass is no longer 1 pound; it is calculated according to the following laws, the unit force is the mutual attraction between two particles, each of which has unit mass, 1 foot asunder; and again, unit force produces unit acceleration (1 foot per second) in unit mass. This astronomical unit of mass may be shown to be that of 932,000,000 pounds.

that when a force acts upon a body already moving the increase of kinetic energy produced by the force is the same as the work done by the force.† Now work is often estimated in foot pounds — that is, the work done in lifting one pound avoirdupois at London one foot high is taken as a unit. Here the gravitation unit of force is employed, so that the kinetic energy of a body in foot-pounds is $\frac{m v^2}{64.4}$ where m is the mass in pounds and v is the velocity in feet per second.

Statics.— We have already stated that when two or more forces act on a small body their joint effect is the same as would be produced by a certain single force called their resultant; the determination of a resultant force is a problem in statics. If a point is acted on by a number of forces in the same straight line it is easy to see that they are equivalent in their action to one resultant force; this force is equal to the difference between the sums of the forces acting in each of the two opposite directions; and it acts in the direction which is that of the forces of the greater sum. We shall in future assume that if a small body is kept at rest by two forces, these forces must be equal in amount and opposite in direction. In the annexed figure, if the string O A pulls a small body O with a force 6, and at the same time O B pulls it with a force 8, O will move neither in the direction O A nor O B, but in the direction of a line somewhere between O A and O B. Now O may be kept at rest by the pull of a string O C; and the force in O C, with some opposite and equal force, say in a string O D, would keep O at rest; hence the force in

†Mathematical proof, assuming the above definitions of force and work: A body of mass m moving with uniform velocity v is acted on by a force F in the direction of motion for a very short time t. If v_1 is the velocity at the end of this time $v_1 - v$ is the velocity acquired, and $\frac{v_1 - v}{t}$ is the acceleration. But by the above law accel.$= \frac{\text{force}}{\text{mass}}$, therefore $\frac{v_1 - v}{t} = \frac{F}{m}$ and $F = \frac{m(v_1 - v)}{t}$. Again, the space passed over (for v varies uniformly during the time t) during the short time is $\frac{1}{2} t (v_1 + v)$; hence the work done by the force, or force multiplied by space is $\frac{m(v_1 - v)}{t} \times \frac{1}{2} t (v_1 + v)$ or $\frac{1}{2} m (v_1^2 - v^2)$ or $\frac{1}{2} m v_1^2 - \frac{1}{2} m v^2$, or the increase of the kinetic energy of the body. This law may be extended to cases in which the force varies from time to time, and to cases in which the time has any value; indeed, it holds generally.

some string, such as O D, is equivalent to (or is the resultant of) the forces in O A and O B. It is found by experiment that if the distance O M is made equal to 6 (according to any scale of distance), and the distance O N, 8, and if the parallelogram O M K M is completed, then the length of O K represents numerically the force which must act on O C to keep O at rest; and besides O C and O K are in the same straight line. We showed that the resultant of O M and O N must be equal and opposite to the force on O C, and therefore it is represented in magnitude and direction by the line O K. Thus, to find the resultant of two forces acting together on a small body, when their directions make an angle with one another, draw two lines from a point representing the two forces in



magnitude and direction; complete the parallelogram of which two sides are already drawn; the diagonal through the point represents the resultant force in magnitude and direction. This law is called the parallelogram of forces. It may be observed that for three forces to keep a small body at rest their directions must lie in one plane. By the same method of reasoning it may be shown that when three or more forces act at the same time on a small body and tend to cause motion, they are equivalent to one resultant force. This resultant may be determined by first finding, by the above law, the resultant of any two of the forces, combining this with a third force, and so on. From the parallelogram of forces we may at once deduce another law called the triangle of forces. If three forces keep a small body at rest, and if a triangle be drawn whose sides are parallel to the three forces, which is such that arrows drawn on the sides, indicating the direction of the forces, are seen to proceed in the same direction around the triangle, then the sides are proportional to the respective forces to which they are parallel. The polygon of forces may be deduced by a repeated application of the same principle; it is: If a number of forces keep a small body at rest, and if a polygon be drawn whose sides are parallel to the forces, which is such that arrows drawn on the sides indicating the directions of the forces seem all to proceed in the same direction around the polygon, then the sides are proportional to the respective forces to which they are parallel. These two theorems admit of easy experimental proof.

We have been considering how to find the resultant of a number of forces, or the composition of forces; the reverse process is called the resolution of forces. A single force may be supposed to be the resultant of any number of forces; for any single force there may be substituted, representing it by the diagonal of any parallelogram, the two forces represented by the sides. It is often necessary to resolve a force into two whose directions are at right angles with one another.*

Hitherto we have supposed our forces to act on a very small body. Now when the body has sensible size (a large body we shall call it), the above theorems are true only when the directions of the forces meet in the same point. A number of forces acting on a large body tend not only to give it a motion of translation, but also, as a general rule, to cause turning. The turning action of a number of forces may be observed by suspending a wooden disk by a smooth nail through its center to a vertical wall. Strings tied to nails in the disk will enable forces in any directions (paral-

* When the directions of a number of forces acting on a small body are in the same straight line, all the forces which act in one direction may be regarded as positive, those acting in the opposite direction being negative; the resultant is evidently the algebraic sum of all the forces. The parallelogram of forces is evidently equivalent to the following: If two forces P and Q, making an angle θ with one another, act upon a small body, their resultant is a force R such that $R^2 = P^2 + Q^2 + 2\ P\ Q \cos\ \theta$ and R makes an angle α with P such that $\sin\ \alpha = \frac{Q \sin\theta}{R}$. The triangle of forces is equivalent to the following: If three forces keep a small body at rest, each force is proportional to the sine of the angle between the other two, The force P may be resolved into two, one equal to $P \cos\theta$ parallel to any direction making an angle θ with P and the other $P \sin\ \theta$ at right angles to the first. If a number of forces P_1, P_2, P_3, etc., making angles $\theta_1, \theta_2, \theta_3$, etc., with any given direction, act on a small body, each force may be resolved into two, one along, and the other at right angles to the given direction. The forces are therefore equivalent to a force $P_1 \cos\theta_1 + P_2 \cos\theta_2 + P_3 \cos\ \theta_3 +$, etc., in the given direction, and another $P_1 \sin\ \theta_1 +$ etc., at right angles to the first. These two forces have a resultant R such that $R^2 = (P_1 \cos\theta_1 + \text{etc.})^2 + (P_1 \sin\theta_1 + \text{etc.})^2$ or $(\Sigma P \cos\theta)^2 + (\Sigma P \sin\ \theta)^2$ and R makes an angle α with the first direction such that $\tan\ \alpha = \frac{P_1 \sin\theta_1 + \text{etc.}}{P_1 \cos\theta_1 + \text{etc.}}$ or $\frac{\Sigma P \sin\theta}{\Sigma P \cos\theta}$.

Mechanics

lel to the wall) to be applied to the disk. It is found that the effect of any force in turning the body is measured by its moment about the center of the disk. The moment of a force about a point is equal to its amount multiplied by the distance of its line of action from the point. If two forces tend to turn the disk in opposite ways they balance one another when their moments about the point of suspension are equal. This may be proved experimentally, and also that when any number of such forces act upon the disk they have no effect in turning it if the sum of the moments about the point of suspension of the forces tending to turn it in one direction is equal to the sum of the moments of the forces tending to turn it in the opposite direction. When any body is constrained to move about a fixed axis, the turning effect of any force is measured by its moment about the axis. To find the moment of any force about an axis, resolve the force into two, one at right angles and the other parallel to the axis; the moment is the force at right angles to the axis multiplied by the shortest distance between the axis and the direction of the force. Readers are referred to Todhunter's "Statics" for the general investigation of the action of a number of forces on a large body. A special case is that of parallel forces. When a number of parallel forces act on a body, a single force can generally be found which will keep the body at rest; and therefore a single resultant force can be found to which they are equivalent. If two parallel forces, P and Q, act in the same direction at the points A and B of a body, their resultant is found to be equal to $P + Q$, and it may be supposed to act at a point C in the straight line A B, such that $P \times A\ C = Q \times C\ B$. If the forces act in opposite directions, and P is the greater, their resultant is equal to $P - Q$, and it acts in the same direction as P, at a point C in the line B A produced, such that $P \times A\ C = Q \times B\ C$. These laws may be proved experimentally by attaching strings to certain parts of a stiff wooden rod, and allowing weights to pull them. When P and Q are nearly equal to one another, and are opposite in direction, C is at a great distance from A and B in the produced line B A; and when P and Q are equal and opposite, there is no single force which will balance them. Two equal and opposite parallel forces are called a couple; the plane containing the forces is called the plane of the couple; as they are not equivalent to a resultant force it is evident that they simply tend to turn the body. It is easily shown that their turning action about any axis perpendicular to their plane is the same as about any other such axis, and that this turning action is measured by the moment of the couple, that is, by one of the forces multiplied by the perpendicular distance (the arm of the couple) between them. For two couples to balance one another they must be in parallel planes, they must tend to turn the body in opposite directions, and their moments must be equal. One of the best examples of the action of a couple is that of a light sphere of cork kept in rapid rotation in the air by a vertical jet of water playing against one side of it; it does not fall so long as the upward force exerted by the jet is exactly equal to the weight of the body (a downward force which may be supposed to act at the center of the sphere). It may be shown by mathematics that the action of a number of forces on a large body is generally the same as that of a certain resultant force and a certain couple.

It may be observed that the rule for finding the point C in the line A B, at which the resultant of the two parallel forces acts, is quite independent of the direction of the line to which the forces are parallel. The point C is called the center of the parallel forces P and Q. When the points of a body at which a number of parallel forces act are known, the center of these parallel forces can be found by a repeated application of the above law; it is the point at which the resultant of the forces acts, no matter what may be the line to which all the forces are parallel. Now any body may be supposed divided into a great number of small parts, each of which is attracted by the earth, and hence the body is acted on by a great number of vertical forces. When the body is small these forces may be considered parallel; their center has been called the center of gravity of the body. (See CENTER.)

When a body lies on a table its weight is a force which may be supposed to act through its center of gravity; this force is balanced by the upward force with which the table acts on the body. Sometimes these two forces cannot be in equilibrium, but form a couple tending to turn the body. This may be the case when a body is suspended by a point or is free to turn about an axis; the body will tend to turn till its center of gravity is as low as possible. Sometimes a suspended body may be in equilibrium in such a position that a very slight displacement would enable a couple to come into action turning the body further from its old position; the equilibrium in this case is unstable. When the couple which comes into action on a slight displacement of a body from its position of equilibrium tends to return it to that position, the equilibrium is said to be stable. When there is no such couple the equilibrium is neutral.

In ordinary works on statics, when large bodies are acted on by forces, they are supposed to be rigid, that is, all their parts

retain invariable positions with respect to each other. Now in reality when forces act upon bodies they deform or tend to break them. In the experimental proof of the laws of parallel forces, the wooden rod to which the forces are applied bends and may break if the forces are great enough. The internal stresses of a communicator of force produce strains or deformations of the communicator. It is found by exact observation that when we push a body by means of a rod, or pull it by means of a string, the rod or string is shortened or lengthened by a small amount, however small the exerted forces may be. If the stresses which deform any body are not too great, it is found that when they no longer act the body returns to its old form. The particles of a body are kept in their places by the attraction of cohesion. When any force tends to separate two particles which are very near to one another, cohesion tends to prevent such separation. The force of cohesion resists any deformation or change of volume of a body, and causes it to return to its old shape and volume when no longer subjected to stresses. Liquids and gases offer no resistance to stresses tending to change their shape unless these are very suddenly applied (see MATTER); but they resist stresses tending to diminish their volumes.

Mechanism. Anything which changes one form of energy into another may be called a machine; mechanism treats of those arrangements of machinery by means of which a body, acted on by a certain force and moving in a particular path, communicates mechanical work to another body in such a way that it exerts a certain force and moves in another particular path. Mechanism generally consists of combinations of the mechanical powers. The steam engine affords a source of mechanical work in giving rotation to a shaft. We shall confine our attention to the various methods of transforming the motion of this shaft into uniform and variable motions, in straight and circular and other paths. Mechanism, as thus limited, is a part of the subject of kinematics. In causing one revolving shaft to turn another, spur and bevel wheels are usually employed. We may have, for instance, a system of spur wheels fixed firmly to cylindric shafts, which rest in proper bearings, and are merely capable of turning on their axes. The teeth on the circumference of a driving wheel lock into the teeth of a follower in such a way that when the driver turns the follower must turn also. The second shaft may drive a third, and so on. It is easy to see that in a train of wheels the following law holds: If D_1, D_2, etc., are the numbers of teeth in the drivers, and if F_1, F_2, etc., are the numbers of teeth in the followers, then the number of revolutions made by the first driving shaft in any time is to the number of revolutions of the last following shaft in the same time as the product of $F_1 \times F_2 \times$ etc., is to the product $D_1 \times D_2 \times$ etc. That the teeth of wheels may work smoothly together their curved surfaces must be mathematical, and hence they are always formed according to certain rules. Two spur wheels may be represented by two circles rolling on one another; these are called the pitch circles of the wheels. The pitch of a tooth is the distance from the center of one tooth to the center of another measured along the pitch circle. Bevel wheels enable one shaft to turn another making an angle with the first, and they are often used to connect shafts at right angles to one another. They may be represented by two cones rolling on each other, the vertices of the cones being at the point of intersection of the axes of the shafts; it may be observed that all the straight lines of the teeth would meet at this point of intersection. When the following shaft is to be driven very rapidly the driving wheel is made large and the follower small. The law for a train of bevel wheels is evidently the same as for a train of spur wheels. An endless belt or rope may pass around the circumferences of two disks or pulleys keyed on two shafts to communicate motion. The number of revolutions of the driving pulley in any time is to the number of revolutions of the follower in the same time as the circumference or diameter of the follower is to the circumference or diameter of the driver. In the endless screw there is a screw on one shaft, whose thread works into the teeth of a wheel on another shaft at right angles to the first. If the screw is single-threaded, for every revolution of the screw the circumference of the wheel moves through a distance equal to the pitch; therefore, if there are 59 teeth in the wheel, the wheel shaft makes one revolution for every 59 revolutions of the screw shaft. The combination of all pieces of mechanism employed for a common object in a machine is sometimes called gearing or gear. Wheels are said to be in gear when they are capable of moving one another. They are called out of gear when rendered incapable of communicating motion from one to another.

The circular motion of a point at the end of a rotating arm (a crank) is changed into straight-line motion by connecting it (by means of a connecting rod or link) with a body constrained by guides to move in a straight line. Straight-line motion may be changed into circular by means of the same mechanism, which is in constant use in steam engines to change the reciprocating straight-line motion of the piston to the circular motion of a shaft. When a thick plate of any curved shape (a cam) is fixed like a wheel on a shaft, any body constrained to lie and slide on the circumfer-

ence of the plate will get a motion to or from the center of the shaft, which will depend on the shape of the plate or cam. Cams are in constant use in many forms apparently different in principle. The eccentric, the swash plate, cams employed in punching and shearing machines, the revolving heart, the screw cam, the frisket plate cam and Applegarth's cam of printing machinery, Napier's cam, the expansion and exhaust tappets of steam engines, and the cam of Breguet's telegraph manipulator, may be mentioned. Escapements convert the circular motion of a wheel into the reciprocating motion of a pendulum. Many other contrivances for converting circular into straight-line motion are in use, the screw, the rack and pinion, and others; they are of great importance in self-reversing machines, and indeed in machines generally.

Link motion is the name applied to a mechanism consisting of two cranks and a connecting rod or link. The cranks may have reciprocating motions of a varied character. The straight-line motion of the piston of a steam engine is usually transformed into the reciprocating motion in a circular arc of the end of a vibrating beam, by means of a piston rod and parallel motion, the object of the parallel motion being to keep the end of the piston rod in a certain straight line. Various forms of the parallel motion are employed in steam engines and machinery. Ratchets of different kinds, the nipping lever, the silent feed, and other contrivances, are employed to convert reciprocal into discontinuous-circular motion.

Very numerous are the arrangements of mechanism employed to give peculiar motions; in general they are combinations of those mentioned above. The fusee of a watch is a sort of stepped pulley which produces a steadily accelerating rotation of the main-spring box, to enable the spring to give out as much work in a unit of time when nearly unwound as at any other time. Of special contrivances we may mention: conical pulleys and speed pulleys on shafts, the link motion in steam engines, various "winding-on" and other arrangements in spinning frames and mules, the snail of the striking part of clocks, the knuckle joint of the power loom and other machines, mechanism for counting the revolutions of wheels, wheels of elliptic and other shapes to give certain variable revolving motions to shafts, Hooke's joint, often employed on telescopes to transmit motion between two shafts hinged together, the various unique arrangements adopted in certain automata, and in the calculating machines of Babbage and others, and the governor employed in steam engines and with water wheels to cause the engine or wheel to give out more or less work when more or less work has to be performed, thus preventing much change in the velocity of the crank shaft. The above mechanical arrangements may be further studied in works on applied mechanics and mechanical engineering.

The principle of conservation of energy is that energy is indestructible and cannot be created. Part of the energy given to a machine is converted into heat through friction at rubbing surfaces, so that only part of it is given out by the machine as mechanical work. If we consider the moving parts at which mechanical work enters and leaves a machine, we find that the force exerted on the first part, multiplied by its velocity in the lirection of the force (the work given to the machine in a second), is equal to the force exerted by the other part multiplied by its velocity in the direction of the force (the work given out by the machine), on the supposition that there is no friction or other source of loss of energy in the machine; but as there is always friction the latter product is really always less than the former. We see that those parts of a machine which move most slowly are capable of exerting the greatest forces, and it is for this reason that in any vibrating arm the parts moving most slowly are made very strong.

A machine is commonly readily stopped or set in motion by small forces when these are applied to the parts which are capable of moving most rapidly. To determine by experiment the amount of work done against friction in a machine it is only necessary to measure the amount of work given out by it, and subtract this from the amount of work given to it, a process which is often performed by engineers. It is found that the work done against friction is proportional to the work given to any machine unless the velocity is very great; or, as it is sometimes stated, the friction is proportional to the load. To determine the amount and law of friction in pulley blacks, cranes, etc., the applied forces are found by trial which will not only balance certain weights but also cause a slow motion of the machine; a number of values may thus be found of the mechanical advantage. If these values are nearly the same it is easy to show by algebra that the law, friction proportional to load, has been proved. The difference between the true mechanical advantage and the mechanical advantage calculated on the supposition of no friction, is a fraction expressing the amount of the total energy which is wasted or lost.

Mechitarist (-kit'-), one of the members of a Roman Catholic congregation that was founded at the close of the 17th century by an Armenian named Mechitar, for the purpose of instructing and improving the condition of his countrymen. He was ordained

in 1699, and went to Constantinople to put his plans into execution. Meeting with opposition there, he founded a religious house at Modon in the Morea, and when war broke out between Turkey and the Venetian Republic in 1715, the latter power granted him the island of San Lazzaro, in the lagoon between the Lido and Venice, where he founded the Armenian convent which is such an object of interest to travelers. The Mechitarists are devoted to literary work, principally the perfecting of Armenian, and the translation into that language of the principal productions of European literature.

Mechlin. See MALINES.

Mecklenburg Declaration, a resolution said to have been adopted in May, 1775, at a midnight meeting of representatives of the militia of Mecklenburg co., N. C. It declared that the people of that county were free and independent of the British crown, and not only was its general tenor that of the Declaration of Independence, but many phrases are word for word as they appear in that document. The minutes of the midnight meeting are said to have been destroyed by fire in 1800. Whether the Declaration of Independence followed the words of the Mecklenburg Declaration or whether the latter, having probably been replaced from memory, was tinctured with the former, is a disputed question.

Mecklenburg (mek'len-börg), a territory of Northern Germany, bounded on the N. by the Baltic, on the E. and S. by the Prussian dominions, and on the W. by Hanover, Denmark, and Lübeck; area, 6,266 square miles. It is divided into:

MECKLENBURG-SCHWERIN (-shvā-rēn') GRAND-DUCHY OF; a state of Northern Germany bounded on the N. by the Baltic, on the E. by Pomerania and Mecklenburg-Strelitz, on the S. by the province of Brandenburg, and on the W. by Luneburg and Lauenburg, and part of Mecklenburg-Strelitz; area 5,135 square miles; pop. (1905) 625,045. The surface is undulating and the soil generally fertile. The principal rivers are the Rechnitz, Warnow, Stepnitz, the Elde, a tributary of the Elbe, and others. Products, wheat, corn, hemp, flax, tobacco, etc. The horses and horned cattle which are both numerous and excellent find a ready sale in every part of Germany, and are a source of great profit to the landed proprietors. Manufactures, woolen and linen fabrics, cotton, paper, and glass; Mecklenburg-Schwerin is famous also for its distillation of corn-spirits, and has an extensive trade in farm produce. The government is intimately connected with that of Mecklenburg-Strelitz. Each grand-duchy has its separate diets, which also meet separately; but the diets of both grand-duchies assemble once a year, alternately at Sternberg and Malchin. The joint assembly has the right, in conjunction with the grand-duke of Mecklenburg-Schwerin, to make laws and impose taxes for the whole of Mecklenburg; it consists of the landed proprietors among the nobility, and of deputies from towns, in all amounting to between 500 and 600 members. The executive power is intrusted to a "directorium" of eight grand-ducal councillors, three heads of noble families (*Erb-Landmarschälle*), and a deputy from the town of Rostock, which is itself a sort of little republic or *imperium in imperio*. Justice is administered in primary courts in the towns and villages; in patrimonial courts on the estates of the nobility, with courts of secondary jurisdiction at Schwerin, Güstrow, and Rostock, and a high-court of appeals at Parchim, which is the supreme legal tribunal for both grand-duchies. With the exception of between 3,000 and 4,000 Jews, the inhabitants are nearly all Lutherans. In 1872 the army was incorporated with that of Prussia. The only commercial towns and ports of consequence are Schwerin, Rostock, Wismar, and Ludwigslust. Schwerin is the political capital, but Ludwigslust is the usual summer residence of the grand duke.

MECKLENBURG-STRELITZ (strā'lits) GRAND-DUCHY OF, a state of Northern Germany, consisting of two separate territorial divisions: the first and largest, the duchy of Stargard, bounded on the W. by Mecklenburg-Schwerin, and surrounded on all other sides by the Prussian territories; the second, the principality of Ratzeburg; united area, 1,131 square miles; pop. (1905) 103,451. The general features of the country are the same as those described in the above article. Its mean elevation is, however, somewhat less than that of Mecklenburg-Schwerin, though the Helpterburg, near Woldeyk, rises to 640 feet above the sea. The chief river in Stargard is the Havel, and in Ratzeburg the Stepnitz. The land is divided among the sovereign, the nobility, and the towns, in the proportion of about seven-tenths to the first, two-tenths to the nobles, and one-tenth to the municipalities. Nearly one-fourth of the grand-ducal property consists of forest lands. Agriculture and cattle breeding are the chief branches of industry here, as in Mecklenburg-Schwerin. The manufactures are even more insignificant than in the latter grand-duchy. The government is a feudal monarchy, as in Mecklenburg-Schwerin. Justice is administered in eight courts of primary jurisdiction, the superior court of Ratzeburg, and the court of chancery in New Strelitz, from which appeal lies to the supreme tribunal at Parchim. Neu-Strelitz is the capital and residence of the grand-duke. The other chief towns are Neu-Bran-

denburg, Friedland, and Old Strelitz. In 1872 the army was incorporated with that of Prussia. Mecklenburg-Strelitz was originally peopled by the Heruli and the Vandals, who were expelled by the Obotrites in 782. Charlemagne failed in his attempts to reduce this tribe to subjection; but in 1159 Henry the Lion subdued its chief, Niclot, and seized his territories. The two lines of Mecklenburg and Werle were founded by John the Theologian, and Niclot, on the death of their father, Henry Burwin II., in 1236. The latter became extinct in 1436. The entire duchy was conferred on Wallenstein by the emperor Ferdinand II., March 4, 1628; but in 1631 it was again restored to Adolphus Frederick and John Albert, the then existing representatives of the lines of Mecklenburg-Schwerin and Mecklenburg-Güstrow. The division of the entire duchy between the grand-duchies of Strelitz and Schwerin was effected March 8, 1701. In 1815 the dukes assumed the title of grand-duke.

Meconic Acid, in chemistry, $C_7H_4O_7$. One of the constituents of opium discovered by Sertürner in 1805. It is prepared from the alcoholic extract of opium by precipitating with baric chloride and decomposing the baric meconate with sulphuric acid. It crystallizes in colorless, mica-like plates or prisms, containing three molecules of water, with difficulty soluble in cold water and ether, but more readily in hot water and alcohol. When heated to 200° it gives off carbonic anhydride, and is converted into comenic acid, $C_6H_4O_5$. Its aqueous solution is colored deep-red by ferric chloride. Meconic acid is dibasic, and forms two classes of salts. When calcic meconate is dissolved in warm nitric acid, and the solution cooled, brilliant plates of the monobasic salt $(C_7H_3O_7)_2Ca, 2H_2O$ are produced. Di-ammonic meconate, $C_4HO\begin{matrix}(CO(NH_4)O)_2,\\COHO\end{matrix}$ crystallizes in slender needles.

Di-ethyl meconic acid, $C_4HO\begin{matrix}(CO(C_2H_5)O)_2\\COHO\end{matrix}$ is obtained from the mother liquor from which the former acid has separated. It forms flattened colorless prisms, melting about 110°, and dissolving easily in water and alcohol. The acid is monobasic, and forms, with ammonia, a crystalline salt of a yellow color.

Medals of Honor, tokens bestowed by high authorities on individuals for specific services. By the Act of July 12, 1862, the United States government authorized the striking of 2,000 medals to be given to non-commissioned officers and privates for gallantry in action and soldier-like qualities. On March 3, 1863, the sum of $20,000 was appropriated for making the medals, and officers were made eligible to receive them. Medals were also authorized by Congress in recognition of acts of bravery performed (during the war with Spain in 1898) in the naval battles of Manila and Santiago, the Manila medals bearing the portrait of Admiral Dewey, and the Santiago medals a portrait of Rear-Admiral Sampson. These medals are highly prized, though less well known than the Victoria Cross of Great Britain, the Iron Cross of Prussia and Germany (both also bestowed for military service), and the Cross of the Legion of Honor of France (conferred for either military or civil merit). Pensions accompany the English and French decorations.

Medea (mē-dē′ä), a celebrated magician of classic fable, daughter of Æetes, King of Colchis, and the niece of Circe. When Jason came to Colchis in quest of the golden fleece, Medea became enamoured of him, and it was to her arts that the Argonauts owed their preservation. Medea had an interview with her lover in the temple of Hecate, where they bound themselves by the most solemn oaths and promised eternal fidelity. No sooner had Jason overcome all the difficulties which Æetes had placed in his way, than Medea embarked with the conquerors for Greece. To stop the pursuit of her father, she tore to pieces her brother Absyrtus, and left his mangled limbs in the pass through which Æetes was to pass. When Jason reached Iolchos, the return of the Argonauts was universally celebrated; but Æson, the father of Jason, was unable to assist at the solemnity, on account of the infirmities of his age. Medea, at her husband's request, removed the weakness of Æson, and, by the juice of certain herbs,

MEDEA.

restored him to vigor and youth. Her conduct, however, to the daughter of Pelias, and her refusal to bring Pelias to life after tney boiled his flesh in a caldron, greatly irritated the people of Iolchos, and Medea, with her husband, fled to Corinth, to avoid the resentment of an offended populace. Here they lived for 10 years; but the love of Jason for Glauce, the king's daughter, soon interrupted their mutual harmony, and Medea was divorced. Medea revenged the infidelity of Jason by causing the death of Glauce and the destruction of her family. This act was followed by another more atrocious. Medea killed two of her children in their father's presence, and when he attempted to punish the barbarity she fled through the air upon a chariot drawn by winged dragons. From Corinth Medea went to Athens, where she married King Ægeus. From her connection with Ægeus, Medea had a son, who was called Medus. She fled at length from Athens, after having attempted to poison Theseus at a feast, and went to Colchis, where, according to some, she was reconciled to Jason, who had sought her in her native country after her sudden departure from Corinth. The story of Medea's life has furnished a subject for both ancient and modern tragic writers; Euripides, Seneca, and Corneille being the principal.

Medeba (med′-), a town E. of the Jordan, in the tribe of Reuben (Josh. xiii: 9, 16.) Near it the army of David gained a great victory, (I Chr. xix: 7.) Long afterward, it fell again into the hands of the Moabites, its ancient masters (Num. xxi: 30; Isa. xv: 2.) Its ruins, on rising ground a few miles S. E. of Heshbon, still retain the old name.

Medellin (mā-del-yēn′), (1) a town of Spain, on the Guadiana, 66 miles E. of Badajoz; the birthplace of Cortes. (2) The second city of Colombia, capital of the department of Antioquia, in a lovely mountain valley, 4,850 feet above the sea, and 150 miles N. W. of Bogota; is a handsome town, having a cathedral, college, seminary, technical school, four printing establishments and manufactures of pottery, porcelain ware, and jewelry; has a considerable trade, exporting gold and silver; pop. (1905) 60,000.

Medford, a city in Middlesex co., Mass.; on the Mystic river, and on the Boston and Maine railroad; 5 miles N. W. of Boston. There are Tufts College, a high school, public library, electric light and street railroad plants, waterworks, and the Craddock House, said to be the oldest building in the United States. The city has brick yards, machine shops, dye works, large fruit works, and boot and shoe, and carriage factories, and an assessed property valuation of nearly $3,000,000. Pop. (1890) 11,079; (1900) 18,244; (1910) 23,150.

Media (mē′diä), in ancient geography, a country of Asia, which extended on the W. and S. of the Caspian Sea, from Armenia and Assyria on the N. and W., to Farsistan or Persia proper on the S.; and included the districts now called Shirvan, Aderbeitzan, Ghilan, Mazanderan, and Irak Adjemi. It covered a territory larger than that of Spain, and was one of the most fertile and earliest cultivated among the kingdoms of Asia. It had two grand divisions, of which the N. W. was called Atropatene, or Lesser Media, and the S., Greater Media. The former corresponds to the modern Aderbeitzan, now, as formerly, a province of the Persian empire, on the W. of the Caspian, surrounded by high mountains of the Tauritic range, except toward the E., where the river Kur, or Cyrus, discharges its waters into the Caspian. The Greater Media corresponds principally to the modern Irak Adjemi, or Persian Irak. Ecbatana was the ancient capital. Media is one of the most ancient independent kingdoms of which history makes mention. Berosus states that the Medes had conquered Babylon 2000 B. C., and that the dynasty lasted 224 years. Rawlinson, who ranks Media third among the five great monarchies of the ancient world, declares that Median history from 2234 B. C. to 835 B. C. is a blank. The Medians were in language, religion, and manners very nearly allied to the Persians. After they had shaken off the yoke of the Assyrians, their tribes united about 708 B. C., according to the common account, and chose Dejoces (Kai-Kobad) for their chief. His son Phraortes, or Arphaxad, subdued the Persians. Cyaxares (Kai-Kaous), the son of Phraortes, in alliance with Nabopolassar, King of Babylon, overthrew the Assyrian empire about 604 B. C., and spread the terror of his arms as far as Egypt. He was succeeded by his son Astyages (Asdehak), who was deposed (560 B. C.) by his own grandson Cyrus (Kai-Khûsru), King of Persia; and from this time the two nations are spoken of as one people. Ecbatana, the capital of Media, became the summer residence of the Persian kings. After the death of Alexander the Great (324 B. C.), the N. W. portion (Atropatene) became a separate kingdom, and existed till the time of Augustus; the other portion, under the name of Great Media, forming a part of the Syrian monarchy. Media was on several occasions separated from Persia. In 152 B. C., Mithridates I. took Great Media from the Syrians, and annexed it to the Parthian empire, and about 36 B. C. it had a king of its own, named Artavasdes, against whom Mark Antony made war. Under the Sassanian dynasty, the whole of Media was united to Persia.

Mediastine (mē′di-as-tin), or **Mediastinum,** in anatomy, the septum formed by the union of the two pleuræ. The term

anterior mediastinum is given to the part of this septum in front of the heart and pericardium, and posterior mediastinum to the part behind. That portion which incloses the pericardium is sometimes distinguished as the middle mediastinum.

Medical Jurisprudence, that branch of state medicine which is concerned with the administration of justice. It had its rise in Germany; the first course of lectures on the subject were delivered by Michaelis at Leipsic about 1650. Medical jurisprudence deals with (1) questions affecting civil rights; as those of personal identity, age, sex, legitimacy, malingering, and unsoundness of mind; (22) injuries to persons from whatever causes, when those injuries are the subject of judicial inquiry. Under the second head toxicology is sometimes included, though that science has a copious literature of its own.

Medici (med'ē-chē), a distinguished Italian family of Florence, whose historical fame begins in 1351 with GIOVANNI DE MEDICI, who with a small body of 100 men forced his way through a Milanese army which was besieging the fortress of Scarperia, and relieved the place. His son, SALVESTRO, who enjoyed the rank of gonfaloniere from 1378 to his banishment in 1381. GIOVANNI, his son and successor, distinguished for his commercial enterprise, and for promoting the interests of the republic, flourished 1360–1428.

COSMO, one of the sons of the latter, surnamed "Father of his Country," born in 1389. He early took part in the important commercial concerns of his father, and also in the government of the republic. He attended Balthasar Cossa, elected Pope as John XXIII., to the council of Constance in 1414; and Cossa being there deprived of the papal dignity, found a home at Florence. In 1433, Rinaldo de Albizzi, head of a party opposed to the Medici, obtained the chief magistracy, and Cosmo was banished for 10 years. He settled at Venice, and there founded the library in the monastery of St. George. After one year he was recalled, and his life was thenceforth peaceful and prosperous. As chief magistrate Cosmo acted with consummate prudence; always aiming to rule without seeming to do so. He employed his influence and wealth in the patronage of literature and art, and had among his friends the most distinguished authors and artists of his age. He formed a large and valuable collection of manuscripts in various languages, which became the basis of the library known as the Laurentian. After the fall of Constantinople he welcomed many learned Greeks who sought refuge there. His influence on the political movements of Italy was immense. He once saved Florence from a war with Naples and Venice by calling in debts from these two States, and so incapacitating them from making war. In his latter years he applied himself to study, especially of the Platonic philosophy, and to farming. He died August 1, 1464. PIERO I., his son and successor; born 1414, became the victim of a revolt in 1469.

LORENZO, usually styled The Magnificent; born Jan. 1, 1449, and the son of Piero, was carefully educated, and early initiated in state affairs. In 1466 he visited the court of Rome, and afterward the principal States of North Italy, thus forming relations afterward of importance to him. At the age of 21 he married Clarice, a noble lady of the Orsini family, and the same year, 1469, succeeded his father as head of the Florentine republic. His policy, eloquence, and fascinating manners succeeded, where ambition less artfully disguised would probably have failed, and the liberties of Florence were charmed away. His will was supreme and almost unquestioned, and a general license and corruption of morals made it easy for him to be tyrant. In 1471 Galeazzo Sforza, Duke of Milan, with his duchess and court were entertained at Florence, and the gaieties, pageants, and luxurious habits with which the people were then gratified demoralized them still more. The next year a revolt broke out at Volterra, which Lorenzo suppressed by force, and allowed his troops to pillage the town. Literature, philosophy, and art engaged the attention of Lorenzo no less than political affairs; he patronized scholars and artists; collected manuscripts at great expense; assisted in founding a Platonic academy at Florence; restored the Academy of Pisa; and made great additions to the Laurentian Library. The quiet of his reign was interrupted, in 1478, by the conspiracy of the Pazzi, to which Pope Sixtus IV. was a party, and which had for its object the overthrow of the Medici. The conspirators attacked Lorenzo and his brother Giuliano in the Duomo, when the latter was killed and Lorenzo narrowly escaped. The chiefs and many of the associates of the conspiracy were executed. The Pope then excommunicated Lorenzo, allied himself with the King of Naples, and declared war against Florence. Lorenzo, with happy boldness, went as his own ambassador to Naples, and succeeded in detaching the king from the papal alliance; fear of the Turks induced the Pope soon after to make peace. The influence of Lorenzo in Italy became greater than ever, and the rest of his administration was unmarked by any important event. In the spring of 1492 he fell ill and retired to his villa at Careggi. On his death-bed he was attended by two of his most intimate friends, Politiano and Pico della Mirandola; he was also visited by the famous monk, Savonarola, the circumstances of whose interview with him are differently related by two contemporary

writers. He died in Careggi April 8, 1492. Lorenzo was author of numerous lyrical and other short poems, many of them of a licentious character, and some devotional. His "Life" by Roscoe is well known, and is admitted now to be far too eulogistic, and therefore untrustworthy as a history. The darker side of the case is shown in Signor Villari's admirable "Life and Times of Savonarola." The story is also more fairly and very ably told by T. A. Trollope, in his "History of the Commonwealth of Florence." He had three sons: GIOVANNI, who became Pope as Leo X., (*q. v.*), GIULIANO, and PIERO. The latter, Piero II., born Feb. 15, 1471, succeeded Lorenzo, and was deprived of his estates when the French invaded Italy in 1494. He was drowned Dec. 28, 1503, leaving two sons, Lorenzo and Cosmo. GUILIANO, brother and successor of Piero, abdicated in favor of Lorenzo, 1513, and became Duc de Nemours by his marriage with the aunt of Francis I. He died March 17, 1516. LORENZO II., eldest son of Piero II., came to power by the abdication of his uncle, and governed under the influence of Leo X., who invested him with the duchy of Urbino. He died May 4, 1519, leaving an only daughter.

CATHERINE DE MEDICI; born in Florence in 1519. She married the Duke of Orleans, who became Henry II. of France, and her children were Francis II., Charles IX., Henry III. and Marguerite of Valois. Catharine de Medici was Queen Regent of France from 1560 to 1563. She died in Blois, Jan. 5, 1589. After some reverses we find the family reëstablished in the sovereignty of Florence, under the influence of Charles V., with the title of dukes. The first was ALESSANDRO, proclaimed duke 1532, stabbed by his relative Lorenzino, after poisoning his cousin Hippolytus, 1537. LORENZINO, murderer of Alessandro, was assassinated at Venice by order of Cosmo I., 1548. COSMO I., called "The Great," Duke of Florence, and Grand Duke of Tuscany, was the son of Giovanni, the "Invincible," descended from Lorenzo, and was born June 11, 1519. He was raised to power by the influence of Charles V., and abdicated in favor of his son, 1564. In 1569 he became Grand Duke of Tuscany, and died April 21, 1574. FRANCESCO MARIA, son and successor of Cosmo, (1541–1587), and left only a daughter, MARIE DE MEDICI, born in Florence, April 26, 1573. She became queen consort of Henry IV. of France. She died in Cologne July 3, 1642. FERDINANDO I., brother and successor of Francesco, was also cardinal and Grand Duke of Tuscany, 1551–1609. COSMO II., son and successor of Ferdinando I., 1590–1621. FERDINANDO II., son and successor of Cosmo II., 1610–1670. COSMO III., son and successor of Ferdinando II., 1642–1723. GIOVANNI GASTON, son and successor of the latter, was the last of the Medici who reigned over Tuscany, being compelled to abdicate and make way for Francis II., Duke of Lorraine, by the great Powers. He flourished 1671–1737. His daughter, ANNA, wife of John William, elector-palatine, was the last of the family. She died in 1743.

Medicine, the science of diseases, and the art of healing or alleviating them. It is founded on the study of man's physical and moral nature, in health and in disease. Created by necessity, the offspring of instinct, observation, time, and reflection, it began in ages previous to the records of history; it has struggled at all times, and continues to struggle, with favorite theories; has been influenced by all systems of philosophy and religion, by truth and superstition; and has, with the slowness which marks all the important advancements of mankind, but lately emerged from some of the prejudices of thousands of years, and will long continue subject to others. Like other sciences, medicine has gained more from the single discoveries of close observers than from centuries of theory. For the few hundreds of years in which men have begun to apply themselves more to actual observation, and the human body has been carefully studied, medicine, like all the natural sciences to which it is so near akin, has made great progress. The higher kinds of skill and knowledge in the earlier stages of nations, are in general exclusively appropriated by the priests, and this has been the case with medicine and the other branches of natural science. In the sacred writings mention is occasionally made of the external application of oil and wine, and of the effects of warm bathing in the treatment of the sick. Among the Assyrians it was usual to carry those afflicted with diseases to the gates of the temples, where they might have an opportunity of imploring the advice and assistance of those who passed by. Machaon and Podalirius are mentioned in the "Iliad" of Homer as having been "good physicians"; and their skill in the cure of wounds is recorded with great praise. They are called the sons of Asclepios or Æsculapius, the god of medicine. Hippocrates is the earliest author on medicine whose writings have been preserved. He lived about the middle of the 5th century B. C., and was a man of very superior talents and great medical acquirements. His writings maintained an unrivaled authority over the minds of his successors for many centuries, and by the consent of posterity he has been styled the Father of Medicine. The remedies which he employed were principally evacuants, more especially purgatives, and he also prescribed diuretics and sudorifics. He was accustomed to draw blood both by the lancet and scarifications, employed cupping-glasses, inserted issues, and used in-

Medicine

jections. Most of the active drugs of the present day were unknown to him; all the powerful metallic preparations, for instance, as well as the spirituous and ethereal compositions; and anodyne and narcotic remedies were but little valued.

The doctrine of Hippocrates may be called that of empiric rationalism; and, numerous as are the systems that have flourished since, in ancient and modern times, mankind have always returned to his principle of making observation the only rule in the treatment of diseases. The doctrine of Hippocrates was blended by his immediate successors with the Platonic philosophy, whereby was formed the (so called) ancient dogmatic system. In Alexandria, which was from 300 B. C. the seat of learning, medicine was one of the branches studied, but soon degenerated into mere dialectics and book-learning. Hence we find it soon followed by the empiric school (286 B. C.), the methodic school (100 B. C.), the pneumatic school (68 B. C.) and at length by the eclectic school 81 A. D.), which took from all the others. A philosophical and great mind was required to put an end to so confused a state of medical science, and such a mind appeared in Galen (see GALEN), of Pergamus. His system acquired an almost undisputed preeminence during the Middle Ages, and down to the 16th century. For some time (in the 7th century) the intellectual Arabians cultivated the sciences, and with them medicine. They also founded their medicine on that of Galen, but fashioned the science according to their notions, and left it not unimproved in respect of practical application and pharmacology. Arabian medicine reached its highest point under Avicenna (born 980), who for some time was esteemed even higher than Galen; the opinion of the latter's superiority, however, eventually revived. The Western medicine begins with the medical school of Salerno, perhaps existing as early as in the 9th century, but well established by the middle of the 12th century, where medicine was taught according to the principles of the Greeks. During the rest of the Middle Ages there existed a Galeno-Arabian science of medicine, mostly fostered by ignorant monks, and only gradually struggling on, after suffering, perhaps, more than any other science, from every superstition and every misconception of nature.

In the 14th century anatomy was improved by Mondini; later, the knowledge of medicaments was increased by the discovery of new and distant countries; practical medicine by the appearance of new diseases, such, for instance, as the sweating sickness and syphilis. The love of Greek literature was revived by the scholars driven from Greece by the conquest of Constantinople (in 1453), and men having begun to read the Greek medical writers, especially Hippocrates, in the original language, a more scientific and liberal spirit of investigation took the place of slavish adherence to antiquated prejudice. Thus, the fall of the Galenic system was prepared, which was completed in the 16th century, and forms the essential part of the reformation produced by Theophrastus Paracelsus (1526). The chemico-theosophical system of this enthusiast was refined and arranged by J. B. van Helmont (who died in 1644), till deprived of its theosophical character, it passed over into the chemico-material system of Francis Sylvius (who died in 1672), and at length into the psychiatric system of Stahl (who died in 1734). Soon after Harvey's great discovery of the circulation of the blood (in 1619), the iatromathematical doctrine, under Alphonso Borrelli (who died in 1679), developed itself, and finally took the shape of the dynamic system of Fr. Hoffman (died 1742), from which the dynamic schools of subsequent times proceeded. Thomas Sydenham, the great English physician (1624–1689), discarding theory, was content to base his practice on the careful observation of phenomena. Hoffman referred the effects of vitality to the nervous system, and to the nervous influence he attributed the production of two diseased states of the system, dissimilar and opposite to each other, to which he applied the terms of spasm and atony — the first expressing the condition of increased, the second of diminished activity. On this doctrine Dr. Cullen of Edinburgh laid the foundations of his system. Discarding in the most positive manner the merely mechanical powers of matter as accounting for the phenomena of vitality, and resting all his opinions on the specific properties of the living body, he taught that the great agents in all the operations either of health or disease are the minute fibers of the nerves and muscles, which, he says, are the immediate cause, not only of sensation and motion, but of all the changes gradually effected in the internal economy of the system.

Soon after the promulgation of this system Dr. John Brown, also of Edinburgh, proposed another equally novel and striking. He taught that every living being possesses a specific power or excitability, from which all its appropriate functions arise; that every circumstance, either external or internal, which can effect a living animal, is an excitement or stimulus, and contributes to expend a portion of its excitability; that upon the proper action of these excitements depends the due development of the vital powers; so that whenever they are applied in an immoderate degree the excitability is too speedily expended, the animal becomes exhausted, and falls into a state of indirect debility; but that if, on the contrary,

Medicine

there should be a deficiency of stimulus, the powers of life become languid from a want of being called into play, and a contrary state, or direct debility, ensues, and the excitability becomes preternaturally accumulated. Hence he concluded that all diseases may be divided into two great classes, either of excess or defect — or, as he calls them — sthenic or asthenic — of which the principal differences in each class consist in the parts which they affect, modified by peculiarities in the temperament, sex, age, habits of life, etc. Brown's system never gained much hold in England and France, but in his native country, and still more in Italy and Germany, it met with enthusiastic acceptance. A great American disciple of Brown was Benjamin Rush (1745–1813) of Philadelphia, and it should also be noted here that Erasmus Darwin (1731–1802), grandfather of the celebrated naturalist, propounded independently a theory very similar to Brown's.

Dr. Brown was the last of the medical systematists in the proper sense of the term, and the history of medicine since his time has to record the steady advance of scientific empiricism and the relegation of general conceptions to a secondary place. The rapid development of chemistry; the progress of the physical sciences, leading to the perfection of experimental methods and the invention of diagnostic instruments; the rise of the study of microscopic organisms which has issued in a germ theory; the creation of new branches of science, such as histology and cellular pathology; the introduction of statistical and quantitative methods of research; the introduction of anæsthetics; and many other similar movements, have determined the character of medical development during and since the 19th century. Vitalism, or the doctrine of the vital principle, founded by Théophile Borden (1722–1776), and developed especially by his colleague in the Montpellier school, Paul Joseph Barthez (1734–1806), has been displaced altogether, especially by the polemic of the philosopher Rudolf Hermann Lotze (1817–1881). At first the rise of the modern positive school took place mainly in France, where Marie François Xavier Bichat (1771–1802) supplied an entirely new basis for pathology by his epoch-making researches in anatomy and physiology. His pupil François Joseph Victor Broussais (1772–1838) represents a union of the dawning empiricism with the dying systems of Brown and Barthez. His general theories all professed to be based upon anatomical investigations, but he was led into the extravagance of attributing all fevers and many other diseases to inflammation of the bowels, a view first completely discredited by Pierre Charles Alexandre Louis (1787–1872). René Théophile Hyacinthe Laennec (1781–1826) immortalized himself by the invention of auscultation and by acute researches in morbid anatomy; and among the other great French physicians who led European medicine in the earlier part of the 19th century were Auguste François Chomel (1788–1858), Jean Cruveilhier (1791–1874), Gabriel Andral (1797–1876), Pierre Bretonneau (1771–1862), Léon Louis Rostan (1791–1866), Pierre François Olive Rayer (1793–1867), and Armand Trousseau (1801–1866).

In more recent times the greatest name in French medicine is that of Louis Pasteur (1822–1895), who did more than any other single man to establish the germ theory of infectious diseases and to form the new sciences of bacteriology and microbiology. Before 1815 England was practically out of communication with Continental, and especially with French thought, but during that period of comparative isolation she produced some notable physicians, such as Robert Willan (1757–1812) and William Charles Wells (1757–1817). When the Continent was opened to Englishmen in 1815 the work of Bichat, Laennec, and their contemporaries stimulated the progress of medicine in England. Richard Bright (1789–1858) and Thomas Addison (1793–1860) added greatly to our knowledge of the pathology of the kidneys; Sir Charles Bell (1774–1842) and Marshall Hall (1790–1857) rendered notable service by their investigations of the nervous system; Sir James Young Simpson (1811–1870) is chiefly remembered as the introducer of chloroform as an anæsthetic; Lord Lister (born 1827) gained a reputation in connection with the antiseptic treatment; John Abercrombie (1780–1844), James Gregory (1758–1821), and William Pulteney Alison (1790–1859) maintained the reputation of the great Scottish school of the 18th century; Robert James Graves (1796–1853) and William Stokes (1804–1878) shed luster on the Dublin school; and Charles Robert Darwin (1809–1882), though a naturalist rather than a physician, marks an epoch in medicine as in every other branch of scientific inquiry. Germany, though following France in the first instance, has latterly taken the lead, especially in bacteriological research. The work of the Göttingen school, founded by Albrecht von Haller (1708–1777), a pupil of Hermann Boerhaave (1668–1738) of Leyden, the greatest physician of his time, and of the Vienna school, founded by Van Swieten, another disciple of Boerhaave, was continued by men imbued with the modern spirit. Karl Rokitansky (1804–1878) distinguished himself in pathological anatomy and Moritz Heinrich Romberg (1795–1873) added greatly to our knowledge of nervous diseases; but the real founder of modern German medicine is Jo-

hann Lukas Schönlein (1793–1864), whose teaching brought Germany into line with the scientific movement in French and English medicine. Among the more recent German physicians of eminence are Rudolf Virchow (1821–1902), founder of cellular pathology; Ernest von Bergmann (born 1836), notable in connection with the aseptic treatment; Robert Koch (born 1843), a distinguished bacteriologist; and Emil Behring (born 1854), a pioneer in serum-therapy; and mention should also be made of Hermann Ludwig Ferdinand von Helmholtz (1821–1894), inventor of the ophthalmoscope, and of William Konrad Roentgen (born 1845), who has provided the physician with methods of the utmost value in radiography and radioscopy. Among works dealing with the history of medicine are the following: Berdoe's "Origin and Growth of the Healing Art" (1893); Baas' "Die geschichtliche Entwickelung des ärztlichen Standes und der medicinischen Wissenschaften" (1896); Guardia's "Histoire de la Médecine d'Hippocrate à Broussais" (1884); Puschmann's "History of Medical Education" (Eng. trans., 1891); and Pagel's "Biographisches Lexikon hervorragender Aerzte des neunzehnten Jahrhunderts" (1901).

The various sciences or branches of knowledge more or less requisite for a thorough knowledge of modern medicine include human anatomy in the widest sense, comparative anatomy, physiology, botany, physics, chemistry, psychology, etc. The science of health, that is, of that in which it consists, its conditions, etc., is called hygiene, or as far as it relates to the regulation of the diet, dietetics. Pathology, on the other hand, is the science of disease, of that in which it consists, its origin, etc. Nosology treats of the various sorts of diseases, their origin and symptoms, and strives to classify diseases scientifically. Pathological anatomy teaches the diseased alterations and changes of structure. Therapeutics is the science of the treatment of diseases, often divided into general, treating of the subject of cure in general, its character, etc.; and special, of the cures of the particular diseases. Surgery treats of mechanical injuries, and the mode of relieving diseases and derangements by mechanical means. Obstetrics treats of the modes of facilitating delivery. Materia medica is the science of medicines, their external appearance, history, and effects on the human organization. Pharmacy teaches how to preserve drugs, etc., and to mix medicines. Clinics or clinical medicine applies the results of all these sciences to real cases. We should mention, in this connection, the history and literature of medicine; the history of diseases, a very interesting branch; forensic medicine, that branch which enables the physician to give to courts and other legal authorities proper explanations in regard to personal injuries, particular appearances of the body, etc., as whether a wound was mortal, how inflicted, whether a child was dead before being born, etc. We must last mention midwifery, as taught in many countries to women who make a regular study and business of it. A student of medicine ought to be well versed in the two learned languages, and cannot dispense with a respectable knowledge of English, French, German, and Italian.

Medicine, a Century of Progress in. The word "medicine," as used in the title of this paper, includes all branches of the art of prevention and treatment of disease and injuries; all discoveries of methods of diminishing physical pain and of prolonging life, and also that part of modern science which is concerned with accurate knowledge of the structure and functions, normal and abnormal, of the human body, and of the causes of diseases. In other words, it includes not only therapeutics, medical and surgical, but also physiology, pathology, and hygiene.

In all these branches of medicine greater progress has been made during the last century than had been made during the previous 2,000 years. This progress has been largely due to improvements in methods of investigation and diagnosis, resulting from increase of knowledge in chemistry and physics; to better microscopes and new instruments of precision; to experimental work in laboratories, and to the application of scientific method and system in the observation and recording of cases of disease and of the results of different modes of treatment. The introduction of statistical methods in the study of cases of disease and of causes of death; the discovery of general anæsthetics; the adoption of antiseptic and aseptic methods in surgery, and the development of modern bacteriology —each marks a point in the history of medicine in the 19th century.

The scientific demonstration that some diseases are due to the growth and development of certain specific micro-organisms in the human body dates from about 1880, though the theory of such casual relation is much older. Since 1880 it has been proved that anthrax, Asiatic cholera, cerebro-spinal meningitis, diphtheria, one form of dysentery, erysipelas, glanders, gonorrhœa, influenza, certain epidemics of meat poisoning, pyæmia and suppuration in general, pneumonia, tetanus, relapsing fever, tuberculosis, bubonic plague, and typhoid fever are due to minute vegetable organisms known as bacteria; that malarial fevers, Texas cattle fever, and certain forms of dysentery are due to forms of microscopic animal organisms known as microzoa; and for most of these diseases the

Medicine

mode of development and means of introduction of the micro-organism into the body are fairly well understood. To the information thus obtained we owe the triumphs of antiseptic and aseptic surgery, a great increase of precision in diagnosis, the use of specific antitoxins as remedies and as preventives, and some of the best practical work in public hygiene.

The evidence as to the increased powers of medicine to give relief from suffering and to prolong life is most clear and direct in the records of modern surgery — particularly in some of its special branches. In a large proportion of certain cases in which the surgeon now operates with a fair chance of success, such as calculus in the kidney or gall bladder, shot wounds of the abdomen, and tumors of various kinds, there was no hope in the year 1800, and the unhappy sufferer could only expect a certain, though often a lingering and painful, death. In cases of cancer of the face, tongue, breast, or uterus, the persistent pain, extreme disfigurement, and offensive odors which attended them made death a boon to be prayed for, if not deliberately sought, while now such cases, if brought in time to the surgeon, can often be entirely relieved. The knowledge of this fact has become general with the public, and patients no longer defer an operation as long as possible, as was their custom in days of old. Instead of having to look forward to the torture of incisions, manipulations, and stitching, with but small hope of surviving the exhausting suppuration and blood-poisoning which were such common results, the patient now knows that he will inhale a little sweet vapor, and sleep unconscious of the strokes of the surgeon's knife or the pricks of his needle. He may dream wondrous dreams, but he will soon awake to find himself in his bed staring at the trained nurse standing by his side, and wondering vaguely why the operation has not begun. He does not have to look forward to weeks and even months of daily dressings. The surgeon will glance at his temperature record and at the outside of his bandages, but will probably not touch them for a week; and when he does remove them nothing will be seen but a narrow red line without a trace of suppuration. These improved methods not only preserve the mother for her children, and the breadwinner for the family, but they greatly contribute to the public good by shortening the period of enforced idleness and unproductivity after operations.

Some of the greatest triumphs of modern surgery are obtained in cases of disease or injury of the abdominal organs. The removal of ovarian and uterine tumors is now so common and successful that it is not easy to realize that 100 years ago there was practically no help or hope for such cases. In former days the lists of deaths contained many cases reported as inflammation or obstruction of the bowels or as peritonitis. It is now well understood that most of these cases are due to disease of a little worm-like appendix connected with the large intestine on the right side of the lower part of the abdomen, inflammation of which, known as appendicitis, causes excruciating pain, and often produces internal abscesses and death. An operation for the removal of such a diseased appendix is now common and in most cases successful. The operation for the removal of calculus, or stone, from the urinary bladder dates from over 2,500 years ago, and no one knows who first performed it. Within the last century it has been largely superseded by an operation which crushes the stone to powder within the bladder, and removes this powder without the use of the knife. The removal of calculi from the kidney or from the gall bladder, and the removal of a diseased kidney are new operations made possible by improved means of diagnosis, anæsthesia, and antisepsis. Wounds of the intestines were formerly thought to be almost necessarily fatal, and nothing was done for them except to stupefy the patient with opium. Now in such cases the abdomen is opened, the lacerations of the bowel are closed, the effused blood and other matters are removed, and in many cases life has thus been preserved.

By increase of knowledge of the anatomy of the brain, and of the distribution of nerves connected with it, it has become possible in a certain number of cases to determine what part of the brain is suffering from irritation or pressure, and to operate for the removal of the tumor or other substance causing the trouble, with considerable hope of giving permanent relief. A branch of surgery which has developed into an important specialty during the last century is that known as plastic and orthopædic surgery. The replacing of a lost nose by engrafting other tissue in its place is a very old triumph of surgical art, but operations of this kind have been greatly extended and perfected within the last 100 years, and much can now be done to mitigate the deformity and weakness due to club feet, bandy legs, contracted joints, etc., which formerly were considered to be beyond remedy.

Many of the diseases peculiar to women have been deprived of much of their terrors within 100 years. In 1800 for every 1,000 children born from 10 to 20 mothers died. Puerperal fever occurred in epidemics, following certain physicians or nurses, but nothing was known as to its causes or nature. Today puerperal fever is almost unknown in the hospitals or in the practice of a skilled physician. The death rate of mothers is less than 5 per 1,000 births, and

Medicine

the mechanical obstructions which a century ago would almost certainly have brought about the death of both mother and child are now so dealt with that more than half of both mothers and children are saved.

The study of the diseases of the eye has greatly developed another specialty during the century, viz., ophthalmology. The investigations of Helmholtz in physiological optics, with his invention of the ophthalmoscope in 1852, effected a revolution in this branch of medical science and art, and have added greatly to human comfort and happiness. A hundred years ago when the physician saw the eyelids of the new-born babe redden and swell, and yellow matter ooze from between them, he knew that in a few days or weeks the child would be partially or wholly blind, but he knew nothing of the simple means by which the skilled physician can now prevent such a calamity. It is unfortunately true that this knowledge is not even now sufficiently widely diffused, and that our blind asylums must for some time to come continue to receive those who have been deprived of sight during the first months of their life through the ignorance or neglect of those who should have properly cared for them.

While it is certain that the death rates in the last century were greater than those of the present day, it is not possible to make precise comparisons. The record of deaths in the city of New York begins with 1804, and was necessarily very imperfect till the law of 1851, which required the registration of all deaths; but it shows a death rate of 30.2 per 1,000 in 1805, which means that the true death rate must have been between 35 and 40. At present, for a series of five years, it would be about 20, having been below 19 in 1899, so that the death rate has been diminished by at least one-third. How much of this is due to improved methods of treatment and how much to improved sanitary conditions it is impossible to say. A comparison of the list of causes of death in 1805 with the list of causes for 1900 shows great differences, but much of this is due to changes in name and to more accurate diagnosis.

"Malignant sore throat" and "croup" were well known to anxious parents in 1800, but "diphtheria" caused no anxiety. "Inflammation of the bowels" was common and fatal, but "appendicitis" had not been heard of. "Nervous fever," "continued fever," and "low fever" were on the lists, but not typhoid, which was not clearly distinguished as a special form of disease till 1837, when Dr. Gerhard, an American physician, pointed out the differences between it and typhus, which also prevailed at the commencement of the century.

One hundred years ago the great topic of discussion in our cities on the North Atlantic coast was the means of preventing yellow fever, which had been epidemic in New York and Philadelphia for two years. Physicians were disputing as to whether the disease was contagious and imported, and therefore perhaps preventable by quarantine and disinfection, or was due to some occult condition of the atmosphere (which was the view taken by Noah Webster in his "History of Epidemic and Pestilential Diseases," a work which appeared about the middle of the year 1800, though it is dated 1798). The discussions remind one of the remark that a certain patented form of electric light was surrounded by a cloud of nonluminous verbosity. For example, the committee of the Medical Society of the State of New York reported that yellow fever may be produced in any country by pestilential effluvia; and Webster concluded that typhus and nervous fevers were due to a "conversion of the perspirable fluids of the body into septic matter"—all of which means that they knew nothing about it. Even now we do not know the cause of yellow fever or the precise mode of its spread; but we are sufficiently certain that it is due to a specific micro-organism to be confident that its spread can be checked by isolation and disinfection properly applied—and Memphis and New Orleans are witnesses to the truth of this.

In the year 1800 the majority of persons over 20 years old were more or less pitted by smallpox, being the survivors of a much greater number who had suffered from this disease. Dr. Miller in New York had just received from England a thread which had been steeped in the newly discovered vaccine matter, and was about to begin vaccination in that city. Today there are many physicians who have never seen a case of smallpox, and a face pitted with the marks of this disease is rarely seen. During the century there have appeared in civilized countries two strange and unfamiliar forms of epidemic disease, namely Asiatic cholera and the plague, the first coming from the valley of the Ganges, the second from the valley of the Euphrates, and each having a long history. A really new disease was the outbreak in Paris in 1892 of a specific contagious disease transmitted from sick parrots, and known as psittacosis. This little epidemic affected 49 persons, and caused 16 deaths. Typhus fever has almost disappeared, while some diseases have increased in relative frequency, in part at least because of medical progress. The children who would have died of smallpox in the 18th century now live to be affected with diphtheria or scarlet fever, and the increase in the number of deaths reported as due to cancer is partly due to the fact that a greater proportion of people live to the age most subject to this disease.

Medicine

A large part of modern progress in medicine is due to improved methods of diagnosis, and to the use of instruments of precision for recording the results of examinations. The use of the clinical thermometer has effected a revolution in medical practice. Our knowledge of diseases of the heart and lungs has been greatly expanded during the century by auscultation and percussion, and especially by the use of the stethoscope. The test tube and the microscope warn us of kidney troubles which formerly would not have been suspected, and the mysterious Roentgen rays are called in to aid the surgeon in locating foreign bodies and in determining the precise nature of certain injuries of the bones. Bacteriological examination has become a necessary part of the examination in cases of suspected diphtheria, tuberculosis, or typhoid, and a minute drop of blood under the microscope may furnish data which will enable the skilled physician to predict the result in certain cases of anæmi or to make a positive diagnosis as between malaria and other obscure forms of periodic fever.

The means at the command of the physician for the relief of pain now include not only the general anæsthetics — chloroform, ether, and nitrous oxide — but also the hypodermic use of the concentrated alkaloids of opium, belladonna, and other narcotics, and the local use of cocaine; and restful sleep for the weary brain may be obtained by sulphonal, chloral, etc. Some agonizing forms of neuralgic pain are now promptly relieved by the section or excision of a portion of the affected nerve; or it may be forcibly stretched into a condition of innocuous desuetude. Relief to the sufferings of thousands of neurotic women and of their families and friends has been produced by the systematic scientific application of the rest cure of Dr. Weir Mitchell.

A hundred years ago the medical advertisement which was most prominent in New York and Philadelphia newspapers was one of a remedy for worms. Many symptoms of nervous and digestive troubles in children were in those days wrongly attributed to worms. Nevertheless there is good reason to believe that parasitic diseases derived from animals were in those days much more prevalent in this country than they are today. Our knowledge of the mode of origin and development of the tapeworm, the *Trichina spiralis*, the liver fluke, and the itch insect has been gained during the 19th century. Much the same may be said with regard to the peculiar worm known as *anchylostum*, the cause of Egyptian chlorosis and of the St. Gothard tunnel disease, though prescriptions for this parasite are found in the Papyros Ebers, written before the time of Pharaoh.

The limits of this article permit of but a brief reference to the progress in preventive medicine during the century. The studies made in England of the results of the cholera epidemic of 1849 and the experience gained in the English army during the Crimean War led to some of the most important advances in sanitary science, more especially to the demonstration of the importance of pure water supplies and of proper drainage and sewerage. During the American Revolutionary War and the Napoleonic wars the losses to the armies from disease greatly exceeded those from wounds; and hospital fever — in other words, typhus — was dreaded by a general almost more than the opposing forces. During the wars of the last 25 years typhus and hospital gangrene have been unknown, but some extensive outbreaks of typhoid fever have occurred, showing that our knowledge of the causes and mode of transmission of this disease has not been practically applied to the extent to which it should have been; this remark applies also to some of the most fatal diseases in civil life. In the United States diphtheria and typhoid fever each causes from 20,000 to 30,000 deaths a year, while more than 100,000 deaths are annually due to consumption. Yet for each of these diseases we know the specific germ, the channels through which it is usually conveyed, and the means by which this conveyance can be to a great extent prevented. The ravages of these diseases are therefore largely due to the fact that the great mass of the people are still ignorant on these subjects. Antitoxin is not yet used for either prevention or treatment in diphtheria to anything like the extent which our knowledge of its powers demands.

Our better knowledge of the causes of certain infectious and contagious diseases and the mode of their spread has been of great importance to the world from a purely commercial point of view, since it has led to the doing away with many unnecessary obstructions to traffic and travel which were connected with the old systems of quarantine, while the security which has been gained from the modern method of cleansing and disinfection is decidedly greater than that secured by the old methods.

A striking illustration of the effect of these improvements is seen in the manner in which the news of the recent outbreak of plague in Glasgow was received in England and throughout Europe. One hundred years ago the city would have been almost deserted and terror would have reigned in all England. Today it is well understood that the disease spreads by a bacillus which is not conveyed through the air. No one fears a repetition of the ghastly scenes of the black death in the 14th century. In like manner and for the same reasons Asiatic cholera has lost most of its terrors.

The benefits to the public of modern progress in medicine have been greatly enlarged by the establishment of many small hospitals and by the steady increase in the employment of specially trained nurses in private practice, even in rural districts. The result of a case of typhoid or of pneumonia often depends as much on the nurse as on the doctor; and affection cannot take the place of skill in either. For the great mass of the people, cases of severe illness or injury, or those requiring major surgical operations, can be treated more successfully in well appointed hospitals than in private houses, and as this is becoming generally understood the old feeling against entering a hospital for treatment is rapidly disappearing. Improvement in hospital construction and management has kept pace with progress in medical knowledge; and in future such institutions seem destined to play an increasingly important part in municipal and village life.

All progress in civilization is attended with injury to some individuals. Trained nurses have deprived some unskilled labor of employment; hospitals have injured the business of some physicians; pure water supplies, good sewers, food inspection, vaccination — in short, all effective easures in public hygiene — interfere with the trade side of medical practice; but on the whole the public at large benefits by all these things. In one sense they seem opposed to the general law of evolution in that they prolong the life of the unfit; but in a broader sense they work in accordance with this law by increasing the power of the strong to protect and care for the weak.

All told, the most important feature in the progress of medicine during the century has been the discovery of new methods of scientific investigation, more especially in the fields of bacteriology and pathology. These methods have been as yet only partially applied, and great results are to be hoped from their extension in the near future. They will not lead to the discovery of an elixir of life, and the increasing feebleness of old age will continue to be the certain result of living a long time, for the tissues and organs of each man have a definitely limited term of duration peculiar to himself; but many of the disorders which make life a burden in advancing years can now be palliated or so dealt with as to secure comparative comfort to the patient, so that "if by reason of strength" life can be prolonged beyond threescore years and ten it no longer necessarily involves labor and sorrow.

J. S. Billings.

Medill, Joseph, an American journalist; born in St. John, N. B., April 6, 1823; was admitted to the bar in 1846; went to Chicago in 1855 and purchased an interest in the Chicago "Tribune," of which he was editor-in-chief in 1863–1869, when, owing to other public duties, he resigned the position. In 1874 he again became editor-in-chief and secured control of the majority of the stock of the Tribune company, and continued in this relation till his death. He was elected mayor of Chicago in 1871, eight months after the devastating fire of that year, and was an important factor in the rebuilding and improvement of the city. He died in San Antonio, Tex., March 16, 1899.

Medina (me-dē′nä), or **Medinet=el=Nabi** (me-dē′net-el-nä′bē), "the town of the prophet," one of the sacred cities of Arabia. It is, next to Mecca, the great center of attraction to Mohammedan pilgrims, from its connection with the founder of the Mohammedan faith. This celebrated city stands in a plain, close to a chain of hills which bounds the great desert W. It is of an irregular oval form, within a walled enclosure of 35 or 40 feet high, flanked by 30 towers, which render Medina the chief stronghold of Hedjaz. Its most prominent building is the great mosque, Al-Harem, supposed to be erected on the spot where Mohammed died.

Medina Sidonia (mā-*th*ē-nä sē-dō′nē-ä), a city of Spain, 25 miles S. S. E. of Cadiz; on an isolated hill overlooking a wide plain; has the ruins of a castle, the ancestral seat of the dukes of Medina Sidonia, descendants of Guzman the Good, conqueror of Tarifa (1292), a member of which house commanded the "invincible Armada." Pop. about 12,000.

Mediterranean Sea, a large and important inland sea, bounded on the N. by Europe, on the E. by Asia, on the S. by Africa, and communicating at its W. extremity by the Straits of Gibraltar with the N. Atlantic Ocean, and at its N. E. extremity, by the Dardanelles and Bosporus, with the Black or Euxine Sea; extending from lat 30° to nearly 46° N., and from lon. 5° 54′ W. to 36° 8′ E.; greatest length, 2,300 miles; greatest breadth, from Venice to the Bay of Sidra, 1,200 miles; area, est. 690,000 square miles. It is of an oblong, but irregular shape, especially on the N., where the large peninsulas of Italy and Greece project S. It includes several other seas, as the Adriatic, Ionian, Tyrrhenian, and the sea of the Grecian Archipelago, besides several smaller inlets, such as the gulfs of Tarento in Italy, Lepanto in Greece, Cades, and Sidra, the ancient Syrtes in Africa, the bays of Lyon, Genoa, and Naples, etc. The coast of the Mediterranean is as remarkable for the difference of altitude as for variety of outline. In the N., with the exception of Italy, it is bold and rugged. On the E. and S. the country presents a low uninteresting flat, with rocky reefs and shoals projecting 5 to 7 miles from the shore, and which ren-

der the navigation near these shores both difficult and dangerous; and in this respect the S. side presents a striking contrast to the N., where, generally speaking, deep soundings may be had close to the shore; while in parts, particularly between Nice and Genoa and near Gibraltar, no soundings can be found under 1,000 fathoms and upward. The temperature averages from 72° to 76°, or 3½° F. higher than that of the Atlantic Ocean. The principal rivers which flow into the Mediterranean are the Ebro, Rhone, Po, and Nile. The evaporation from the surface of the Mediterranean is greater than in the Atlantic Ocean, owing to the heat which proceeds from the African deserts, and the shelter which the mountains afford from the cold winds of the N. In consequence of this evaporation it contains a sixth per cent. more salt than the waters of the Atlantic Ocean. The Mediterranean was long considered tideless, but this is untrue, as in the Adriatic, as well as between that sea and the coast of Africa, the tide rises from 5 to 7 feet. The prevalent winds vary during the spring between S. E. and S. W.; at other times from N. W. to N. E. The most formidable of these winds is the sirocco, or solano, which is very destructive. The shores are in many places subject to earthquakes. There are also the active volcanoes of Ætna, Vesuvius, and Stromboli, and many evidences of volcanic action, as the sudden upheaving of islands, and their equally sudden disappearance. Water spouts are of frequent occurrence, especially along the coast of Asia Minor. Several springs of fresh water rise in different parts of the Mediterranean; the largest being in the port of Tarento, near the mouth of the Galesus, where the fresh water ascends with such impetuosity and in such a volume that it may be taken up at the surface without the least impregnation of salt. The Mediterranean possesses several large islands, including Sicily, Sardinia, Malta, Corsica, Crete, and the Balearic Islands, besides a large number of small ones. Around it lie some of the most historically interesting countries of the civilized world.

Medjidie (me-jē′dē), a Turkish order of knighthood, instituted in 1852. It has been conferred on numerous English and French officers, soldiers, and seamen, who have taken part in wars on behalf of Turkey. Also a Turkish coin, value about $4.50.

Medlar, a much-branched spinous tree. The leaves are obovate or oblong-lanceolate, entire or serrulate, pubescent beneath; the flowers white, with a wooly calyx; the fruit half an inch or an inch in diameter; depressed at the top. It is eaten raw, but not till it is rotten. The large-flowered medlar is *Pyrus (mespilus) grandiflorus;* the medlar of Japan, *Eriobotrya japonica;* the medlar of Surinam is one of the Sapotaceæ, and the West Indian medlar *Mimusops elengi.*

Médoc (mā-dok′), a district in the French department of Gironde, famed for the quantity and excellence of the wine it yields, some of the most famous growths of Bordeaux, such as Château-Margaux, Château-Lafite, and Château-Latour. The district lies on the left bank of the estuary of the Gironde, being separated from the Landes by low hills, and is 40 miles long by from 5 to 10 wide.

Medola. See SCHIAVONE, ANDRE.

Medulla, a medical term for marrow. It exists chiefly in the central canal, in the long bones; blood-vessels, and even nerves, have been traced going in for the nutrition of the osseous tissue.

Medulla Oblongata (-gā′tä), the cranial prolongation of the spinal cord, of similar structure, but differing by a peculiar arrangement of the strands of the cord before entering into and forming a connection with the brain. In it are found the great ganglionic centers which control respiration, deglutition, vomiting, etc. Pressure of the medulla oblongata and not strangulation is the actual cause of death in judicial hanging. It is formed of two lateral columns, each divided into three smaller ones, and passes through the pons **varolii**, terminating in the crura cerebelli.

Medusa (-dū′sä), in classical mythology, one of the Gorgons who, giving offense to Minerva, had the fine hair, on which she prided herself, turned to serpents; her eyes were also endowed with the power of converting every one who looked at her into stone. There are some unimportant variations in the myth.

Medusæ (the plural): Jelly-fishes, or of the family *Medusidæ.* It consists of an umbrella-like disk surrounded by numerous short filiform tentacles. From the lower part of the umbrella hang four long arms with membranous fringed margins. The most common species is *Medusa aurita,* which is often seen on sandy sea shores like a mass of jelly. The genus is so named because the organs of motion on the animal spread out so as to resemble the snaky hair of the fabulous Medusa.

Medusæ (the plural): Jelly-fishes, or sea-nettles, a sub-class or order of Hydrozoa. It is called also *Discophora.* Greene defines them as "Hydrozoa whose hydrosoma is free and oceanic, consisting of a single nectocalyx, from the roof of which a single polypite is suspended. The nectocalyx is furnished with a system of canals. The reproductive organs are as processes, either of the side of the polypite or of the nectocalycine canals." The edge of the umbrella is fringed with thread-like tentacles. Lines, often eight in number, pass from the top of the disk to the circumference, uniting in

a canal passing all around the edge. The mouth, which is on the lower side, opens into a stomach, which is surrounded by four colored circular spots. The jelly-fishes, or sea-nettles, move through the water by contracting and expanding their umbrella-shaped disks. The sub-class or order *Medusæ* (or *Discophora*) does not contain all Cuvier's *Acalephæ*, and it is in further process of reductions as various members of it are successively proved not to be mature species, but only the free generative buds or gonophores of other Hydrozoa. Nicholson makes the *Medusæ* contain only one family, *Meduisdæ*. Prof. Martin Duncan has two sub-orders, *Pelagida* and *Rhizostoma*. Soft and fugitive animals, like the *Medusæ*, are not likely to be found fossil; but impressions of a few seem to have been discovered.

Head of Medusa: In astronomy, a portion of the constellation Perseus, who is supposed to carry the head of Medusa in his left hand. It contains the variable or periodic star Algol.

Meeanee, or **Miani** (mē-ä′nē), a village in Sind, India, on the Indus, 6 miles N. of Hyderabad. It was the scene of a battle between Sir Charles Napier with 2,800 men and a Baluch army, 22,000 strong, on Feb. 17, 1843; the latter were totally routed, losing 5,000 men; the British loss was 256. The result of this victory was the conquest and annexation of Sind.

Meehan, Thomas, an American botanist; born in England, March 21, 1826; immigrated to the United States at an early age; was mainly self-educated; and became botanist to the Pennsylvania State Board of Agriculture at its formation. He was editor of the "Gardener's Monthly" for 30 years, and afterward of "Meehan's Monthly." His publications include "The American Handbook of Ornamental Trees" (1853); "The Flowers and Ferns of the United States"; etc. He died Nov. 19, 1901.

Meek, Alexander Beaufort (mēk), an American jurist; born in Columbia, S. C., July 17, 1814. He served in the Seminole war, 1836; was attorney-general of Alabama, 1836; judge of Tuscaloosa county, 1842–1844; member of the Legislature in 1853, where and when he established the free-school system of Alabama; Speaker of the Alabama House, 1859. Besides a legal digest (1842), he wrote: "The Red Eagle" (1855); "Songs and Poems of the South" (1857); "Romantic Passages in Southwestern History" (1857); "History of Alabama" (unpublished); etc. His best-known poem is "The Charge at Balaklava." He died in Columbus, Miss., Nov. 30, 1865.

Meerschaum, a peculiar silicated magnesian mineral found in several parts of Europe, but mostly in Greece and Turkey. In the last-mentioned country it is extensively used as fullers' earth; but in Austria and Germany it is adapted to the manufacture of tobacco pipes, which are prepared for sale by being first soaked in tallow, afterward in wax, and then finally polished with shave grass. The true meerschaum always turns from a pure milk-white to a brownish black color when smoked for some time, by reason of the influence on it of the tobacco oil; and to connoisseurs this is a true criterion between true and false meerschaum, the latter of which is also extensively manufactured.

Meerut (mē′-), or more correctly **Merath** (mē′räth), a town, district, and division in the Northwestern Provinces of British India. The town lies 40 miles N. E. of Delhi, about half-way between the Ganges and the Jumna. Here in 1857 the great mutiny broke out.

Megaceros (Greek, *mega*, great; *keras*, horn), the name given to an extinct genus of *Cervidæ* or deer, popularly known as the "Irish elk" (*Cervus megaceros* or *Megaceros Hibernicus*), the remains of which are most plentifully, though not exclusively, found in the post-Pliocene deposits of Ireland. Its remains also occur in England in deposits of a similar age. The Irish elk was a true deer and appears to have been intermediate in structure between the existing fallow deer and reindeer. It was remarkable for the large size of the antlers, and from the fact of these structures exhibiting certain peculiarities of conformation not seen in any living species of deer. In some specimens of the Irish elk the antlers measure 10 feet from tip to tip, being correspondingly massive.

Megachile, in entomology, leaf-cutters; a genus of *Hymenoptera*, tribe *Aculeata*, family *Apiariæ*. *M. centuncularis*, the commonest known species, is very widely distributed, being spread over nearly the whole of the Northern Hemisphere. Their popular name has reference to their habit of cutting portions of the leaves of trees and plants, with which they line their nests. These are formed either in the ground or in decaying trees; and the portions of the leaves are arranged to separate the different cells, which roughly resemble so many thimbles placed one within the other.

Megalichthys (-ik′this), a genus of ganoid fishes, family *Saurodipterini* (Huxley), *Saurodipteridæ* (Günther), and *Saurichtyidæ* (Owen). They have heterocercal tails, rhomboidal scales, with large dispersed laniary teeth, sometimes of a size rivaling those of great saurians, for which they have been mistaken. Found in the Coal Measures at Carluke, near Glasgow, and elsewhere.

Megalonyx (-lon'iks), a genus of large, sloth-like edentates from the post-Pliocene of North America. It has the same dental formula as Megatherium and Mylodon. The fore limbs are shorter than the hind limbs, and the calcaneum is excessively long. The animal was named in 1797 by Jefferson, President of the United States, who thought the remains were those of a gigantic carnivore at least five feet in height. Cuvier was the first to recognize Megalonyx as an edentate

Megalosaurus (-sâ'rus), a gigantic Oölitic reptile of the Deinosauria (Orthoscelida, Huxley), occurring also in the Weald Clay. Its length has been variously estimated from 40 to 50 feet. Owen says that some of the remains "indicate a reptile of at least 30 feet in length." As the cylindrical bones contain medullary cavities, it is clear that Megalosaurus was terrestrial. That it was carnivorous is evidenced by the teeth. In their structure we find a combination of mechanical contrivances analogous to those which are adopted in the construction of the knife, the saber, and the saw. The oldest known beds from which any remains of Megalosaurus have been obtained are at the Lower Oölites at Selsby Hill and Chipping Norton, Gloucestershire, England.

Megalotis (-ō'tis), a genus of *Canidæ*, differing from other members of the family in its dental formula, which approximates to that of the Civets. It contains but a single species, *M. lalandii*, the long-eared fox.

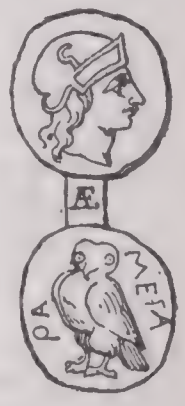
Megaphone, an instrument invented by Thomas A. Edison for carrying the sound of the voice long distances without the aid of wires. It is composed of two large funnels in which the waves of sound are collected and concentrated and carried by means of tubes held to the ears of the person using the instrument. In the instrument called telephone-megaphone, the mouthpiece of the telephone is connected with four transmitters which multiply the usual telephone sound of the voice by four, and it is sent by wire, so increased, into the megaphone, which sends it forth into space with sufficient intensity to carry it with perfect distinctness throughout a large church or hall.

Megapodius (-pō'di-us), mound-bird; the typical genus of the family *Megapodidæ;* often referred to the *Cracidæ*. Authorities vary greatly as to the number of species. They are found in the Samoa Islands, the Tonga group, the New Hebrides, the N. portion of Australia, in New Guinea and the neighboring islands, in the Celebes, the Pelew islands, the Ladrones, the Philippines, Labuan, and the Nicobars. They are about the size of small fowls, the head generally crested, the tail very short, feet enormously developed, and, with the exception of *Megapodius wallacii*, from the Moluccas, have somber plumage. The popular name has reference to the peculiar habits of these birds. They heap up large mounds, of which vegetable matter is the principal component; in the center of this mass they deposit their eggs, and, covering them up, leave them to be hatched by the heat of the fermenting vegetable matter.

Megaptera (-gap'tur-ä), the humpbacked whale. *M. longimana* is the long-finned whale, found in the Atlantic area, as far as Davis' Straits; *M. lalandii* is the Cape humpback, from the South Atlantic; *M. novæ zelandiæ* is from the South Pacific; and *M. kuzira*, the Japanese humpback, ranges to the Aleutian and Californian coasts. They yield little oil or baleen. An adult averages 50 feet in length. The skin of the coat and belly is corrugated; the flippers are as much as or even more than one-third of the length of the animal. The body is bulky, the head broad and flat. The characteristic hump is a low dorsal fin situated behind the middle of the body. Black, occasionally paler below; flippers sometimes white.

Megara (meg'a-rä), the daughter of Creon, killed by her husband Hercules.

Megaris (meg'a-ris), in ancient geography, a small mountainous region of Hellas, or Greece proper, lying between Attica and the Isthmus of Corinth.



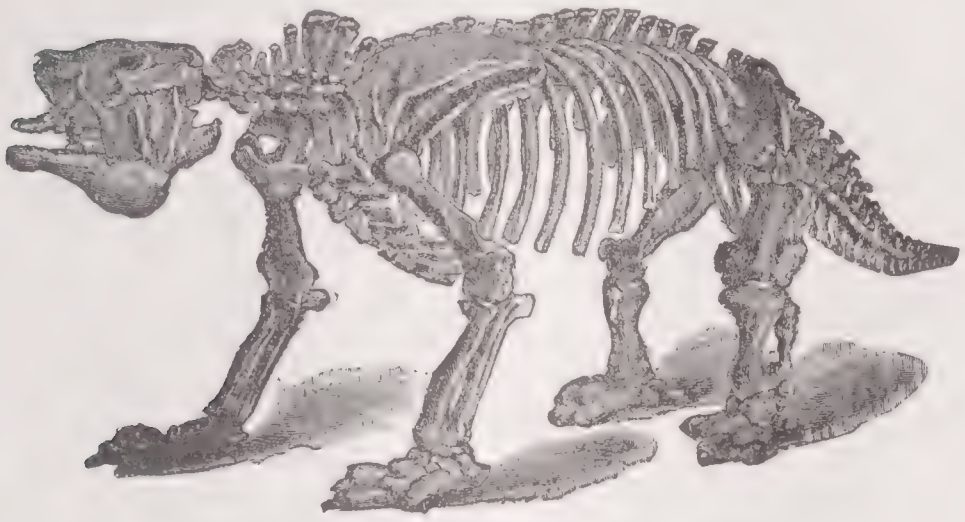
COIN OF MEGARA.

The people were excellent sailors, and founded several colonies, of which the most famous were Byzantium (667 B. C.), Chalcedon, and Megara (Hyblæa) in Sicily. They were generally regarded as guilty of deception and dissimulation, hence the phrase "Megarian tears." The capital was Megara, long an important commercial city, and famous for its white shell marble, and for a white kind of clay, of which pottery was made. From Euclid the philosopher, who, as well as Theognis the poet, was born at Megara, the Megaric school took its name.

Megasthenes (me-gas'thē-nēz), a Greek ambassador stationed by Seleucus Nicator (306–298 B. C.) at the court of Sandrocottus or Chandra Gupta, in the valley of the Ganges. Here he gathered materials for his work on India, from which Arrian, Strabo, and others borrowed. The fragments that remain have been edited by Schwanebeck (1846) and Müller (1848).

Megatherium (-thēr'i-um), a genus of extinct edentates, family *Megatheriidæ*, founded on a nearly complete skeleton discovered on the banks of the Lujan, about 9

miles from Buenos Ayres, and sent by the Marquis of Loretto, the viceroy, to the Royal Museum of Madrid. There are two skeletons in England; one found near Rio Salado in 1832, now in the Museum of the College of Surgeons; the other, found at Luxan, in 1837, now in the British Museum of Natural History, South Kensington. The best-known species, *M. americanum*, was nearly as large as an elephant, though the limbs were shorter. Its mounted skeleton measures 18 feet in length, of which the



MEGATHERIUM.

tail occupies five. Dr. Leidy has described a smaller species, *M. mirabile*, from the post-Tertiary of Georgia and South Carolina; and there is a third, *M. laurillardi* (Lund), founded on remains from Brazil.

Meghná (megh'-), a river or estuary of Bengal, which carries the waters of the Ganges and the Brahmaputra to the sea; its most noteworthy characteristic is the "bore" or tidal wave which advances swiftly at the height of 20 feet.

Megrims, or **Vertigo,** the term usually applied when a horse at work reels, and then either stands for a minute dull and stupid, or falls to the ground, lying for a time partially insensible. These attacks come on suddenly, are often periodical, and are most frequent during hot weather and when the animal is drawing up a hill, or exposed during heavy work to the full rays of a hot sun. Liability to megrims constitutes unsoundness, and usually depends on the circulation through the brain being temporarily disturbed by the presence of tumors, or by weakness of the heart's action. Horses subject to megrims are always dangerous; if driven at all, they should be used with a breast-plate or pipe collar, so as to prevent, as much as possible, pressure on the veins carrying the blood from the head; they should be moderately and carefully fed, and during hot weather have an occasional laxative.

Mehemet Ali (mā'he-met ä'lē), Viceroy of Egypt; born in Kavala, Macedonia, in 1769. He entered the Turkish army and served in Egypt against the French; rose rapidly in military and political importance; became Pasha of Cairo, Alexandria, and subsequently of all Egypt. In 1811 he massacred the Mamelukes to the number of 470 in Cairo, and about 1,200 over the country. He then commenced, by the orders of the Porte, a war of six years' duration against the Wahabees of Arabia, which was brought to a successful conclusion by his son Ibrahim, and secured him the possession of Hejaz. Ibrahim also aided in bringing a large part of the Sudan under Egyptian rule. By means of a vigorous domestic policy Mehemet reduced the finances to order; organized an army and a navy; stimulated agriculture, and encouraged manufactures. In 1824–1827 he assisted the Sultan in endeavoring to reduce the Morea, which led to the destruction of his fleet by the allied European powers at Navarino (1827). Subsequently he turned his arms against the Sultan, and in his efforts to secure dominion over Syria by armed invasion, he was so far successful (see IBRAHIM PASHA) that the European powers had to interfere and compel him to sign a treaty in 1839, which gave him the hereditary pashalic of Egypt in lieu of Syria, Candia, and Hejaz. In his latter days he sank into dotage. He died in Cairo, Egypt, Aug. 2, 1849.

Méhul, Etienne Nicolas (mā-ül'), a French opera composer; born in Givet, Ardennes, France, June 22, 1763. He studied in Paris, and in 1795 became professor at the Conservatoire. Among his best-known works are the operas "Folly" (1801), "The Blind Men of Toledo" (1806), and "Joseph" (1807); and the patriotic songs "Parting Song," "Song of Victory," and "Song of Roland." He died in Paris, France, Oct. 18, 1817.

Meigs, Montgomery Cunningham, an American military officer; born in Augusta, Ga., May 3, 1816; was graduated at the United States Military Academy in 1836; served several years as engineer and in 1852 was appointed to superintend the extension of the Capitol at Washington. He also prepared the plans of several government buildings. In May, 1861, he was promoted quartermaster-general U. S. A., in 1864 was brevetted Major-General and was retired in 1882. He died in Washington, D. C., Jan. 2, 1892.

Meilhac, Henri (mā-yäk'), a French playwright; born in Paris, France, Feb. 23, 1832. He was trained as an artist and

published his first dramatic work in 1855. He subsequently produced a long series of light comedies — some in conjunction with Halévy. Some are well known through Offenbach's music. His best work is "Frou-Frou" (1869). He died in Paris, July 6, 1897.

Meinhold, Johann Wilhelm (mīn'-hōlt), a German clergyman; born in Netzelkow, Usedom Island, Feb. 27, 1797. He was settled at Usedom and Coserow. His books are "Maria Schweidler" (1843) and "Sidonia von Bork," both purporting to be mediæval manuscripts discovered by Meinhold; his object being to show the Biblical critics, through the deception, that internal evidence as to the antiquity of works is not reliable. Both the works were successful and popular. He died in Charlottenburg, Nov. 30, 1851.

Meiningen (mīn'ing-en), the capital of the German duchy of Saxe-Meiningen, in a narrow valley on the banks of the Werra, 43 miles N. W. of Coburg. The ducal castle (1682), the most prominent building in the town, contains libraries, a picture gallery, collection of coins, etc. There is a fine English garden here. The town has been in great part rebuilt since 1874, when a fire destroyed the old streets. It was an appendage of the see of Würzburg from 1008 to 1542, and in 1583 came into the hands of the Saxon ducal family. Pop. (1905) 15,985.

Meiningen Company, the Meiningen court company of actors, under the management of Duke George of Saxe-Meiningen and the actor Chronegk; they gained the highest reputation in Germany (from about 1874) for the historical accuracy and beauty of their scenery, dress, and mounting, and the excellent discipline, balance, and harmony of their acting. They appeared at Drury Lane, London, in May and June, 1881. The company was dissolved in 1890.

Meissen (mī'sen), a town in the kingdom of Saxony, on the left bank of the Elbe, 14 miles N. W. of Dresden. Its chief building is the cathedral (1266–1479), one of the finest Gothic churches in Germany, surmounted by an exquisite spire (263 feet) of open work, and containing many fine brasses. The castle was built in 1471–1483, and in 1710 was converted into the porcelain factory over which Böttger presided. In 1863 the castle was restored, its walls being adorned with frescoes by modern painters, the porcelain factory having been removed in 1860 to other premises; 800 men are employed. Other manufactures are iron, machinery, jute, and cigars. Here is the celebrated school of St. Afra, where Gellert and Lessing were educated. It was founded by Duke Maurice in 1543, and till 1879 occupied the former Afra monastery (built in 1205). Meissen was founded in 928 by Henry I. of Germany, as a stronghold against the Slavonians, and was long the capital of the margraviate and burgraviate of Meissen, which was subsequently merged in the duchy of Saxony. The town was burned down by the Swedes under Banér in 1637. Pop. (1905) 32,336.

Meissen, Heinrich von. See FRAUENLOB.

Meissner, Alfred (mīs'nur), a German poet and novelist; born in Teplitz, Oct. 15, 1822. He lived at Prague (1850–1869) and Bregenz (1869–1885). His principal works are: The revolutionary "Poems" (1845); the epic "Ziska" (1846); the romances "Sansara" (3d ed. 1861), "Dark Yellow" (1862–1864), "Norbert Norson" (1883). He died in Bregenz, May 29, 1885.

Meissonnier, Jean Louis Ernest (mā-so-nyā'), a French painter; born in Lyons, France, Feb. 21, 1815. Among his most celebrated works are: "The Cuirassiers, or 1805"; "Friedland, or 1807"; and "French Country, 1814." All his works were painted with Flemish care and finish, but were, nevertheless, thoroughly original in their treatment. His pictures, though generally of small size, obtained very large sums, and he stood at the head of a crowd of enthusiastic imitators. He was likewise very successful as a designer of book illustrations. The best of these last are the sketches for "Paul and Virginia," Balzac's novels, etc. He died in Paris, Jan. 31, 1891.

Meistersingers (mīs-), a society of German citizens formed in the 13th century for the cultivation of poetry. It is believed to have arisen at Mayence, whence it spread to Augsburg, Nuremberg, etc. It was incorporated by Charles IV. in 1378. Among the most famous of them were Hans Sachs, Henry of Meissen, FRAUENLOB (*q. v.*), Regenbogen, Hadlaub, and Muscatblut. The meistersingers were the successors of the minnesingers. Their poems were often satiric, "Reynard the Fox" and "Tyl Owlglass" are attributed to them.

Mekhong, or **Mekong** (mā-kong'), the greatest river of the Siam peninsula usually identified with the Lan-tsan, which rises in the neighborhood of Chiamdo in Tibet (its exact sources are not known); it pursues a generally S. direction to the China Sea, which it enters by several mouths in Cochin-China (which country is indeed formed by its deltaic deposits); total length 2,800 miles; but not navigable higher than lat. 14° N., owing to rapids and cliffs which beset its bed in the mountainous regions.

Mekran (mek-rän'), a maritime district of Southern Asia, forming part of Persia and of Baluchistan; it is mostly arid and

barren, but there are fertile tracts along the river valleys yielding excellent dates.

Mela, Pomponius (mē′lä), the first Latin writer who composed a strictly geographical work; born in Tingentera, Spain. He lived in the time of the Emperor Claudius. His work, an unsystematic compendium, is in three books, and is entitled "On the Position of the Globe." The text is greatly corrupted.

Melæna (-lē′nä), the vomiting of black matter, ordinarily succeeded by evacuations of the same character. The black vomit in yellow fever is owing to a morbid secretion from the mucous membrane of the stomach and small intestines, mixed with blood. Also hemorrhage from the intestines.

Melain, a black substance, resembling in character the black pigment of the eye, obtained from the so-called ink of the cuttlefish. It is insoluble in water, alcohol, ether, and the alkaline carbonates, but dissolves in nitric and sulphuric acids.

Melampus (-lam′pus), a legendary prophet of Greece, who first taught the worship of Bacchus there.

Melampyrum, in botany, cow wheat; a genus of *Scrophulariaceæ*, tribe *Euphrasieæ;* calyx tubular, four-toothed; corolla personate, the upper lip laterally compressed and turned back at the margin, the lower trifid; capsule oblong, two-celled, the cells one to two-seeded; distribution, Europe and temperate Asia; known species, six.

Melanchlore, a blackish green mineral, occurring on tryphylite, and supposed to be derived from its alteration. It contains sesquioxide of iron, 38.9; protoxide of iron, 3.87; protoxide of manganese, phosphoric acid, and water, and is found in Rabenstein, Bavaria.

Melanchthon, Philip, Luther's fellow laborer in the work of the Reformation; born in Bretten, in the Rhenish Palatinate, Feb. 16, 1497. His original name was Philipp Schwarzerd (black earth), of which Melanchthon is the Greek equivalent. His father, whose name was George, was armorer to the Pfalzgraf, and died in 1507; his mother, named Barbara, was a kinswoman of Reuchlin. He attended the school of Pforzheim, and as early as 1510 entered the University of Heidelberg, where in 1512 he took the degree of Bachelor of Philosophy, and became the tutor of some young counts; but in the same year he went to Tübingen, devoted himself, in addition to his previous studies, to theology, and having in 1514 attained his degree of Master, delivered lectures on the Aristotelian philosophy and the classics. The solidity of his learning, which was proved at this time by the issue of a Greek grammar, and his eloquence as a lecturer gained him universal esteem and excited the wonder of Erasmus. Through the recommendation of Reuchlin he was called in 1518, as Professor of the Greek Language and Literature, to Wittenberg. He soon decided for the newly promulgated evangelical doctrines, and his classically trained judgment, his dialectical and exegetical acumen, the uncommon clearness with which he treated every subject, and his prudence and moderation in dealing with opponents, contributed as much to the progress and prosperity of the Reformation as the zeal and enterprise of Luther in pushing forward and defending the movement. Already, in 1519, in the literary war which followed the Leipsic disputation, he came forward as a champion of Luther's opinions. Two years later appeared his "Loci Communes Rerum Theologicarum," a work which set the example of a scientific exposition of the Christian faith, and became the model of subsequent works on Protestant dogma. His "Visitations-artikel" ("Instructions to the Visitors") of 1527, drawn up at the request of the Elector John, encroached directly on the constitution of the Saxon Church, and gave the visitors of the Church new directions on the doctrines to be taught to the people, and on the most important points in Church and school organization. While in this paper he softened many points of contention, he showed uncompromising decision in the "Protest of Spires" (1529), which gave its name to the party; and in drawing up the "Augsburg Confession" (1530) he displayed a marvelous strength of religious conviction, combined with a prudence which embraced every requisite consideration.

This masterpiece, together with the apology for the "Augsburg Confession," which he drew up shortly afterward, carried his name throughout Europe, and brought him an invitation from Francis I. to visit France and assist at a conference for accommodating the religious differences of that country. It also brought him an invitation to England. From political considerations he declined both invitations, but other inducements to travel presented themselves, partly for recreation and partly in connection with the religious concerns of his party. On a journey which he undertook to attend a religious conference at Hagenau in 1541 he was taken ill at Weimar. Luther hastened to him, and believed that his life was spared in answer to his prayer alone. The conference at Hagenau did not take place, and he went in 1541 to Worms and shortly afterward to Ratisbon to conduct the affairs of the Protestants in a conference for reconciliation with the Catholics. He had, however, the mortification to find that the peace he ardently desired was not to flow from these conferences, and had, besides, bitter reproaches to undergo from his own party for the conces-

sions made by him in them. A like experience befell him when, called by the Elector Hermann to Cologne, he tried to introduce the Reformation there (1543) in a spirit of toleration for the Catholics, though neither Luther nor any of his friends ever doubted the purity or truth of his zeal for the Reformation. The friendship between him and Luther, though often tried by their difference of temperament, continued unbroken till the death of the latter (1546), on which Melanchthon honored him with a biographical memorial.

A great part of the confidence which had been reposed in Luther was now bestowed on Melanchthon. The spirit of concession which he had repeatedly manifested was, however, far from being acceptable to many theologians. He had already gone to the utmost verge of concession; and it was not without reproach of conscience that, after the unfortunate result of the Schmalkaldic War, he agreed to the "Leipsic Interim" (1548) which restored the greater part of the Catholic ceremonies. In the controversy which arose about these concessions he was looked on almost in the light of a traitor. Other subjects of contention arose in regard to doctrinal points. On the Lord's Supper he approximated to the Calvinistic or Zwinglian view, which had been so vehemently opposed by Luther, and in opposition to the doctrine of the universal corruption of human nature he maintained the coöperation of the free will of man in his conversion and the necessity of good works. The alterations which he had made in the "Augsburg Confession" during Luther's lifetime, and which had long passed unquestioned, were now regarded as conclusive proof of declension from orthodoxy. Melanchthon had always differed somewhat from Luther in the development of his doctrines, but the Lutheran doctrines had since the death of Luther acquired a systematic rigidity which was now held up to him as the standard of evangelical truth. All these things caused many vexations to Melanchthon, whose sensitive frame was already exhausted with numerous labors. He had thus little cause for regret when the war between the Elector Maurice and the emperor prevented his participation in the Council of Trent, to join which he had already, in January, 1552, journeyed as far as Augsburg. His orthodoxy was recognized by the theological convention of Naumburg in 1554, but a final attempt which he made in 1557, at the convention of Worms, to bring about a reconciliation with the Catholics, again proved a failure. This effort to restore the unity of the Church was his last public work. He died in Wittenberg April 19, 1560. By his excellent and often-printed Latin text-books on rhetoric and philosophy, such as "De Dialectica," "De Anima," "Epitome Philosophiæ Moralis," etc., Melanchthon deservedly earned the title of Præceptor Germaniæ. His life was written by his friend Joachim Camerarius. The most complete edition of his works is that of Bretschneider and Bindseil in the "Corpus Reformatorum," in 28 volumes, Brunswick and Halle, 1834–1860.

Melanesia (-ne′shiä), a group of islands stretching from the N. E. of New Guinea to the tropic of Capricorn, and including New Britain Archipelago (with the Admiralty Islands) Solomon Islands, Queen Charlotte or Santa Cruz Islands, New Hebrides, New Caledonia, Loyalty Islands, and the Fiji Islands. The Melanesians (Black Islanders) are, as their name implies, of a very dark color; the hair is woolly and curly but not crinkled. Ethnographically they are allied to the Negritos more nearly than to the Polynesians, but their dialects are more closely related to the speech of the latter race.

Melanite (mel′an-īt), a black variety of garnet; a lime-iron garnet in which the protoxides are almost wholly lime. Dana includes most of the black garnet in his group, andradite, but excludes that from Arendal, Norway, referring it to the magnesia-alumina garnet group, for which he adopts the name of pyrope.

Melanorrhœa (-rē′a), a genus of *Anacardiaceæ*. *M. usitata*, or *usitatissima*, a fine tree, 100 feet high, called in parts of Burma theetsee or kheu, is the varnish tree of Mataban or of Burma. The thick grayish fluid of the tree is an excellent anthelmintic. The wood, which is very hard, is used in the East for handles of tools, anchor stocks, railway sleepers, gun stocks, etc.

Melanthaceæ (-thā′se-ē), an order of endogens, alliance liliales. It consists of bulbous, tuberous, or fibrous rooted plants, stemless or with a stem; calyx and corolla both petaloid, white, green, or purple, in six pieces or cohering into a tube; stamens six; anthers turned outward; ovary three-celled, many-seeded; fruit capsular. The species are widely diffused, but are most common in temperate climes. Known genera 30, species 130. Tribes Veratreæ, Uvulareæ, and Colchiceæ. Sir Joseph Hooker considers *Colchiceæ* a tribe of *Liliaceæ*.

Melaphyre (mel′a-fīr), a petrological species or group of species akin to both basalt and to diabase. Lyell says that it is quite indistinguishable in external appearance from basalt, but is, as a rule, not so heavy, dark, or compact; does not contain so much olivine, but has more silica and alumina, with less oxide of iron, lime, and magnesia. Rutley thinks it has more affinity to basalt than to diabase, and is not sure that it is distinct. Rosenbusch regards it as closely related to or identical

with olivine diabase. Allport thinks it a partially altered dolerite. It is dark in color, and consists of plagioclase, augite, olivine, iron, magnetite, or titaniferous iron, and delessite, or chlorophœite. It is of Palæozoic age.

Melasma (-laz'-), a black spot, occurring on the lower extremities of old people especially. Also, a cutaneous affection, *M. cutis*, analogous to chloasma, differing from it only in the dark color of the morbid pigment. It is also called *Pityriasis Nigra*. An affection of the kind is seen in Paris in old persons, females especially, who sit over a charcoal fire. It is common, also, in Ireland among the poor where turf fires are used, and is called by them the trouts.

Melastoma (-las'-), the typical genus of the tribe Melastomeæ, and the order *Melastomaceæ*. The species are numerous. They are from Asia, and the Asiatic and Pacific islands. The leaves of *M. malabathrica* are given in diarrhœa, dysentery, etc.

Melastomaceæ (-mā'se-ē), an order of epigynous exogens, alliance Myrtales. It consists of trees, shrubs, or herbs, with leaves opposite, undivided, entire, undotted, and with several ribs running from the base to the apex. Flowers terminal, usually thyrsoid; calyx four, five, or six-lobed, forming cavities containing the young anthers, which curve downward; petals four, five, or six; stamens usually twice as many more, rarely equal to them in number; ovary with several cells; ovules definite or indefinite, style on stigma simple; fruit dry or succulent. The metropolis of the order is in tropical America, a number are from the East Indies, others from tropical Africa, Australia, etc. Tribes: Melastomeæ, Astronieæ Kibesseæ, Memecyleæ, and Mouririeæ. The plants of this order have no poisonous properties and some are used in the Malay Archipelago as food, the leaves, which are pleasantly acid being cooked. In other plants the fruits are edible. This is the case with the *Blakea triplinervis*, the *Clidemia hirta*, and the *Memecylon edule*. Some of the *Melastomaceæ* furnish a hard, tough wood and others yield dyes.

Melba, Nellie (Mitchell), an Australian prima donna; born in Melbourne, Australia, May 19, 1865; studied under Madame Marchesi in Paris, and made her début in "Rigoletto" at the Théâter de la Monnaie, Brussels, Oct. 15, 1887; appeared as Lucia, at Covent Garden, London in 1889; the following year as Ophelia at the Paris Grand Opera, and as Juliet in London. Since then she has sung in all the principal cities of Europe and the United States with brilliant success.

Melbourne, the largest city of Australia; capital of Victoria; is situated on the Yarra Yarra river, a stream of no great size, Melbourne proper being several miles from its mouth, while suburban extensions reach the shores of Port Phillip bay, into which the river flows. The city and its suburbs occupy an extensive area, which is mostly hilly or undulating, with the Yarra winding through it, the city proper, on the N. bank of the Yarra, being the central and most important business part of the whole. Here the principal streets are about 1 mile long and 99 feet wide, and run at right angles to one another, being lined with handsome and substantial edifices. Wide and straight streets running at right angles and lined with well built houses also characterize the extensive suburban districts, which include such important places as Collingwood, North Melbourne, Fitzroy, Carlton, Brunswick, South Melbourne, Richmond, Prahran, St. Kilda, Port Melbourne, etc.

The public buildings of Melbourne as a whole are handsome and substantial, and quite on a par with those of cities of like size in Europe or the United States. The government buildings in particular are very noteworthy. The Houses of Parliament have cost about £1,000,000, and form a remarkable pile with a splendid W. façade. Government House is a palatial building conspicuous from every part of the city, with a tower 145 feet high. Other public buildings include the law courts, forming an extensive square, the postoffice, the custom house, the treasury, the land and mining offices, the mint, the free library with some 300,000 volumes; the university, with an admirable museum belonging to it and a splendid hall (the Wilson Hall) in the Gothic style; the Ormond Presbyterian College; the town hall, with a large assembly room containing a splendid organ; the exchange, athenæum, theaters, etc. The ecclesiastical buildings include an Anglican Cathedral (consecrated in 1891), a fine Gothic building 273 feet long; the nearly finished Roman Catholic Cathedral; the Scots church, with a fine steeple; and several other fine churches. Many banks and business premises are attractive, and the Exhibition building deserves notice. At the head of the educational institutions is Melbourne University, with which are affiliated the three denominational colleges, Trinity (Episcopal), Ormond (Presbyterian), and Queen's (Methodist). Charitable and benevolent institutions are numerous. There are several parks and other grounds for public recreation, and among these the Botanic Garden deserves special notice on account of its extent (100 acres), its beauty, and the value of its collection of trees and plants. The beautiful Fitzroy Gardens also deserve special mention. The whole city is well lighted and paved and it is abundantly supplied with water, but the

drainage is as yet defective. Cable tramways run along all the principal streets and connect the city with the suburbs. There is access to Richmond above the center of the city for fairly large vessels by the Yarra. Its navigation has been much improved recently and the Coode canal shortens the passage. The largest vessels are accommodated at Port Melbourne and Williamstown, both on Port Phillip bay (or Hobson's bay, its N. extension); and Port Phillip bay itself affords unlimited anchorage for the largest vessels. The shipping trade is large both in exports and imports, the chief of the former being wool, of the latter manufactured goods. Most imports are subject to a heavy duty. The chief industrial products of Melbourne are leather, furniture, clothing, flour, ales, cigars, ironware, woolens, etc.

By its railway system the city is connected with all the principal towns of the Australian continent. The first settlements on the site of Melbourne were made in 1835, and a year or two after it received its present name, being so called after Lord Melbourne, who was then British prime minister. It was incorporated in 1842, and became a bishop's see in 1849. In 1851 it became capital of Victoria (then established as a separate colony), and received an immense impetus from the discovery of gold fields. A centennial exhibition was held in 1888 in celebration of the founding (in 1788) of the Australian colonies. The first Parliament of the Commonwealth of Australia was opened in the Exhibition building on May 9, 1901, by the Duke of Cornwall and York (now Prince of Wales). Pop. within the limits of the city of Melbourne (1901), 63,380; of the Greater Melbourne (1908), 538,000.

Melchites (mel'kīts), a name given to those Greek Christians in the East who, after the Council of Chalcedon (Fourth General, A. D. 451) remained orthodox, following the example of the Byzantine Court. As they followed Constantinople at this juncture, in remaining in communion with the West, so they cast in their lot with that patriarchate when the Greek schism took place. In 1686 the Patriarch of Antioch returned to the Roman obedience, and since then the patriarchates of Alexandria and Jerusalem have also submitted. This prelate is chosen by the bishops of the patriarchate, but the election must be examined and approved by the Propaganda, and confirmed by the Pope. The bishops may be chosen from the unmarried secular clergy. The latter may continue to live as married men, if married before receiving orders. The Arabic speaking bodies of Melchites found in Northern Syria are believed to be the representatives of those converts who were gathered by Jesuit missionaries in the 17th century. The religious service of these Christians is conducted in the vernacular and the laity are allowed to partake of the Lord's Supper in both kinds. They are also unrestricted in the reading of the Scriptures. The Melchites retain their own rites, and in 1865 their number was estimated at about 35,000.

Melchizedek (-kiz'e-dek) ("King of righteousness"), in the story of Genesis, King of Salem and priest of "Supreme El." He met Abram on his return from the victorious expedition against Chedorlaomer, gave him his blessing, and received tithes from him. The ante-legal king-priest stands in Psalm cx. as a figure typical of the vicegerent of Jehovah, and in Hebrews, vii: 3, of the kingly priesthood of Jesus. The chapter in Genesis containing his story stands alone in character in the Pentateuch, and according to Wellhausen is one of its latest additions. Some count it the earliest portion of ancient secular history, as Ewald, who thinks it may be based on old Canaanitish records; others, as Nöldeke, explain it as utterly unhistorical.

Meleager (mel-ē-ā'jur), in classic fable, a chieftain of the Ætolian Calydon son of Æneas and Altheæ. The tale ran that while he was a child the Mœræ appeared to his mother and said that he should live only while a brand which lay burning on the hearth should be unconsumed; that Althæa immediately extinguished the flame, and put the wood carefully away; but when afterward irritated by the death of her brothers she threw the wood into the fire; that Meleager died as its last spark flickered out; and that his death was followed immediately by that of his mother and his wife. Like Achilles and Paris, like Balder and Sigurd in N. mythology, Meleager dies young; like them, he is invincible in the field; like Theseus, Perseus, and Bellerophon, he is the destroyer of noxious beasts; in the hunt of the wild boar of Calydon, Atalanta exhibits the swiftness and strength of Daph-

MELEAGER.

ne, Arethusa, and Kyrene, while the chase itself is paralleled by the exploits of Heracles and other heroes against the beasts of the field. With him die his mother and his wife, as the death of Heracles and Paris is followed by that of Deianira and Œnônê; and as Achilles falls at the close of day, so Meleager dies when the torch of day is burnt out. Like those heroes again, he can only be slain one way or in one vulnerable spot, and his sisters weep for his death till they are changed into guinea hens, as the sisters of Phaethon shed amber tears over his dead body and are changed into poplars.

Meleagris (-ā′gris), a breed of turkey; a genus of gallinaceous birds of the family *Meleagridæ*, or the sub-family *Meleagrinæ*. They are the largest birds of the order to which they belong. Head naked, with wattles or folds of bright-colored skin, tuft of long hair on the breast, plumage more or less metallic.

Melegnano (mel-en-yä-nō), formerly **Marignano** (mä-rēn-yä′nō), a town of Northern Italy, 12 miles S. E. of Milan. Here Francis I. of France defeated the Swiss in 1515, and the French routed the Austrian rear-guard in 1859.

Melendez Valdes, Juan, Don (mä-len′ deth väl-dās′), a Spanish poet; born in Ribera del Fresno, March 11, 1754; was Professor of the Humanities at Salamanca (1781); afterward entered public life; the lasting unpopularity incurred by siding with the French on their invasion of Spain forced him in 1811 into exile, where he died. He was one of the most prominent figures in Spanish literary life during the 18th century. He died in Montpellier, France, May 24, 1817.

Meles (mē′lēz), the badger; the typical genus of the family *Melidæ*. *M. taxus* (or *vulgaris*) is the largest of the indigenous British mammals. The siffleur of the United States and Canada is *M. labradoricus*, and the Indian badger, *M. collaris*.

Meletian Schism, a heresy arising from the conduct of Meletius, Bishop of Lycopolis, in the Thebaid, and lasting from A. D. 304 till the middle of the 5th century. Its proximate cause is involved in obscurity. By some writers it is said that during the Diocletian persecution Meletius ordained priests beyond the limits of his own diocese. Other writers attribute the rise of the schism to a dispute between Meletius and Peter, Patriarch of Alexandria, on the subject of the Lapsed. According to Athanasius, Meletius sacrificed to idols during the persecution; but Hefele is of opinion that Athanasius must have been misled by a false report, as Epiphanius speaks of Meletius in terms of commendation. The Council of Nice (A. D. 325) dealt with the matter, but the Meletians managed to evade, to a great extent, the conditions imposed on them. Also a schism arising from the deposition of St. Meletius, Bishop of Antioch. It lasted from the sixth decade of the 4th to the beginning of the 5th century.

Meli, Giovanni (mā′lē), a Sicilian poet; born in Palermo, March 4, 1740. He was Professor of Pharmaceutical Chemistry in the University of Palermo (1787). His best work was his songs, some of which recall Anacreon and Theocritus; next, his witty satires and fables. He wrote also two epics, and the heroi-comic poem "Don Chisciotte," an elaboration and continuation of Cervantes's "Don Quixote." He died in Palermo, Dec. 20, 1815.

Melia (mel′yä), the typical genus of the tribe Melieæ, and the order *Meliaceæ*. Calyx, five-cleft; petals, five linear; stamens, 10, the filaments combined into a tube; drupe fleshy, five-celled, each cell with one or two seeds. Species few, chiefly from India. *M. azedarach* is believed to be a native of China and the N. of India, but has been carried into most warm countries. It has bipinnate leaves and bunches of lilac-colored, fragrant flowers, whence it has been called the Persian lilac. In Bermuda, etc., it is termed the Pride of India Tree, in parts of India the hill margoza, in New Zealand the white cedar. Other names are the common bead-tree, the holy tree, and the false sycamore. It is from 30 to 50 feet high. The flowers and leaves are applied as a poultice in India to relieve nervous headaches. The bark and leaves are used internally and externally in leprosy and scrofula. The root, which is bitter and nauseous, is used as an anthelmintic. Of other East Indian species, one, *M. azadirachta*, sometimes called *Azadirachta indica*, is the neem tree.

Melicertes (mel-i-sur′tēz), the son of Athamas and Ino, changed into a sea-god.

Melikoff. See LORIS-MELIKOFF.

Melilotus (-lō′tus), melilot, a genus of papilionaceous plants, sub-tribe Trifolieæ. Leaves trifoliate, the flowers in long racemes; calyx five-toothed, petals distinct, deciduous; keel, obtuse; legume, one or few-seeded, indehiscent, longer than the calyx. It is found in the warmer parts of the Old World. Known species, 10. A decoction of *M. officinalis* is emollient, and sometimes used in lotions and enemas. The flowers of *M. cærulea* are used to give the peculiar odor and flavor to Schabzieger cheese made in Switzerland, and more particularly in Glarus; the plant is said to be a styptic. The seeds of *M. parviflora* are regarded as useful in treating diarrhœa, especially of infants; the plant is esteemed in India as forming good pasture for milch cattle.

Melinda, a seaport of Eastern Africa, on the Zanzibar coast, formerly a place of importance.

Meline, James Florant, an American historical writer; born in Sackett's Harbor, N. Y., 1811. His later years were devoted to literary work. Three of a series of articles on Savonarola have been published. Most noted of his works are: "Two Thousand Miles on Horseback" (1867); "Mary Queen of Scots, and her Latest English Historian," an attack on Froude's view of the subject; and "Life of Sixtus the Fifth" (1871). He died in Brooklyn, N. Y., Aug. 14, 1873.

Melinite, an explosive, discovered in 1886–1887, and said to possess 10 times the force of nitro-glycerine. The two men who discovered the principles of melinite are Captains Locard and Hirondart. The name melinite was bestowed because in color it resembles honey (*miel*). To launch the shells charged with melinite no special design of mortar is required. General Boulanger, then the French Secretary of War, decided on the immediate manufacture of 210,000 melinite projectiles. The destructive power of the explosive is 100 times that of ordinary gunpowder and 10 times that of nitro-glycerine. An ordinary shell, falling on the roof of a building, bursts and shatters everything in its immediate vicinity. The melinite shell is intended to strike the ground at the foundations of the building, where it explodes and blows everything into the air, reducing beams and joists to powder.

Meliphaga (-lif'a-gä), honey-eater; the typical genus of the family *meliphagidæ*. The bill is as long or longer than the head, the wings and tail being rounded. *M. phrygia* is a beautiful black and yellow bird, inhabiting Australia. It seeks its food in the blossoms of the eucalypti. It makes a nest of grass, wool, and hair, and deposits two eggs of a yellowish buff color, with spots and blotches of chestnut-red and dull-purplish-gray.

Melissa (-lis'ä), the daughter of Melissus, King of Crete, turned by Jupiter into a bee.

Melissa, balm, so named because the plants are favorites with bees; the typical genus of the tribe Melisseæ. The calyx obviously two-lipped, the upper lip longer than the stamens; the upper lip of the corolla concave, tube curved upward; stamens didynamous and diverging. Distribution Europe and Asia; known species four, scarcely distinct from Calamintha.

Melita. See Malta.

Mellite. See Honey Stone.

Mellifont Abbey, a ruin 4 miles N. W. of Drogheda, was the first Cistercian foundation in Ireland, founded by St. Malachy in 1142. In 1539, when it surrendered to Henry VIII.'s commissioners, it had 140 monks. Its remains were excavated during 1884–1885.

Mellin, Gustaf Henrik (mel-lēn'), a Swedish novelist; born in Revolax, Finland, April 23, 1803. He was a pastor at Norra Wram (1851). Most of his novels deal with Swedish history. Among them are: "The Flower of Kinnekulle" (3d ed. 1831); "Sivard Kruse's Wedding" (2d ed. 1832); "Anna Reibnitz" (2d ed. 1833). He produced also historical, biographical, and poetical writings. He died in Norra Wram, Aug. 2, 1876.

Melloca (-lō'kä), or **Melluco** (-lū'kō), a genus of *Basellaceæ*. *M. tuberosa,* which is called also *Ullucus tuberosa,* is cultivated under the name of Oca quina for its tuberous roots in the Andes of Peru and Bolivia. They were tried in Ireland during the potato famine of 1846, but proved a complete failure.

Melo, or **Mello, Francisco Manuel de** (mā'lö or mel'lō), a Portuguese historian; born in Lisbon, Nov. 23, 1611. He served with distinction in the Spanish army in Flanders; was imprisoned for nine years, and banished to Brazil on a false charge of murder. He wrote sometimes in Spanish, sometimes in Portuguese. Among his voluminous works are: "History of the Disturbances, Separation, and War of Catalonia in the Time of Philip IV." (1645; best ed. Paris, 2 vols. 1826–1832); "The Three Muses of Melodino" (1649), containing his poems, mostly satirical and comic. He died in Lisbon, Oct. 13, 1665.

Melocactus, the typical genus of the family *Melocactidæ*. It consists of a globose or conical stem, having rows of spores at intervals and flowers at the top on a hemispherical or cylindrical head. Distribution, West Indies and other parts of tropical America. *M. communis* is the Turk's, Englishman's, or Pope's Head Cactus. The head bearing the flower is red, and like a Turkish fez in form.

Melodeon, a wind instrument with a row of reeds and operated by keys. In 1846 a method of drawing air through the reeds by suction bellows was patented. Pressure on the key drives down the pin and the valve, allowing passage to the air. The principle is the same as that of the accordeon.

Melodrama, originally a dramatic piece in which the interest was heightened by the character of the vocal or instrumental music accompanying certain situations. The melodrama is of French invention; the subjects are generally of a romantic character, illustrated with picturesque costumes and scenery, and having serious and sensational incidents. Though sometimes confounded with the opera, it differs from that higher

class of work insomuch that the action is carried on in speaking and not in recitative and aria. Now: A play of strong situations, resembling both the domestic and the sensational drama, and characterized more by bold coloring than artistic finish. The more thrilling passages are accentuated by musical accompaniments known as the "hurries," the only relic of the original musical character of the melodrama. This form of drama is abandoned to second-rate theaters, and the word is often used to signify a strained and unnatural play.

Melody, an agreeable succession of simple sounds, produced by a single voice or instrument, and so regulated as to give a pleasing effect or to be expressive of some kind of sentiment. It is often founded on relative harmonies, and yet is completely distinguished from harmony by not needing the addition of parts to make it perfect.

Meloe (mel′ō-ē), oil beetle; the typical genus of the family *Meloïdæ*. One or two species are common on hedgebanks in spring. Wing cases short, color blue-black, abdomen full, and general appearance greasy. The eggs are laid in holes in the ground, and the larvæ when hatched attach themselves to bees of various species, whence their popular name bee lice. The active six-footed larva changes into a fleshy cylindrical grub, with less aborted legs and stronger jaws than the corresponding stage of Sitaris.

Melon, in botany, *Cucumis melo*. Linnæus, who discriminated it from others of the genus by the angular points of the leaves being rounded off and its torulose, *i. e.*, knotted, fruit, says that it is a native of the Kalmuck country (in Tartary). De Candolle considered it to come from the valleys S. of the Caspian Sea, and from those of Mount Caucasus. It was early cultivated. It was so in Egypt. It is supposed to have been the *sikuos* of Theophrastus, the *sikuos pepōn* of Hippocrates, the *pepōn* of Dioscorides, the *melopepo* of Galen (the name being given from its resemblance to the apple), and the *melo* of Pliny. Till lately the plant was called musk melon, to distinguish it from *Citrullus vulgaris*, water melon. The variety having the fruit with green flesh is preferred; others have white, red, or salmon-colored pulp.

The Hebrew *abhattichhim*, Num. xi: 5, seems to be correctly translated, as in the authorized version, melon. Dropping the plural termination, *im*, the word is like the Arabic *butikh* = the melon.

Melopiano, an invention by which sustained sounds can be produced on a pianoforte. It consists of a series of small hammers set into very rapid vibration by the winding up of a spring. When a note is struck and held down, the constant repetition of the blows of the hammer causes a continuous vibration of the string which is of a most charming character. An admirable crescendo is obtained by the ingenious plan of raising the hammers gradually farther from the string, the force, of course, being proportioned to the distance they have to fall. The melo-piano was invented by Caldara of Turin in 1870.

Melos (mē′los) (Italian Milo), a Greek island, the most S. W. of the Cyclades; length 13 miles, width 8 miles. The island is volcanic, and produces sulphur, salt, pumice stone, stucco, millstones, and a little oil and wine. Among the ruins of the ancient city of Melos, and near its theater, was found the priceless antique, the Venus de Milo, now one of the chief treasures of the Louvre. Pop. about 5,000.

Melpomene (mel-pom′e-nē), one of the nine muses. She presided over tragedy, and is represented as having the form and face of a woman still young, with a commanding mien, and richly dressed. On her feet is the cothurnus; in one hand she holds a poniard and in the other a tragic mask.

MELPOMENE.

Melrose, a village of Scotland, county of Roxburgh; on the Tweed, 31 miles S. E. of Edinburgh. It is celebrated for possessing the finest monastic ruin in Scotland. Melrose Abbey, originally founded by David I., in 1136, was destroyed by Edward II. of England in 1322. In 1336 it was rebuilt by Robert Bruce, and completed in the reign of James IV., about 1488–1513. It was again destroyed by the English in 1545. It was of Gothic style, and the ruins still attest its grandeur and magnificence.

Melting Point, that point of the thermometer at which a substance becomes fused.

Melting Point of Metals: Aluminum, 1,292°; antimony, 797°; arsenic, 365°; bismuth, 507.2°; cadmium, 608°; cobalt, 2,192°; copper, 1,995.8°; gold, 2,485.8°; indium, 348.8°; iron, wrought, 2,786°; iron, cast, 2,192°; iron, steel, 2,552°; lead, 617°; magnesium, 455°; mercury, —40°; nickel, 2,912°; potassium, 143.6°; platinum, 4,712°; silver, 1,904°; sodium, 172.8°; tin, 455°; zinc, 773.6°.

Melton-Mowbray, a town of Leicestershire, England, in the center of a great hunting district; on the Eye river near its junction with the Wreak, 104 miles N. N. W. of London; it has a fine cruciform church, mainly Early English; and is famous for its manufactures of pork pies and Stilton cheese. Near the town in February, 1644, a severe engagement took place between parties of royalist and parliamentary troops, resulting in the defeat of the latter; and among its natives have been Archbishop de Melton, who lies buried in the church, and "Orator" Henley.

Melusina (mel-ū-sī'nä), a beautiful nymph or fairy, whose history occupies a large space in the popular superstitions of France. She is represented as the daughter of Helmas, King of Albania, and the fairy Persine; and as having married Raymond, Count of Toulouse, who built the magnificent castle of Lusignan (originally called Lusineem, the anagram of Melusine). Like most of the fairies of that period, she was doomed to a periodical metamorphosis, during which the lower part of her body assumed the form of a fish or a serpent. On these occasions she exerted all her ingenuity to escape observation; but having been once accidentally seen by her husband in this condition, she swooned away, and soon afterward disappeared, none knew whither. But her form is said to be seen from time to time on the tower of Lusignan, clad in mourning and uttering deep lamentations; and her appearance was universally believed to indicate an impending calamity to the royal family of France.

Melville, the name of an island, a sound, and a peninsula in the polar regions of North America. The island is crossed by lat. 75° N. and long. 110° W., and is separated on the W. by Fitzwilliam Strait from Prince Patrick Island; greatest length, 200 miles; greatest breadth, 130 miles. In 1819 Parry, who gave the island its name, passed the winter here with his crews. The sound, about 250 miles long by 200 broad, extends S. E. of the island, and communicates with the Arctic Ocean on the W. by Banks Strait, and with Baffin Bay on the E. by Barrow Strait and Lancaster Sound. The peninsula projects from the continent at its N. E. corner, and has on the N. the Fury and Hecla Strait, and on the E. Fox Channel. It is 250 miles in length by about 100 in average breadth. Another Melville Island lies across the entrance to Van Diemen Gulf off the shore of the N. territory of South Australia; area,143 square miles; it is hilly and covered with vegetation. The earliest British settlement on this coast was made here in 1824.

Melville, Andrew, a Scotch reformer; born in Baldovie, Forfarshire, Scotland, Aug. 1, 1485. After completing his education at St. Andrew's University, he was appointed, in 1574, principal of Glasgow College, and took a leading part in the establishment of Presbyterianism in Scotland. In 1582, being then the principal of St. Mary's College, St. Andrew's, Melville was the first to sign the well-known Remonstrance of the Presbyterian clergy against the royal policy in ecclesiastical affairs. He was then summoned before the Privy Council on a charge of treason, and sentenced to imprisonment. He evaded the latter, however, by escaping into England, returning to Scotland, eventually, in 1585. In 1595, Melville was elected Lord Rector of St. Andrew's University. After the accession of James I. to the English throne, Melville having indited a biting epigram on certain ceremonies of divine worship at Whitehall, he was brought before the Privy Council, found guilty of *scandalum magnatum,* and committed to the Tower of London, whence he was released in 1611, on the intercession of the French ambassador. Expatriated to France, Melville was made Professor of Theology at the University of Sedan. He died in Sedan, France, in 1622.

Melville, George Wallace, an American naval officer; born in New York city, Jan. 10, 1841. He entered the United States navy in 1861, rising through the various grades to that of Chief of the Bureau of Steam Engineering. He accompanied the unfortunate "Jeannette" polar expedition in 1878; also that of the Hall relief expedition in the United States steamer "Tigress"; also the Greely relief expedition in 1884. In the "Jeannette" expedition he underwent the severest sufferings and hardships, but reached Irkutsk in safety.

Melville, Herman, an American author; born in New York, Aug. 1, 1819. Going to sea as a cabin boy, he spent a number of years in travel. His most famous books were "Typee" (1846), and "Omoo" (1847), narrating his adventures in the Marquesas Islands; others were "White Jacket" (1850), "Moby Dick" (1851), and a number of other stories, and three volumes of poems. He died in New York, Sept. 28, 1891.

HERMAN MELVILLE.

Membrane, an expansion of any tissue in a thin and wide layer. Bichat divides

them into serous, mucous, and fibrous membranes. Among the most important membranes in the body are those of the brain : viz., the dura mater, the arachnoid, the pia mater and the falx.

Undulating membranes, simple membranous bands, one margin only of which is attached, the other being free and exhibiting an undulatory motion. They are allied to and answer the same purpose as cilia. They are stated to occur on the spermatozoa of salamanders and tritons, and in the water vessels of some Annelids, Infusoria, and Rotatoria.

Memel (mā′mel), a Prussian seaport, defended by a citadel and two forts on the sea side; at the N. extremity of the Kurisches Haff, at its opening into the Baltic, 70 miles N. N. E. of Danzig; has a large harbor, and exports from Lithuania and Russia timber, flax and linseed, coal, manure, grain, and herrings; has also manufactories of brandy, soap and chemicals, sawmills, iron foundries, breweries, and shipbuilding yards. Memel was founded in 1252 by the Livonian order, who gave it to the Teutonic Knights, by whom it was fortified in 1404. It suffered severely in the Lithuanian wars (13th to 15th centuries). Here in 1807 Frederick-William III. of Prussia took refuge, and a treaty with England was signed. Having been almost wholly destroyed by fire in 1854, it was rebuilt in modern style. Pop. (1900) 20,-166.

Memling, Hans, a Flemish painter; born of Dutch parents, in Mainz, in the first half of the 15th century. His painting gained him a wide reputation, extending even to England and Italy. His principal works are sacred subjects, such as "The Last Judgment" (at Danzig), "Seven Sorrows and Seven Joys of the Virgin," "Marriage of St. Catherine," "Adoration," several Madonnas, and the 14 small paintings that adorn the shrine containing St. Ursula's relics at Cologne; and portraits, as of Sir John Donne, of Burgomaster Moreel, and of Moreel's daughter. He died in Bruges, Aug. 11, 1494.

Memnon, in Greek mythology, a son of Eos (the morning) and Tithonis (=Titan, a name for the sun), represented in the legend as a son of Laomedon and brother of Priam. As Tithonis was a prince of Troy, his son, the Ethiopian Memnon, had to take part in the Trojan war, in which he was slain by Achilles. At the intercession of Eos, Zeus raised Memnon from Hades to Olympus. The famous statue called by the Greeks Memnon, in the sepulchral quarter of Thebes called Memnoneia, which possessed the real or imaginary property of emitting a sound like that of a harp at the rising of the sun, is supposed to have been in the building called by Champollion the Rhamesseion, from its reputed founder Rhameses, or Sesostris, of which the stupendous ruins are still seen between Medinet-Habou and Kournah. The vocal Memnon is the most N. of two colossal sitting figures, each of whom is about 60 feet high, including the pedestal on which they rest. On the vocal Memnon there are 72 inscriptions in Greek and Latin by the Emporor Hadrian, the Empress Sabina, several governors of Egypt, and distinguished travelers, testifying that they have visited the Memnon and heard his voice at sunrise. The theory is now advanced that the moisture drawn rapidly from the porous rock by the heat of the rising sun, produces the humming, musical note.

Memory, the mental faculty or power which causes the impressions of bygone events, at ordinary times latent in the mind, to affect it anew or to be reproduced by an effort for the purpose. In the first case it will be found that the principle which has created the old impression spontaneously to affect the consciousness again has been the association of ideas. The ideas connected with the long latent impression had been for some cause prominently before the mind, and they brought up with them the latent one unsummoned. When a conscious effort is made to recall some half-forgotten incident, aid is sought from the same principle of association of ideas. One attempts to remember what happened at the same time and place as the incident which he seeks to recall, and it tends to come back in their company. If, in place of a historical, what is forgotten is a scientific fact or law, association of the time and place at which it first became known to us will, as in the other case, aid in its recall, besides which there is logical and philosophical connection between it and other facts. General laws exist and natural classification and arrangement. Historic incidents also can be linked together naturally by regarding each as the consequence of some known antecedent one, and as the antecedent of some one immediately following. Ordinary minds remember incidents and facts by association of ideas of the first and more artificial kind; philosophers aim at doing so by the second and more natural kind of association. Men vary greatly in the value of their memories. A memory to be good should be susceptible, ready, and retentive. The keener one's susceptibility, the more interested he will be in human affairs, the more attention he will pay to all objects of sensation, and the more easily he will remember them; the more that reflective coexists in his mind with perceptive power, the more permanent will be the impression. The old, losing interest in recent events, as their mind and body decay, complain of difficulty in remembering them

When an event or fact is recalled to the mind by an effort made for the purpose, this is not memory of the normal kind, but recollection. The art which furnishes aid to memory is called MNEMONICS (*q. v.*).

Memory, Diseases of. Memory is impaired by age, wounds, or injuries to the head or nervous system, fevers, intemperance, and various physical conditions. It is affected in most kinds of mental derangement, but is in a most signal manner obliterated or enfeebled in dementia. There are, however, examples of memory surviving all other faculties, and preserving a clear and extensive notion of long and complicated series of events amid general darkness and ruin of mind. Incoherence owes some of its features to defective or irregular memory. Cases of so marvelous an exaltation of this faculty as where a whole parliamentary debate could be recalled, or a whole play of Shakespeare's recited by a man at one time, which would be ordinarily impossible for him, are common in the beginning of attacks of mania, and always should suggest disease. There are, however, special affections of the faculty. It may be suspended while the intelligence remains intact. Periods of personal or general history may elude the grasp, and even that continuity of impressions which goes far to constitute the feeling of personal identity is broken up, and a duality or multiplicity of experiences may appear to be conjoined. The converse of this may happen, and impressions that had completely faded away may, under excitement or cerebral disease, return. There are, besides, states in which this power is partially affected, as in the instances where the numbers five and seven are lost, and where a highly educated man could not retain any conception of the letter F; secondly, where it is perverted, recalling images inappropriately and in an erroneous sequence of order or time, and different from what are desired; and thirdly, where, while the written or printed signs of ideas can be used, the oral or articulate signs are forgotten. Such examples of diseased memory are now classified as amnesia, simple loss of memory; amnesic aphasia, loss of memory of spoken words; and amnesic agraphia, loss of memory of written words. Most of these special deviations from health depend on morbid changes in a very limited portion, "Broca's convolution," of the left side of the brain. The discovery of this fact by Broca was the first as to the localization of function in the brain cortex.

Memphis, a celebrated city of Egypt, on the W. bank of the Nile, 10 miles S. of the modern city of Cairo. Herodotus ascribes the foundation of this place, the Moph of the Old Testament, to Menes, first king of Egypt; the date has been assigned from 3893 B. C. to 2100 B. C. Memphis was taken by the Persians under Cambyses 525 B. C., when many of its temples and palaces were destroyed. Alexander III. (the Great), who wintered here 332 B. C., did it much injury by founding Alexandria. Memphis, made capital 272 B. C., was taken by Antiochus Epiphanes 171 B.C., and was visited and restored by Septimius Severus in 202. In the 7th century it passed under the dominion of the Arabs, and gradually fell into decay, Cairo being built from its ruins. The Arabian traveler, Abd-al-latif, visited it in the 12th century. The ruins were discovered and excavated by Mariette between 1850 and 1854. The most celebrated of its sacred buildings were the temple of Ptah, improved and beautified by several monarchs; the temple of Proteus; the temple of Isis, founded at an early period and completed by Amasis 564 B. C.; and the temple of Apis, called the cathedral of Egypt, founded by Psammetichus. The position of Memphis was such as to command the whole inland trade of Egypt, ascending or descending the Nile; it was the chief seat of learning and religion in Egypt. It ceased to be the metropolis of Egypt on the foundation of Alexandria, 332 B. C. It soon after fell into such obscurity and decay, that, till lately, even its site was disputed.

Memphis, the county-seat of Shelby County, Tennessee, is on the east bank of the Mississippi river, at the head of navigation for large steamers, about 820 miles above New Orleans, and 450 below St. Louis. Besides being upon that great water-way, Memphis is an important station on the lines of some fifteen railroads connecting the North and the South, the Atlantic and the Pacific, a significant witness to its commerce being its great steel bridge across the Mississippi—the only one below St. Louis. This is a cantilever bridge, with a truss span of 621 feet, and two cantilever spans of 790 feet—the longest in the United States. It cost $3,000,000, and was opened in 1892. Several ferries also traverse the river.

The Chickasaw Bluffs, 40 feet above high water, where the city of Memphis now stands, were fortified by the French in 1698, and by the Spaniards in 1794; the first real settlement there having been made by a small colony sent thither by Andrew Jackson, James Winchester and John Overton, in 1819. The town incorporation was in 1826, with 500 inhabitants, and the city charter was granted in 1849. Memphis has always been prosperous, except during the Civil War, when its advantageous locality for communication spurred both Federals and Confederates to gain and hold possession, and during the several yellow-fever epidemics

which attacked the city in 1858, 1867, 1873, 1878 and 1879. The last two were exceedingly disastrous, greatly reducing the population—by flight as well as by death—and prostrating all business. But with characteristic American pluck, the remnant took up seriously the matter of sanitation, and with over 200 miles of new sewers, paving of streets, sinking artesian wells for pure water, rigid building inspection, etc., the natural healthfulness of the place was restored, and its commercial location soon gave it new prosperity. To-day the death-rate among the white population is as low as in any city of the United States, and considering the entire population, white and black, Memphis stands among the six healthiest cities in the country.

Memphis is now a handsome city, with broad, well-paved streets, shaded walks, about 1,000 acres of park area, numerous fine public buildings and private residences, having nearly 900 factories, mills and industrial establishments of a large variety. Perhaps its most notable lines of manufacture are in cotton-seed products and wood-working output from the great forests near at hand. Commercially, it is one of the most extensive cotton markets in the country, while a vast trade pours through its land and water lines of transportation, from and to all parts of the Union. Since the crisis of 1880, Memphis has grown fast, her population at that date being 33,592; in 1890 it was 64,495; in 1900, 102,320, of whom 5,100 were foreigners and 49,900 of negro descent; and in 1910 the census returns gave 131,105.

With its annual expenditure of about a million dollars, the city maintains the public affairs in excellent fashion, and the enterprise of its citizens appears in 65 various private educational institutions (besides its public schools and high schools), 128 churches, several good theaters, 20 banks and 5 trust companies (with capital of $6,500,000 and deposits of $30,000,000), and the industries and commercial activities already mentioned. WALKER KENNEDY.

Menabrea, Luigi Federigo (mā-nä-brā′ä), **Marquis Val-Dora,** an Italian statesman; born in Chambéry, Sept. 4, 1809. He entered the engineer corps of the Sardinian army, and was appointed professor in the military academy at Turin. In 1848 he was sent to the Italian duchies to prepare the way for their annexation. He also served in the ministry of war and of the interior. In the war against Austria, in 1859, he was chief of staff, fortified Bologna, and conducted the siege of Gaeta. In 1861 he was made count and appointed minister of the marine. He constructed the arsenal at Spezia, and introduced many reforms. In 1867 he was called to form a cabinet, in 1876 was appointed ambassador to England, in 1882 to France, and in 1892 retired. He died at Chambéry, May 25, 1896.

Ménage, Gilles (mā-näzh′), a French writer; born in Angers, France, Aug. 15, 1613. He gave up the bar for the Church, but chiefly spent his time in literary pursuits. He founded, in opposition to the Academy, a salon, the Mercuriales, which gained him a European reputation, and the ridicule of Molière. He died in Paris, July 23, 1692.

Menahem (men′-), the 16th King of Israel, previously general of the army of Zachariah. He was at Tirzah when he heard of his master's murder; and immediately marching against Shallum, who had shut himself up in Samaria, he captured and slew him, and then ascended the throne. He reigned in Samaria 10 years, 771-760 B.C., and was a tyrannical and cruel idolater.

Menam (mā-näm′), the chief river of Siam, rising in the Laos country, and flowing generally S. to enter the Gulf of Siam below Bangkok; length, about 900 miles.

Menander (-nan′dur), one of the most celebrated of the Greek comic poets; born in Athens in 342 B.C. He composed 108 comedies, but there are only a few fragments remaining of them. Menander was the disciple of Theophrastus, and, like him, excelled in the delineation of character. He was also the friend of Epicurus, whose philosophy he adopted. The plays of Terence are largely imitated or translated from Menander. He is said to have drowned himself on account of the success of his rival, Philemon, though some accounts attribute his death to accident, in the harbor of the Piræus, 291 B.C.

Mencius (men′shi-us), Latinized from **Mengtse** (meng-tse′), a Chinese philosopher; born in Tsow-hien in 372 B.C. He was a follower of Confucius, whose influence he revived. Twenty-nine years he spent in traveling about China preaching, but with small success; his last 15 years were passed with his disciples in retirement. His sayings are contained in the last of the Chinese "Four Books." They can be seen in English in the second volume of Legge's "Chinese Classics" (London, 1875). He died about 289 B.C.

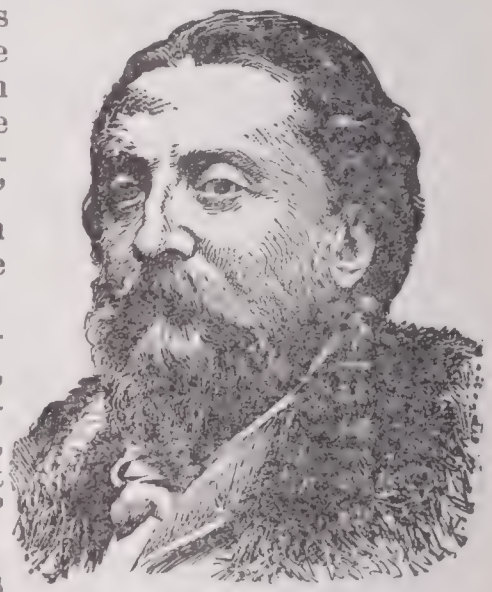
Mendeléeff, Dimitri Ivanovitch (men″-dĕ-lyĕff′), a Russian chemist; born in Tobolsk, Siberia, Feb. 7, 1834. He studied at St. Petersburg, and after having taught at Simferopol, Odessa, and St. Petersburg, became Professor of Chemistry in the University of St. Petersburg in 1866. He enriched every section of chemical science, but is especially distinguished for his contributions to physical chemistry and chemical philosophy. He died Feb. 2, 1907.

Mendelssohn, Moses (men′dels-zōn), a German-Jewish philosopher, commonly called the "Socrates of the Jews"; born in Dessau, Germany, Sept. 6, 1729. He was bred to merchandise, but devoted himself to literature, in which he acquired a distinguished reputation. In 1742 he settled at Berlin, where subsequently he enjoyed the friendship of Lessing. In 1755, he published his first piece, entitled "Pope a Metaphysician"; it was written in conjunction with Lessing. His best known work is the "Phædon," a discourse on the immortality of the soul. He also wrote "Letters on the Perceptions"; "Morning Hours"; "Jerusalem"; etc. At one time he was associated with Lessing, Ramler, Abbot, and Nicolai, in conducting a periodical. He was remarkable for the philosophical mildness of his disposition, and for the excellence of his character; and he was esteemed by persons of the most opposite opinions. He died in Berlin, Prussia, Jan. 4, 1786.

Mendelssohn=Bartholdy, Felix (-bär-tōl′dē), a German composer; born in Hamburg, Feb. 3, 1809. He was the son of a rich banker, and the grandson of the above philosopher. The precocity of his talent surpassed even that of Mozart. Before he was eight years of age, the accuracy of his ear, the strength of his memory, and, above all, his incredible facility in playing music at sight, excited the wonder of his teachers—Zelter and Berger. In his ninth year he performed at a public concert in Berlin, to the admiration of his audience. The following year the boy artist accompanied his parents to Paris; and when he was 12 years old, he composed his pianoforte quartette in C minor, which is still found to be full of interest and originality. His first compositions were published in 1824. These were soon followed by many others, among which was an opera, called "The Marriage of Gamacho"; which, though betraying inexperience, has much character and many beauties. Three years afterward he made a musical tour through Italy, France, and England; and gave, in London, his first symphony, and his overture to the "Midsummer Night's Dream," which produced an electrical effect. In 1833, he was appointed to the directorship of the concerts and theater of Düsseldorf, where, in 1835, he produced his great oratorio of "Paulus"; and 10 years afterward he accepted the same office at Leipsic. As a composer, Mendelssohn traveled over a wide field of art. But his genius, as it reached maturity, became more and more profound and lofty; and his two oratorios, "Paulus," and "Elijah," will form his most enduring monuments. His symphonies are ranked only second to those of Haydn, Mozart, and Beethoven. Mendelssohn was singularly happy in every character and relation of life. Born to affluence and ease, he pursued art with an ardor and activity scarcely ever paralleled; and his artist life was an unbroken career of triumph. He died in Leipsic, Nov. 4, 1847.

MENDELSSOHN-BARTHOLDY.

Mendès, Catuffe (mo*ng*-des′), a French writer; born in Bordeaux, France, May 22, 1843. His verse is marked by extreme devotion to form; his style has been called the cameo-art in literature. The collection entitled "Poesies" appeared in 1878. In prose he wrote: "Love's Follies" (1877), "Parisian Monsters" (1882), "To Read at the Bath" (1884), etc.; the dramas "Captain Fracasse" (1872), "Fiamette" (1889), etc. Chief work: "Grande-Maguet" (1888). He died Feb. 8, 1909.



CATULLE MENDÈS.

Mendes, Leal da Silva, José (men′dās lā-äl′ dä sēl′vä), a Portuguese statesman; born in Lisbon, Portugal, Oct. 18, 1818. He was minister of the navy and of foreign affairs; ambassador to France, 1874–1883; to Spain, 1883–1886. His "Songs" were published in 1858. He wrote also a large number of plays, some of them very popular on the Portuguese stage, as "Uncle Andrew from Brazil" and "The Sportsman"; and several romances. He died in Cintra, Aug. 14, 1886.

Mendez=Pinto, Ferdinand (men′dāth pen′tō), a Portuguese traveler; born near Coimbra, Portugal, about 1509. He departed for the Indies in 1537, and, on the voyage, the ship was taken by the Moors, who carried her to Mocha, where he was sold for a slave; but after some adventures he arrived at Ormuz, and afterward pursued his original object. In 1558 he returned to his native country, and published a very curious relation of his voyages, which was

translated into French and English. Congreve, in his "Love for Love," called him "a liar of the first magnitude," and from that time his narrative was considered as a romance; but his good faith and veracity are now generally admitted. He died near Lisbon, Portugal, in 1583.

Mendicant Orders, monastic organizations, which, by their rule, were forbidden to acquire landed property in any manner whatsoever, but were compelled to subsist on alms, in many instances in their early history, and in some cases even now, in some countries under Roman obedience, actually gathered by begging. They date from the 13th century, and at first consisted of the Carmelites, the Dominicans, and the Franciscans. In the latter half of the century the Augustinians became a mendicant order, and the Servites were recognized by Pope Innocent VIII., in 1487, as a fifth mendicant order. Hallam notes that these new preachers at first were received with approbation by the laity, whose religious zeal depends a great deal on their opinion of the sincerity and disinterestedness of their pastors. It is noticeable that the supineness and corruption which they imputed to the secular clergy came, in time, to be imputed to themselves.

Mendip Hills, a range in Somersetshire, England, extending 23 miles S. E. from Weston-super-Mare to Shepton Mallet, and 3 to 6 miles in breadth. The highest point is Black Down (1,067 feet). The limestone of the Mendips is pierced by numerous caverns, some of which have yielded prehistoric remains; and lead mining, now much decreased in importance, has been carried on from pre-Roman days, calamine mining being a later industry.

Mendive, Rafael Maria de (mān-dē'vā), a Cuban poet; born in Havana, Cuba, Oct. 24, 1821. His first collection of poems (1847), entitled "Passion-Flowers," is widely popular. Banished in 1869, he lived alternately in New York and Nassau, writing legends and stories in verse. He was one of the best Spanish-American poets; many of his verses received English, French, and Italian translations. He died in Matanzas, Cuba, in 1886.

Mendoza (-dō'thä), a W. province of the Argentine Republic; area, 56,502 square miles; pop. (1905) 165,725. The Andes occupy the W. portion, Aconcagua (22,427 feet), the highest peak in America, being on the N. W. frontier; the rest of the province is pampa land, fertile wherever it can be irrigated by the waters of the Mendoza and other streams, but elsewhere almost worthless. Minerals, especially copper, abound; petroleum and coal also have been found; and a large quantity of wine is exported to the other provinces. Capital MENDOZA, 650 miles by rail W. by N. of Buenos Ayres, on the transcontinental railway; it is a handsome town; lying among vineyards and gardens, 2,320 feet above the sea; its streets have shade trees and streams of running water, and the Alameda is the most beautiful on the continent; an active trade is carried on with Chile. An earthquake in 1861 destroyed Mendoza (founded 1559) and 13,000 of its 14,600 inhabitants; many of the ruins are still visible in the larger city, which has been raised on its site. Pop. (1906) 32,000.

Mendoza, Antonio de, a Spanish statesman; born about 1485. He was appointed Viceroy of Mexico (New Spain) in 1535, being the first of 64 viceroys with the best and longest administration. He made many reforms, especially in regard to relieving the oppressed natives, developed agriculture and mining, established the first Mexican mint, founded the first college, and introduced the first printing press. In 1551, he became Viceroy of Peru, where he had prepared a code of laws that has been the basis of the colonial and (to a large extent) of the present laws of the republic. He died in Lima, July 21, 1552.

Mendoza, Antonio Hurtado de (mendō'thä), a Spanish dramatist; born about 1590. He was private secretary of Philip IV., and a member of the Inquisition. Among his best plays are "The Obligations of Lying," and "The Husband Makes the Wife." He wrote also many ballads and lyrics, and a "Life of Our Lady" in about 800 roundelays. He died in 1644.

Mendoza, Diego Hurtado, a Spanish statesman and historian; born in Granada, Spain, about 1503. He was employed by Charles V., in Italy, both as a diplomatist and general, with equal success. He at last fell under the displeasure of Philip II. of Spain, and in 1567 was banished. He spent his last years in literary labors, and wrote his great work, the "War of Granada against the Moriscos," the noble truth and fearless impartiality of which prevented its publication for many years. Mendoza was author of many poems, some of which were published in 1610, the year in which his "History" first appeared. He died in Valladolid, in 1575.

Mendoza, Iñigo Lopez de, Marquis of Santillana, a Spanish poet; born in Carrion de los Condes, Aug. 19, 1398. Made marquis for services in the Moorish wars. He had much to do with the reform of Castilian poetry by subjecting it to the laws of the Italian classic school, and of the later Catalan-Provençal school of the court poets, In the Italian-classic style are his "Proverbs" or "Hundred Adages," a collection of 100 proverbs in 8-verse strophes; and the "Dialogue of Bias against Fortune." His

allegorical poem in dialogue form, the "Comediette of Ponza," after the manner of Dante, had an influence on the development of the Spanish drama. Besides poems, he wrote for the Constable of Portugal, Dom Pedro, a memoir which is of great value for the history of ancient Spanish poetry. He died in Guadalajara, March 25, 1458.

Mene, he is numbered; TEKEL, he is weighed; UPHARSIN, and they are divided, the Chaldee words supernaturally traced on the wall at Belshazzar's impious feast, and significant of his impending doom (Dan. v.). The astrologers could not read them, perhaps because they were written in antique Hebrew characters; still less could they explain, even if they had dared to do so. Daniel, however, received skill to understand, and courage to declare their awful meaning; and the same night witnessed their fulfillment.

Menelaus (men-e-la'us), in Greek legend, one of the Greek heroes, a King of Sparta, brother of Agamemnon, and the unfortunate husband of the lovely but faithless Helen, whose flight with Paris, the youthful envoy from Priam, led to the Trojan war. In the "Iliad" he fights a duel with Paris and does many brave deeds, including the bearing of the body of Patroclus from the battlefield. In the 10th year of the Trojan war, Helen, by perfidiously introducing Menelaus into the chamber of Deiphobus, obtained his forgiveness, and she returned with him to Sparta, after a voyage of eight years. He died some time after his return.

Menelek, or **Menelik, II.,** King or Negus of Abyssinia; son of Hailo Menelek, King of Shoa; born in 1842; succeeded Johannes II. in 1839, and was crowned in 1890. He was of Negro blood with a strain of Jew, Arab and Galla and claimed descent from Solomon and the Queen of Sheba. Menelek united the territories of many lesser chiefs, whom he kept tributary by force and by virtue of the new feudal system, which he substituted for the old feudalism. He was charged with depending, secretly, on the slave trade for the larger part of his revenue. He had considerable intelligence and attempted to keep in touch with European affairs. At the battle of Adowa, in the spring of 1896, his troops inflicted an overwhelming defeat on the Italian army, thus securing independence. He died March 30, 1910. See ABYSSINIA.

Menes (mē'nēz), the conductor, the first king of the first Egyptian dynasty, who built Memphis, made foreign conquests, introduced luxury, and was devoured by a hippopotamus. His name marks a great chronological epoch, being placed by chronologists 3643, 3892 B. C., or even 5702 B. C. Stricter chronologists make his accession 2717 B. C.

Menestho (-nes'-), a nymph who remembered everything.

Menevia. See ST. DAVIDS.

Menevian Beds, or **Menevian Rocks,** certain very ancient rocks found near St. Davids in South Wales, and near Dolgelly and Maentwr in North Wales. They contain more than 50 species of fossils. One of the chief is a large trilobite, nearly two feet long called *Paradoxides Davidis.* The Menevian beds seem coextensive with Étage C of Barrande's Primordial zone and some beds in Sweden.

Mengs, Anton Raphael, one of the most distinguished artists of the 18th century; born in Aussig, Bohemia, March 12, 1728; was the son of an indifferent Danish artist who had settled in Dresden. From the sixth year of his age the young Raphael was compelled to exercise himself in drawing daily and hourly, and a few years later was instructed by his father in oil, miniature, and enamel painting. The father hardly allowed him a moment for play, set him tasks which he was required to accomplish within a given time, and severely punished him if he failed. In 1741 the young artist accompanied his father to Rome and studied the remains of ancient statuary, the works of Michael Angelo in the Sistine Chapel, and finally the inimitable productions of Raphael in the Vatican. He was left to pass the day there with bread and water, and in the evening his studies were examined with the greatest severity. In 1744 his father returned with him to Dresden, and Augustus soon after appointed him court painter. A second visit to Rome was occupied in renewing his former studies, studying anatomy, etc. His first great compositions appeared in 1748, and met with universal admiration. A "Holy Family" was particularly admired, and the young peasant girl who served him as a model became his wife. On his return to Dresden the king appointed him principal court painter. In 1751 he was engaged to paint the altarpiece for the Catholic Chapel, with leave to execute it in Rome. In 1754 he received the direction of the new Academy of Painting in the Capitol. In 1757 the Celestines employed him to paint the ceiling of the Church of St. Eusebius, his first fresco. He soon after painted for Cardinal Albani the "Parnassus" in his villa, and executed various oil paintings. In 1761 Charles III. invited Mengs to Spain, where his principal works at this time were an "Assembly of the Gods" and a "Descent from the Cross." Returning to Rome, he executed a great allegorical fresco painting for the Pope in the Camera de' Papiri, and after three years returned to Madrid (1773). At this time he executed the "Apotheosis of Trajan" in fresco, his finest work. In 1776 he returned once more to Rome where he died in 1779. A splendid monument was erected to his memory by his friend the Cavalier d'Azara at the side

of Raphael, and another by the Empress of Russia in St. Peter's. Mengs' composition and grouping are simple and noble; his drawing correct; his expression, in which Raphael was his model, and his coloring, in every respect are excellent. His works are finished with the greatest care. All that he wanted to be a great artist was originality. His writings in different languages (published in Italian and Spanish by Azara in 1780), particularly his "Remarks on Correggio, Raphael, and Titian," are highly instructive.

Meng-Tse. See Mencius.

Menhaden (-hā-) (Indian name), *Alosa Menhaden*, one of the *Clupeidæ*, abounding in the waters of New England and as far S. as Chesapeake bay. It is also called bony fish, whitefish, hardhead, mossbunker, and pauhagen. In Massachusetts and Rhode Island they are known by their native name; in New York as mossbunkers and skippaugs. The economic value of this fish, surpassed in this country only by that of the ganoids, is derived chiefly from its use as bait, and from the oil extracted from it, the annual yield exceeding that of the whale from American fisheries. The refuse of the oil factories supplies a material valuable for artificial manures.

Menière's (muh-nyārz') **Disease,** an affection described by Dr. Paul Menière in 1861, in which the patient, after recovering consciousness from an apoplectiform attack, or severe vertigo, finds himself totally deaf in one ear, with ringing in the ear, rotary movements toward the affected side, etc.

Meninges (me-nin'jēz), in anatomy, the three membranes that envelop the brain, which are called the dura mater, pia mater, and arachnoid membrane.

Meningitis (-jī'tis), the term applied by Herpin to the inflammation of the membranes enveloping the brain. Acute simple meningitis as a rule involves the membranes extensively, but is more marked over the convexity of the cerebral hemisphere than at the base or any localized spot. The premonitory symptoms are usually well marked, as headache, gradually getting worse, heaviness, giddiness, irritability, and frequently sickness and vomiting. When the disease is established, it presents the following stages: (1) Excitement; (2) Transition; (3) Depression. The extent of the inflammation and its position on the brain determine the symptoms. There are acute and chronic forms of the malady. The former generally terminates in death; while the latter results first in maniacal excitement, and then in idiocy.

Menippus (-nip'pus), an ancient satirist; born in Gadara, Syria; lived probably in the first half of the 3d century B. C. He was born a Phœnician slave, and became a Cynic philosopher. His works in Greek have perished, and he is known only through the imitations of Marcus Terentius Varro, whose own fragments bear the title of "Menippean Satires." The name was adopted as title for a famous French collection of political satires in prose and verse, the "Satire Ménippée" (Menippean Satire), which appeared in 1594 at the crucial period of the League.

Menispermaceæ (-spur-mā'se-ē), menispermads, an order of diclinous exogens, alliance Menispermales. It consists of sarmentaceous shrubs, with alternate, generally entire leaves, reticulated and often palminerved. The wood develops only on one side of the pith. Flowers small, in racemes, generally diœcious; sepals in a tenary series or in binary rows; petals generally smaller than the sepals, six, or in a binary or single series; stamens as many as the petals or more numerous, distinct of monadelphous; ovules three or six; fruit, usually fleshy drupes, containing a single one-celled nut; seed one, enveloped in a membranaceous integument. Found climbing among trees in the tropics of Asia and America. The order is divided into six tribes: (1) Heteroclineæ, (2) Anomospermeæ, (3) Tiliocoreæ, (4) Leptogoneæ, with the sub-tribes Eleutharrheneæ and Cissampelideæ, (5) Platygoneæ, (6) Pachygoneæ. (Lindley.) Known genera 60, species about 350.

Menius (mē'nius), the son of Lycaon, turned into a wolf for speaking disdainfully of Jupiter.

Menken, Adah Isaacs, an American-Jewish actress; born near New Orleans, La., in 1835. Her maiden name was Dolores Adios Fuertes. Married four times (once to the pugilist John C. Heenan), she was generally known by the name of her first husband, Alexander Isaacs Menken. She published: "Memories"; "Infelicia" (1868). She died in 1868.

Mennonites (men'non-īts), the followers of Menno Simons (1492–1559), a priest at Witmarsum, in Friesland, who resigned his position from religious convictions. His teaching was ascetic rather than dogmatic, except that he was antipædobaptist. The discipline of the Mennonites involved separation from the world, to the extent of refusing to bear arms or to fill any civil office. There was no hierarchy, but exhorters were chosen by the congregations, each of which was independent of all the rest, and from these exhorters elders were selected to administer the sacraments. The Mennonites spread over Switzerland, Germany, Holland, and even to France. Their chief home now is in the United States and Canada. There are also some German Mennonite colonies

in Southern Russia. According to a Census report in 1910 for 1906 there were in the United States 14 different Mennonite bodies, having an aggregate of 604 organizations, 585 places of worship, church property valued at $1,237,134, 1,006 ministers, 54,798 communicants, 439 Sunday-schools, 5,041 officers and teachers, and 44,922 scholars. The Mennonite proper and the General Conference were the strongest bodies.

Menobranchus (-brang'kus), a genus of tailed amphibians, of the group Perennibranchiata. Though these animals have received generic distinction, it is by no means certain that they are not either the larvæ or the immature condition of an amblystome Batrachoceps. *M. lateralis* is from the Mississippi, and *M. punctatus* from the lake district of North America. Dusky ash gray, with dark spots, a dark streak from the snout over the eyes; branchiæ three on each side, of bright crimson. Extremities four-cleft, without claws. Erroneously reputed poisonous.

Menominee (-nom'-), a city and county-seat of Menominee co., Mich.; on Green Bay, at the mouth of the Menominee river, and on the Chicago, Milwaukee, and St. Paul, the Chicago and Northwestern and the Wisconsin and Michigan railroads; 52 miles N. E. of Green Bay. It is among the largest lumber shipping ports in the world. It contains a high school, public library, National banks, electric lights, and several daily and weekly newspapers. It has many sawing mills, and an assessed property valuation of nearly $2,500,000. Pop. (1890) 10,630; (1900) 12,818; (1910) 10,507.

Menomonie, a city and county-seat of Dunn co., Wis.; on the Red Cedar river, and on the Chicago, St. Paul, Minneapolis, and Omaha, and the Chicago, Milwaukee, and St. Paul railroads; 64 miles S. E. of St. Paul, Minn. There are the Stout Manual Training School, the Mabel Tainter Memorial Library, County Asylum for Chronic Patients, waterworks, electric light plant, National and State banks, and several newspapers. It has industries in lumber, brick, flour, wheat, and fur. Pop. (1890) 5,491; (1900) 5,655; (1910) 5,036.

Menopome (men'ō-pōm), *Protonopsis horrida,* a large North American amphibian in the Salamander order. It is widely distributed in the rivers of the Mississippi basin, and is well known as the "hellbender," "alligator," "water-dog," etc., names which suggest its fierce characteristics. It resembles the salamander in form, has four well-developed limbs, and a persistent gill-aperture. It attains a length of 18 inches to 2 feet, and has extraordinary powers of voracity and vitality.

Mensa, or **Mons** (monz) **Mensa,** one of the 14 constellations which Lacaille added to the heavens in connection with his work at the Cape of Good Hope. It is named from the mountain which is a conspicuous feature of the landscape at the Cape, and which (in the words of Dr. Gould, speaking of the work of Lacaille) "had witnessed his nightly vigils and daily toils." The constellation is a very inconspicuous one near the South Pole, its brightest star being only of 5.3 magnitude. It is surrounded by Octans, Hydrus, Dorado, Volans, and Chamæleon.

Mensa, a Latin word meaning table. *A mensa et thoro:* In law, literally, "from board and bed"; a phrase applied to a kind of divorce effected by the sentence of an ecclesiastical court, by which the parties were separated, but the marriage relation itself was not dissolved. It is now superseded by a judicial separation.

Menschikov, Alexander Danilovitch (men'shē-kof), a Russian statesman; born in Moscow, Nov. 16, 1672. He was born in humble life, but ultimately became a prince of the empire and first favorite with Peter the Great. When that monarch died his power under Catherine I. was greatly increased. After two years she was succeeded by her grandson, Peter II., who came under the guardianship of Menschikov, and to whom he endeavored to marry his daughter. His designs, however, were frustrated by the combined efforts of the Dolgorukis and the young czar, and Menschikov was exiled to Siberia, where he died Nov. 2, 1729.

Menschikov, Alexander Sergeievich, a Russian military officer; great-grandson of A. D. Menschikov; born Sept. 11, 1787. In 1854 he was made Commander-in-Chief during the Crimean war. He suffered defeat at the Alma and Inkerman; defended Sebastopol, but after its fall and the death of Nicholas he was recalled from the army, and died in retirement, May 2, 1869.

Menstruation, a sanguineous flow from the lining membrane of the uterus, regularly returning once a month. It generally begins about the 15th year, indicating pubesence, and terminates about the 45th. It is sometimes prolonged, but cases are rare in which women above 50 years have borne children. There is, as a rule, no menstrual flow during pregnancy and lactation. The diseases incidental to the woman as a result of menstruation are numerous, the chief being menorrhagia and dysmenorrhœa. A similar flow of blood from the lining membrane of the uterus of oviparous animals. It generally recurs once a year, usually in the spring, though in the case of some animals from two to six times. In those that have undergone a change by domestication, as dogs and cats, the recurrence is usually irregular, depending upon various circumstances, as diet, temperature, etc.

Mensuration, that branch of applied geometry which gives the rules for finding the lengths of lines, the areas of surfaces, and the volumes of solids. In medicine the term denotes a means for exploring the state of the thoracic and other cavities.

Mentana (-tä'nä), a small village, 12 miles N. E. of Rome, where Nov. 3, 1867, the Garibaldians were defeated by the Papal and French troops.

Menteith, Lake of, a sheet of water in Perthshire, Scotland; 17 miles W. by N. of Stirling, 55 feet above sea-level; extreme length and breadth, 1½ and 1 mile; depth in places of 80 feet. It contains three islets — Inchmahome, Inchtalla, and Dog Isle. Inchmahome has remains of an Augustinian priory (1238), the refuge in 1547-1548 of the child-queen Mary Stuart before her removal to France; while on Inchtalla is the ruined tower (1427) of the Earls of Menteith. That title was borne by a Celtic line in the 12th century, and afterward by a Comyn, Stewarts, and Grahams (1427–1694).

Menthol, a white crystalline substance obtained from oil of peppermint, and considered a valuable remedy in neuralgic affections of the face and head. The crystals are partially soluble in water, but entirely so in ether and the fixed and volatile oils. A solution of one part of menthol to 10 parts of solvent is the strength usually employed. If the tip of the finger be dipped in this preparation and applied to the seat of the pain the relief is often well-nigh immediate. The so-called "headache pencils" are simply preparations of menthol in a solid form; the pencil is rubbed over the affected part, and the throbbing ache is immediately alleviated.

Mentone (-tō'ne) (French Menton), a town in the department of Alpes Maritimes, France, pleasantly situated on the Mediterranean, 1½ mile from the Italian frontier and 14 miles N. E. of Nice. Owing to its S. exposure, and the fact that spurs of the Alps shelter it on the N. and W., it enjoys a delightful climate (average for the year 61°) and so has become a favorite winter-resort of invalids and health seekers from England, Germany, and other countries. The town stands on a promontory that divides its bay into two portions; the native town clings to the mountain side, while the hotels and villas for the visitors extend along the water's edge. The harbor is protected on the S. and W. by a sea-wall. Great damage was done to the place by an earthquake in February, 1887. In the 14th century it was purchased by the lords of Monaco, and, except during the period of the revolution and down to 1815, when France seized it, the princes of Monaco kept possession till 1848. In that year the inhabitants voluntarily put themselves under the protection of Sardinia, but that power yielded the town to France 12 years later. Pop. (1901) 9,944.

Mentone, the American, a name given to SANTA BARBARA (*q. v.*), a watering-place on the coast of California.

Mentor, in Greek legend, the faithful friend of Ulysses, who intrusted to him the care of his domestic affairs during his absence in the war against Troy. The education of the young Telemachus fell to his charge, and the wise and prudent counsel which he gave the youth has given to his name its metaphorical significance.

Menu. See MANU.

Menura (-nūr'-), a genus of Passerine songless birds from Australia, typical of the family *Menuridæ*, or the sub-family *Menurinæ*. Three species are known: *M. superba*, the lyre bird; *M. victoriæ*, separated from the former by Gould, and *M. alberti*, first described by C. L. Bonaparte.

Menzaleh (-zä'le), **Lake,** a coast lagoon of Egypt, extending E. from the Damietta branch of the Nile, and separated from the Mediterranean by a narrow strip of land, with several openings. Its surface, 460 square miles in extent, is studded with islands, the most interesting of which is Tennees, the ancient Tennesus, with Roman remains of baths, tombs, etc. Its waters are full of fish, and its shores abound in wild fowl. The Suez Canal passes through the E. portion. The lake has an average depth of not more than three feet, except when the Nile, mouths of whose delta reach it, is in flood; and it is being gradually drained.

Menzel, Adolf (ment'sel), a German artist; born in Breslau, Prussia, Dec. 8, 1815. He is best known for his drawings and oil paintings illustrative of the times of Frederick the Great and William I., emperor — pictures characterized by historical fidelity, strong realistic conception, originality, and humor. His "Adam and Eve," "Christ among the Doctors," and "Christ Expelling the Money-changers" are also notable pictures. He died Feb. 9, 1905.

Menzel, Wolfgang, a German author; born in Waldenburg, Silesia, June 21, 1798. He studied at Jena and Bonn, was for four years schoolmaster at Aarau in Switzerland, and in 1825 returned to Germany. He first made himself known in the literary world by his witty "Elastic Verses" (1823). He edited and contributed to literary magazines, and wrote a very large number of works — poems, romances, histories, literary criticisms, political polemics, and Christian theology. The most important were a history of Germany (1825; Eng. trans. 1848), of German literature (1827, Eng. trans. 1840), of German poetry (1858), of Europe (1853–1857), and of the world ("Universal History," 16 vols. 1862–1872), on Prussia's place in Germany

(1866 and 1870), mythological researches (1842), the pre-Christian doctrine of immortality (1869), and autobiographical "Memoirs" (1876). He was almost constantly involved in controversy, attacking with equal zeal theological rationalists and political radicals, all whose tendencies seemed "dangerous" to the Christian religion or the German monarchies, such as "the Young Germany party" after 1830. He died in Stuttgart, April 23, 1873.

Mephistopheles (mef-is-tof'uh-lēz), the name of one of the best-known personifications of the principle of evil. The word has been very variously explained, but is probably of Hebrew origin, like most names of devils in the history of magic, confounded with, and approximated in form to, the Greek, *μηφωστοφίλης*, "one who loves not light." Mephistopheles owes all his modern vitality to Goethe's "Faust."

Merath. See MEERUT.

Mercadante, Saverio (mer-kä-dän'te), an Italian composer; born in Altamura, Italy, June 26, 1797. He wrote about 60 operas, notably "The Brigands" and "The Vestal." He died in Naples, Dec. 17, 1870.

Mercator, Gerard (mer-kä'tor), a Flemish mathematician and geographer; born in Ruphelmonde, Belgium, March 5, 1512. He is distinguished especially for the method of laying down charts and maps which goes by his name. He died in Duisburg, Prussia, Dec. 2, 1594.

Mercator's Chart, or **Projection,** a mode of projection or representation of a portion of the surface of the earth on a plane, in which the meridians are represented by equi-distant parallel straight lines, and the parallels of latitude by straight lines perpendicular to them. This chart is particularly adapted to the purposes of navigation, inasmuch as the plot of a ship's course, or a rhumb line between two points upon it, is represented by a straight line. On this account, as well as on account of the facilities which it affords for making calculations necessary in navigation, Mercator's chart is now almost universally adopted for sailing purposes.

Mercenaries, or **Stipendiaries,** men who received pay for their services as soldiers, especially as distinguished from the feudal and general levies owing military service to the crown. Such men were often foreigners, and the name has come to mean only foreign auxiliaries. Hired professional soldiers appear very early in the history of military organization. Foreign mercenaries appear in the armies of Alexander the Great and the Romans. They were common in all armies, but generally engaged for a single campaign only. In England, Harold had a body of Danes in his army when he defeated the Norwegian king — the huscarls, a body originally established by Canute. William III. had for some time a body of Dutch troops in his pay after he became king of England; and throughout the 18th century Hessian and Hanoverian regiments were constantly in the pay of the British government for temporary purposes. Hessians fought for Great Britain in the Revolutionary War; and the Landgrave of Hesse, who sold his troops at so much a head, received upward of £500,000 for Hessian soldiers lost in that struggle.

Mercer University, an educational institution of the Baptist Church in Macon, Ga.; founded in 1833 as Mercer Institute at Greensboro, incorporated in 1837, and removed to Macon in 1871; has grounds and buildings, $400,000; endowment, $340,000; volumes in the library, 20,000; ordinary income, about $45,000; average number of faculty, 20; average students, 425.

Merchant Law. See LAW, MERCHANT.

Mercia (mur'shiä), the great Anglian kingdom of Central England. The name, originally limited to the district around Tamworth and Lichfield and the Upper Trent valley, refers to a "march" or frontier that had to be defended against hostile Welshmen. The first settlements were most probably made in the second half of the 6th century, but Mercia first rose into real importance, and indeed grew into Middle England, under the vigorous rule of Penda (626–655). His nephew, Wulfhere (659–675), pushed back the Northumbrians, and extended the boundary S. to the Thames, and Ethelbald (716–755) spread his conquests round all the neighboring states. But the mightest kings of Mercia were Offa (757–795) and Cenwulf (796–819), and after their time its power rapidly declined before the invasions of the Danes on the one side, and the spread of the West Saxon kingdom on the other. At length it became one of the great earldoms, and Elfgar, Leofric, Edwin, and Morcar retained at least the shadow of past power.

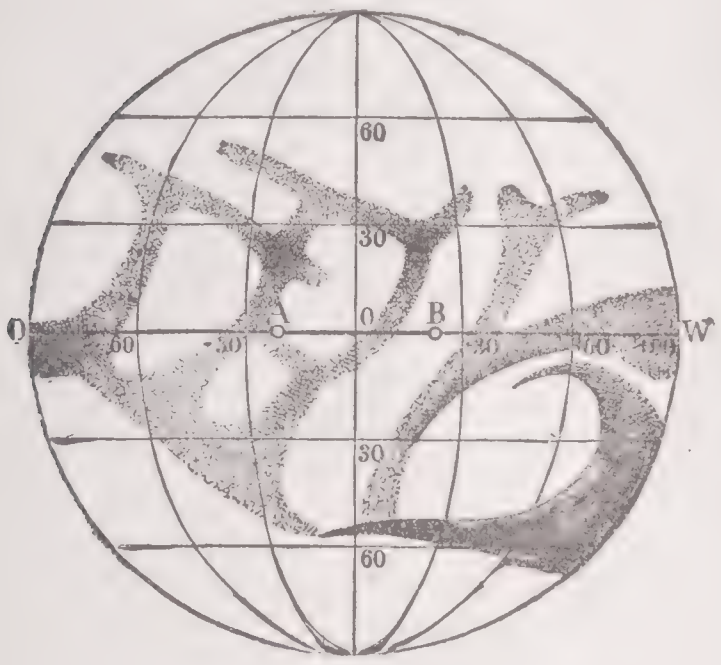
Mercier, Honoré (mer-syā'), a Canadian statesman; born in St. Athanase, Quebec, Oct. 15, 1840. He studied law, and was engaged in journalism. He sat in the Dominion Parliament 1872–1874, and became solicitor-general of the legislative assembly of Quebec in 1879, and attorney-general in 1887. In the last-named year he became premier, but resigned in 1891. He died in Montreal, Oct. 30, 1894.

Mercier, (Louis) Sébastien, a French author; born in Paris, France, June 6, 1740. He was a member of the Five Hundred; Professor of History at the Central School, Paris; member of the National Institute. His dramatic works appeared in four volumes at Amsterdam, 1778–1784. His most important writings were: "Picture of Paris" (12 vols. 1781–1790), a

Mercury

description of Parisian life; "New Paris" (6 vols. 1800), a description of Parisian life during the Revolution. "My Night-Cap" (4 vols. 1784) was an attack on classicism. He was a very prolific writer, and made the first French translation of Schiller's "Maid of Orleans." He died in Paris, April 25, 1814.

Mercury, in astronomy, the planet nearest the sun, unless indeed it be established that the hypothetical Vulcan really exists.



THE PLANET MERCURY.

Its stationary points are from 15 to 20 degrees of longitude from the sun, hence it rises and sets not far from the time when the sun does so. The light of the sun and the haze of the horizon combine to render observation of the planet difficult; hence, as Sir John Herschel says, we "can see little more" of the planet "than that it is round, and exhibits phases." It varies in brightness from 15″ to 12″ of the celestial circle or vault. Hence it is sometimes telescopic, and at other times visible to the naked eye, being as bright as a star of the second magnitude. It was known to the ancients. Its diameter is about 3,200 miles; its mass about 1-19 that of the earth; its sidereal period is 88 terrestrial days. It is seen at its greatest brightness as an evening star, at average intervals of about 116 days. Its average distance from the sun is 36,000,000 miles. Its greatest and least distances differ nearly 15,000,000 miles. It moves in its orbit about 109,360 miles an hour against 68,040 performed in the same time by the earth. The orbit of Mercury is remarkable for its extreme eccentricity, the distance from the sun varying periodically from about 28,500,000 to 48,500,000 miles. The effect of this would be that, supposing there were any inhabitants of Mercury, within a period of about six weeks, the sun would double in apparent size, and give about double the quantity of light and heat. The planet is supposed to rotate on its axis in 88 days. Transits of Mercury over the sun's disk occur like those of Venus, but more frequently; those at the ascending node in November, those at the descending one in May. They are at intervals of about 13 or seven years. Transits occurred in the 19th century in 1802, 1832, 1845, 1848, 1861, 1868, 1891, 1894, etc. Spectroscopic observations indicate that Mercury has a thin atmosphere, in which water vapor is present.

In Chemistry.— A diatomic metallic element; symbol, Hg; at. wt., 200; sp. gr., 13.59; boiling point, 357.25; known from the earliest historical times, and the only liquid metal at ordinary temperatures. It is found most frequently in the form of mercuric sulphide, or cinnabar, an ore found in Spain, Austria, and other parts of the world, from which it is extracted by roasting the ore in a furnace, and conducting the vapors into a chamber where the mercury is condensed, while the sulphurous acid is allowed to escape. It possesses a luster like that of polished silver, and solidifies at — 39.5° to a tin-white malleable mass, contracting at the moment of solidification. Hydrochloric acid is without action on mercury. Cold sulphuric aci does not attack it, but the hot concentrate acid dissolves it with evolution of sulphurous

MERCURY.

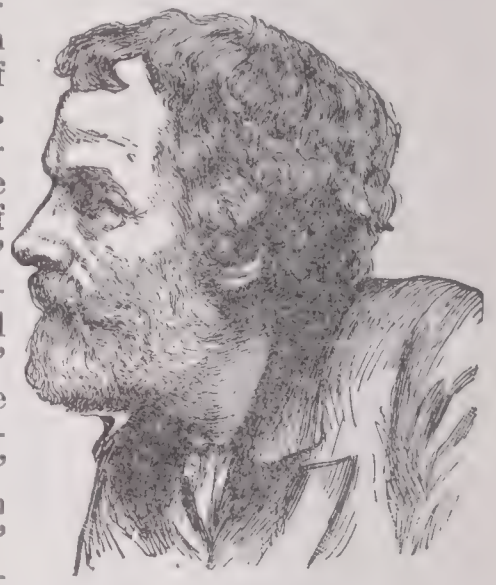
anhydride. It is soluble in cold dilute nitric acid, mercurous nitrate being formed. Mercury is invaluable to the chemist, who employs it in collecting gases which are soluble in water. It is also used in medicine, in extracting gold and silver from their ores, in silvering mirrors, and in gilding. The vapor of mercury, when inhaled, acts as a poison, producing salivation.

In Classical Mythology.—A Roman deity, identified with the Greek Hermes. He was the son of Jupiter and Maia. He was originally the god of traffic and gain [from Latin *merx* (genitive *mercis*) = merchandise, gain], and the protector of merchants and shopkeepers. Afterward, being identified with Hermes, he was regarded as the god of eloquence and commerce and the protector of robbers. He was also the messenger and herald of the gods, and as such he was represented as a youth, lightly clad, with the petasus or winged hat, and wings on his heels, bearing in his hand the caduceus or emblem of his office as a herald, a rod with two serpents twined round about it.

Mercy, Sisters of, the name given to members of female religious communities founded for the purpose of nursing the sick at their own homes, visiting prisoners, attending hospitals, superintending the education of females, and the performance of similar works of charity and mercy. Communities of Sisters of Mercy are now widely distributed over Europe and the United States, and in general are connected with some religious denomination.

Mercy Seat, the golden covering placed on the ark of the testimony. Whether it was the actual lid of that ark, or a tablet placed above the lid, is doubtful. Like the ark, it was two-and-a-half cubits (3 feet 9 inches) long, and one-and-a-half (2 feet 3 inches) broad. At each end was a cherub, the two looking face to face, and covering the mercy seat with their wings. The whole was put in the most holy place of the tabernacle, and afterward of the temple (Exod. xxv: 17–22, xxvi: 34, xxxvii: 6–9, vl: 20; I Chron. xxviii: 11). On the great day of the Atonement, Aaron, the high priest, cast incense on coal (charcoal) burning in a censer, and the cloud of sweet-scented spices which thence arose covered the mercy seat, God, whose special dwelling when He visited the place was between the cherubims (Psalms lxxx: 1), appearing in the cloud (Lev. xvi: 12, 13). The mercy seat was also sprinkled seven times with the blood of a bullock and a goat, offered as a sin offering (Leviticus xvi: 15). Jehovah spoke to Moses from off the mercy seat (Num. vii: 89). In the New Testament the entry of the high priest into the most holy place is made symbolical of the entry of Christ into heaven, to pursue His work of intercession, and of the approach of the Christian to God by the blood of Jesus (Hebrews x: 19–22), whence, in devotional language, an approach to the mercy seat signifies an approach to God in prayer.

Meredith, George, an English poet and novelist; born in Hampshire, England, in 1828. He was educated in Germany; studied law, but essayed a literary career with a volume of poems in 1851. This was followed by the "Shaving of Shagpat" (1855); "Farina, a Legend of Cologne" (1857); "The Ordeal of Richard Feverel" (1859); "Evan Harrington" (1861); Modern Love: Poems and Ballads" (1862); "Emilia in England" (1864); "Rhoda Fleming" (1865); "Victoria" (1866); "Adventures of Harry Richmond" (1871); "The Egoist (1879); "The Tragic Comedians" (1881); "Poems and Lyrics of the Joy of Earth" (1883); "Diana of the Crossways" (1885); "Ballads and Poems of Tragic Life" (1887); "One of our Conquerors" (1891); "Lord Ormont and His Aminta" (1894); "The Amazing Marriage" (1895); "Odes in Commemoration of the History of France" (1898); etc. He died May 18, 1909.



GEORGE MEREDITH.

Merganser (-gan′-), a genus of aquatic birds belonging to the duck family. The goosander (*Mergus Merganser*) forms the typical British species; and the hooded merganser of North America (*M. cucullatus*) is occasionally found in Great Britain. They inhabit lakes and the sea-coast, migrate S. in winter, lay from 8 to 14 eggs, and are gregarious in habit.

Mergenthaler, Ottmar (merg-en-tä′-ler), an American inventor; born in Würtemberg, Germany, May 10, 1854; came to the United States in 1872 and received a government position in Washington to care for the mechanism of bells, clocks, and signal service apparatus; became connected with a mechanical engineering firm in Baltimore, Md., in 1876. Subsequently, while still engaged with that company, he began experiments which resulted in the invention of the type setting machine bearing his name. His plan as finally perfected consist-

ed of a keyboard by means of which a line of type or dies could be set, adjusted to a desired width, and cast into a solid line of type metal. He patented his invention, but it did not succeed till the linotype company which he had formed purchased the Rogers spacer. He died in Baltimore, Md., Oct. 28, 1899.

Mergui Archipelago, a group of islands in the Gulf of Bengal, lying off the S. provinces of Burma; they are mountainous, some rising to 3,000 feet, of picturesque beauty, and sparsely inhabited by a race called the Selungs, who barter edible birds' nests with the Burmese and Malays for rice and spirits; caoutchouc, snakes, tigers, rhinoceros, deer, etc., abound.

Merida (mā′rē-*th*ä) (ancient Augusta Emerita), a decayed town of Spain, on the right bank of the Guadiana, 36 miles E. of Badajoz. It is remarkable for its Roman remains, which include a bridge of 81 arches, 2,575 feet long and 26 feet broad, erected by Trajan; the ruins of half a dozen temples, of an aqueduct, a circus, a theater, a naumachia, a castle, and the Arch of Santiago, 44 feet high, built by Trajan. There is also an old Moorish palace. Merida was built in 23 B. C., and flourished in great splendor as the capital of Lusitania. In 713 it was taken by the Moors, who lost it to the Spaniards in 1229.

Merida, city and capital of the Mexican state of Yucatan; on a barren plain, 25 miles S. of Progreso, on the Gulf of Mexico, and 95 miles N. E. of Campeachy; occupies the site of a former native city, and was founded by the Spaniards in 1542; has a cathedral and 13 churches, a university, seminary, girls' high school, and conservatory of music, an antiquarian museum, a public library, hospital, alms-house, and foundling asylum; trade not extensive; pop. (1900) 43,630.

Merida, a town of Venezuela, capital of Los Andes state; 5,290 feet above sea-level, at the foot of the Sierra Nevada de Merida, and 70 miles S. of the lake of Maracaibo; founded in 1558, it was almost wholly destroyed by an earthquake in 1812; is the seat of a bishop, contains a university and several higher schools, and has manufactures of carpets and woollen and cotton stuffs.

Meriden, a city in New Haven co., Conn.; on the New York and New England, and the New York, New Haven, and Hartford railroads; 18 miles N. by N. E. of New Haven. There are a high school, the Connecticut School for Boys, Meriden hospital, Curtis Home for Orphan Children and Aged Women, waterworks, electric light and street railroad plants, National and savings banks, and several periodicals. The city is widely noted for its manufactures, which include tinware, cutlery, bronze ware, electro-plated ware, granite, iron and pearl agate ware, organs and organettes, brass and iron, gas and kerosene fixtures, bronze art goods, lamp trimmings, builders' furniture, carriage and saddlery hardware, table and pocket cutlery, shears, scissors, steel pens, clocks, screws, vises, shoes, firearms, curtain fixtures, piano stools, paper boxes, harness, printing presses, and machinery. Meriden was taken from Wallingford and incorporated in May, 1806. It has an assessed property valuation of nearly $14,000,000. Pop. (1890) 25,423; (1900) 28,695; (1910) city, 27,265; town, 32,066.

Meridian, a word connected in various ways with the idea of noon, or applied to the special conditions or culminating point in connection with a country, sphere of life, career, etc.

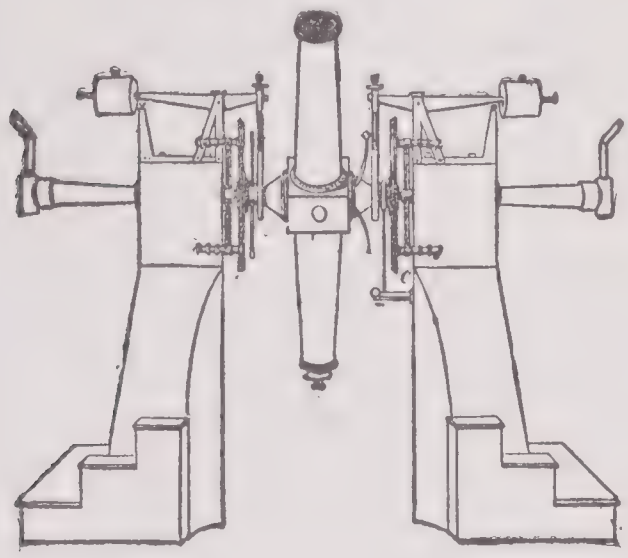
In geology: Noon-day; in allusion to the mid-day date of the strata to which it is applied. A term appropriated to certain middle formations of the Appalachian Palæozoic system, which are called in the New York Survey the Oriskany Sandstone, and which appear to be on the horizon of the Lower Ludlow rocks of England. The greatest thickness of this sandstone is less than 200 feet. Its distinctive fossils are large brachiopodous bivalves.

Celestial meridian: The great circle marked out on the sphere by the prolongation of the terrestrial meridian passing through the spot where the observer stands. If, as is apparently the case, the earth be at rest, then the celestial meridian becomes a fixed circle, across which all the stars pass in their diurnal courses from E. to W. If, as is really the case, the stars are at rest, and the earth rotate, then the spectator's meridian sweeps daily across the plane from W. to E. First meridian, that meridian from which all others are reckoned, counting E. or W., and from which also longitudes are reckoned. Meridian altitude of the sun or of a star, altitude when on the meridian of the place where it is observed. Meridian distance of a point, the distance from the point to some assumed meridian, generally the one drawn through the extreme E. or W. point of the survey. Meridian line on a dial, the same as the 12 o'clock hour-line. Meridian of a globe, the brazen circle in which it turns and by which it is supported; also meridian lines drawn on the globe itself, generally at a distance of 15°. Terrestrial meridian, the terrestrial meridian of any place on the earth's surface is a great circle passing through both of the earth's poles and the place.

Meridian, a city and county-seat of Lauderdale co., Miss., on the Queen and Crescent Route, the Southern, and the Mobile and Ohio railroads; 90 miles W. of

Jackson. It contains Stone College, East Mississippi Female College, the Meridian Academy, electric lights, National and savings banks, and daily and weekly newspapers. Meridian is in the heart of a rich lumber region which accounts for its large trade. It has machine shops, cotton mills, and other manufactories; and an assessed property valuation of over $5,000,000. It was here, on Feb. 16, 1864, that General Sherman perpetrated "the most complete destruction of railways every held." Pop. (1900) 14,050; (1910) 23,285.

Meridian Circle, or **Transit Circle,** an instrument used in observatories in modern times to combine the functions of a transit instrument and of the old mural circle. A



MERIDIAN CIRCLE.

vertical circle is carried on the axis of the transit instrument and revolves with it, its divisions being read by micrometer microscopes mounted solidly on one of the piers. In this way both coördinates of the position of a heavenly body, its right ascension and declination are determined at the same meridian passage — a great saving of time over the old method with the instruments.

Meridian Conference, an international convention, held in October, 1884, at Washington, D. C., by invitation of the United States government, for the purpose of adopting a common prime meridian from which to reckon longitudes, and for other kindred purposes. The principal nations of the globe were represented, and the conferrees were nearly unanimous in recommending to their different governments the adoption of the meridian of Greenwich as the prime meridian. They also recommended the adoption of the Greenwich civil day as a universal day for international and scientific uses when convenient, and these two recommendations have been quite generally adopted.

Mérimée, Prosper (mā-rē-mā′), a French author; born in Paris, France, Sept. 28, 1803. Having received an excellent education at the Collège Henri IV. he devoted himself to the study of the law, and passed advocate; but he attached himself to literature in his 22d year under the *nom de plume* of Joseph Lestrange, and published what was professedly a translation from the Spanish, though really original. The title was "Théâtre de Clara Gazul, Comédienne Espagnole" (1825), which contained eight prose comedies. Other works followed in rapid succession. After the revolution of July, 1830, he was appointed secretary to the ministers of commerce and marine. In 1831 he was made inspector of ancient monuments; in 1844 he was received at the French Academy; he was elevated to the Senate in 1853; commander of the Legion of Honor 1860; grand officer 1866. His best-known works were the two novels, "Colomba" (1830), treating of the Corsican vendetta; and "Carmen" (1840), which furnished the plot of Bizet's opera of the same name. He wrote besides: "Historic Monuments" (1843); "Historic and Literary Medleys" (1855); "Letters to an Unknown" (1873); etc.. He died in Cannes, France, Sept. 23, 1870.

Merino (me-rē′nō), a Spanish breed of the domestic sheep. It is extremely important commercially, on account of the

MERINO SHEEP.

excellence of its wool, which is close-set, soft, spirally twisted, and short. There are large flocks in Germany, and it is extensively bred in Australia, where it was introduced toward the end of the 18th century. The animal is small, flat-sided, and long-legged. The males are horned. The face, ears, and legs are dark, the forehead wooly, and the skin of the throat lax.

A fine French woolen material is made from the wool of the merino sheep. It is a lady's dress goods, all wool, and twilled on both sides.

Meristem (mer'-), the formative tissue of plants, distinguished from the permanent tissues by the power its cells have of dividing and forming new cells. Meristem forms the tissue of embryo plants, and of apexes of stems and roots.

Merivale, Charles, an English historian; son of John H.; born in Barton Place, Devonshire, England, March 8, 1808. He was select preacher at Cambridge (1838–1840) and at Whitehall (1839–1841), Hulsean lecturer (1861), and Boyle lecturer (1864–1865). From 1848 to 1869 rector of Lawford in Essex till 1869 when he was appointed dean of Ely. His chief works are the "Fall of the Roman Republic" (1853); "History of the Romans under the Empire" (7 vols. 1859–1862); "General History of Rome" (1875); "Early Church History" (1879); "The Contrast between Pagan and Christian Society" (1880); and translation of the "Iliad" in rhymed verse. He died in Ely, England, Dec. 27, 1893.

Merivale, Herman, an English statesman; brother of Charles; born in Dawlish, Devonshire, England, Nov. 8, 1806. He was Professor of Political Economy at Oxford, 1837–1842; under-secretary for the colonies, 1848–1860; and perpetual under-secretary for India. He wrote: "Colonization and Colonies" (2 vols. 1841), the best work on the subject; "Historical Studies" (1865); etc. He died in London, Feb. 9, 1874.

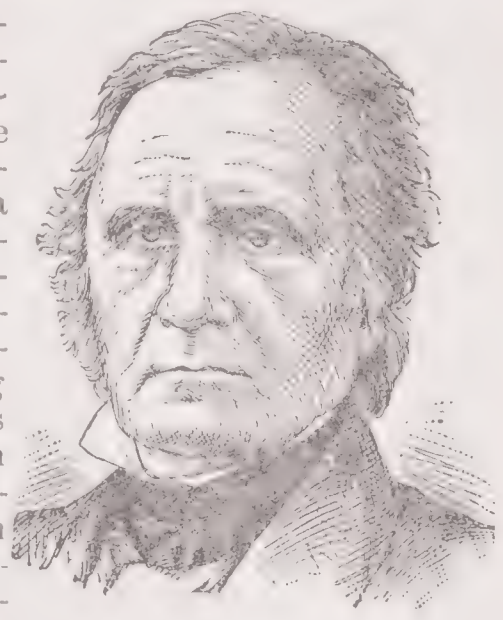
Merivale, Herman Charles, an English dramatist; son of Herman; born in London in 1839. A lawyer for 15 years, he withdrew from practice in 1879. He wrote the plays "All for Her" (1874), "Forget Me Not" (1879), etc.; the stories "Faucit of Balliol" (1882) and "Binko's Blues" (1884); the volume of poems "The White Pilgrim" (1883); the tragedy "Florien" (1884); etc. He died Jan. 15, 1906.

Merivale, John Herman, an English scholar; born in Exeter, England, Aug. 5, 1779. He was the grandson of Samuel Merivale (1715–1771), a Presbyterian minister at Tavistock; was sent to St. John's College, Cambridge, and was called to the bar in 1805. He contributed largely to Bland's "Collections from the Greek Anthology" (1813), and brought out a second edition himself in 1833. From 1831 he held the office of Commissioner of Bankruptcy. Works of no little merit were his "Poems, Original and Translated" (1841), and "Minor Poems of Schiller" (1844). He died in April, 1844.

Meriwether, Mrs. Elizabeth (Avery), an American novelist; born in Bolivar, Tenn, in 1832. She wrote: "The Master of Red Leaf," "Ku-Klux-Klan," a drama; "My First and Last Love"; etc.

Meriwether, Lee, an American writer; son of Elizabeth A. Meriwether; born in Columbus, Miss., Dec. 25, 1862. He wrote: "A Tramp Trip: How to See Europe on Fifty Cents a Day"; "The Tramp at Home"; and "Afloat and Ashore on the Mediterranean."

Merle d'Aubigné, Jean Henri (merl dō-bēn-yā'), a French historian; born in Geneva, Switzerland, Aug. 16, 1794. His education, commenced at Geneva, was completed at Berlin. He became pastor at Hamburg to a French congregation; and removed afterward to Brussels. Having returned to his native city in 1830, he became Professor of Church History in the theological school founded by the Genevan Evangelical Society. Besides his well-known "History of the Reformation in the 16th Century" (1835–1853), he published a supplementary history to the time of Calvin (Paris, 1862–1868); "The Protector" (Cromwell), 1847; and the "Recollections of a Swiss Minister." He died in Geneva, Oct. 24, 1872.



MERLE D' AUBIGNÉ.

Merlin, a prince of enchanters of the time of the Saxon invasion of England. He was the son of a damsel seduced by a fiend, but Blaise baptized the infant, and so rescued it from the power of Satan. He died spellbound by his mistress Vivian in a hawthorn bush.

Merlin, a small falcon, averaging only from 10 to 12 inches in length, according to sex. The plumage of old males is blue-gray on head, back and wing covers; cheeks and back of neck reddish-brown; tail feathers, bluish-gray, with slight indications of three dark bands, tips white; under-surface rufous, with brown patches; bill bluish horn-color; cere, legs, and toes yellow; claws black. The females and young birds are of a more uniform brown.

Mermaids and **Mermen,** in the popular folklore of Europe, a class of creatures more or less like human beings, living in the sea, but in some circumstances capable of social relationships with men and women. The typical mermaid has the head and body of a lovely woman to the waist, ending in the tail of a fish with fins and scales. She has long and beautiful hair,

and is often seen above the surface of the water, combing it with one hand while in the other she holds a mirror. She often discloses what is about to happen, and not seldom gives supernatural knowledge and powers to a favored mortal — a thing in perfect keeping with primitive notions of sorcery, which easily attributed exceptional powers to beautiful women, as Lilith and Circe. Again, she sometimes exercises a special guardianship over an individual, and avenges his wrongs; but her relation to man most often brings with it disaster. There are many stories of mermaids who have fallen in love with men, or been detained through the possession of the skin which they had stripped to dance on the shore, and who have been faithful wives and mothers till they found an opportunity to return to the sea. And there are examples of the converse case of a mermaid falling in love with a man and enticing him to go and live with her under the sea, as well as of a merman bewitching and carrying off a mortal maiden.

Such are the principal forms of mermaid stories found everywhere, with more or less artistic elaboration. The Danish "Hafmand" or "Maremind," the Irish "merrow" or "merruach," the Breton "Marie-Morgan," the Russian "rusalka" or stream-fairy and "vodyany" or water-sprite, some forms of the Teutonic "nixies," and the enchanting Sirens of classical mythology have all close affinities with each other in the dangers they bring to men, the beauty and joyousness of their lives, and yet the gloom of sadness that overhangs them. In their malignant aspect they touch the general doctrine of DEMONOLOGY (*q. v.*), and may be explained on an animistic theory of its origin. To the beauty of the conception and the elaborations of which it is capable in the popular imagination we owe some of the loveliest of our folk-tales as well as such delightful artistic tales as "Undine" and many fine poems of the ages of literary culture. One of the most detailed stories of this class is that of MELUSINE (*q. v.*). The mermaid had a firm hold of the imagination of our fathers, and, besides the witness of heraldry, we have stories supported by excellent evidence of their appearance and capture. One caught at Edam in 1403 was carried to Haarlem and kept there many years. She learned to spin and showed a becoming reverence for the cross.

Mermaid's Glove, a name given to the largest of British sponges (*Halichondria palmata*), from its tendency to branch into a form bearing a remote resemblance to a glove with extended fingers. It sometimes attains a height of two feet.

Mermaid's Purse, the popular name of the egg case of the skate (or of some other cartilaginous fish), which is often cast up empty on the shore.

Mermen. See MERMAIDS.

Meroe (mer'ō-ē), a city and state of ancient Ethiopia, in the N. E. part of Africa, corresponding mainly with the district between the Nile and Atbara, N. of Abyssinia. Meroë was the center of the caravan trade between Ethiopia, Egypt, Arabia, Northern Africa, and India. There are pyramids at the site of ancient Meroë and a small town of same name on the Nile.

Merope (mer'ō-pē), one of the Atlantides, who married Silphus, son of Æolus, and was, like her sisters, changed into a constellation after death.

Merops, the typical genus of the family *Méropidæ*. The bill moderate or long, arched, acuminate, margins entire; tongue narrow, horny at apex; tarsi short; tibiæ denuded above the heel; wings long, tail with two middle feathers elongate. Twenty-one species are known. *M. apiaster* is common in the S. of Europe and in Africa. The back is red-brown, the throat yellow with a black margin, breast and belly greenish-blue. It feeds on insects, especially wasps and bees, which it captures on the wing, like swallows.

Merostomata (-tom-a-tä), the order of *Podostomata*, represented by *Limulus*, the horseshoe or king crab, and a number of fossil forms popularly called in Scotland "seraphims," and known to zoölogists as Eurypterida. The latter resemble scorpions in general appearance, but were marine, some of their feet ending in paddles, while they breathed by gills. The typical forms of the latter group were *Pterygotus* and *Eurypterus*. They flourished in the Palæozoic Age, disappearing during the Carboniferous Period, when the predecessors of the king crab made their appearance.

Merovingians, or **Merwings,** the 1st dynasty of Frankish kings in Gaul. The name is derived from Merwig or Merovech, king of the Western or Salian Franks from 448 to 457. His grandson Clovis established the fortunes of the dynasty which gave way to the Carlovingians in 752.

Merriam, George Spring, an American author; born in Massachusetts in 1843. He lived at Springfield, Mass., and wrote "A Living Faith," "Life of Samuel Bowles," "A Symphony of the Spirit," "The Chief End of Man," etc. He was also a frequent contributor to periodicals.

Merriam, Henry Clay, an American military officer; born in Maine, Nov. 13, 1837; was graduated at Colby University; entered the army in 1862 as captain of the 20th Maine Volunteers; distinguished himself at the battle of Antietam, Sept. 17, 1862; and organized colored troops in the

following year. On April 9, 1865, he commanded the attack on Fort Blakeley, Ala., which was the last battle of the Civil War, and for bravery in that action received a Congressional medal of honor; was promoted colonel, U. S. A., in July, 1885; and afterward served in numerous campaigns against the Indians. As Commander of the Departments of the Columbia and California during the American-Spanish War he organized, equipped, and forwarded troops to the Philippine Islands; was promoted Brigadier-General, U. S. A., June 30, 1897, and Major-General of volunteers May 2, 1898. In 1899 he was sent to the Philippines in command of the army of occupation, and in January, 1900, was placed in command of the Department of Colorado. He was the inventor of the Merriam infantry pack.

Merriam, William Rush, an American statistician; born in Wadham's Mills, N. Y., in July, 1849; settled in St. Paul, Minn., in 1861; was graduated at Racine College in 1871; became a clerk in the First National bank of St. Paul; and was elected president of the Merchant's National bank of St. Paul in 1882. He entered the State Legislature in the last year; was reëlected in 1886; and was governor of Minnesota in 1889–1892. President McKinley appointed him Director of the United States Census in 1898; retired in 1903.

Merrill, Selah, an American archæologist; born in Canton Centre, Conn., May 2, 1837. He was chaplain in the Civil War (1864–1865); after that was engaged in explorations in Palestine. He was consul at Jerusalem 1884–1886, in 1890–1893, and after 1898. Among his works are: "East of the Jordan" (2d ed. 1883); "Galilee in the Time of Christ" (1881); "The Site of Calvary" (1886); etc.

Merrimac, a river rising among the White Mountains of New Hampshire, flowing S. into Massachusetts, and falling into the Atlantic Ocean near Newburyport, after a course of 150 miles; it has numerous falls, affording immense water power, and is navigable to Haverhill. The principal manufacturing towns on its banks are Manchester, Nashua, and Concord in New Hampshire, and Lowell and Lawrence in Massachusetts.

Merrimac, The, a 40-gun screw frigate of the United States navy. On April 19, 1861, the Norfolk navyyard was abandoned by the Federal government and all the ships, including the Merrimac, were scuttled and sunk. The Confederates raised the hull, towed it through the Gulf of Mexico into the Mississippi river, where it was dismantled to the water's edge and a 10-foot high roof of heavy timbers and three-inch iron was built over its deck and two feet below the water line. The prow was of cast iron and her armament consisted of 10 guns. She was named the "Virginia" and was commanded by Commodore Franklin Buchanan. On March 8, 1862, she destroyed the "Congress," a sailing ship of 30 guns, at Newport News. On March 9 she attacked the "Minnesota" and was met by the "Monitor" which had arrived the night before. The battle lasted from 8 A. M. till noon, when the "Merrimac" withdrew from the contest, and failed to return to renew it.

Merrimac, The, a collier in the United States navy, which was originally a Norwegian "tramp" steamer, the "Solveig," built at Newcastle, England, in 1894. She was a steel vessel, 331 feet long, 44 feet in breadth, and 29 feet in depth, of a single screw and 2,556 net tonnage. In the summer of 1897 she ran aground in the West Indies and was abandoned by the crew. She was raised and then purchased by a New York firm and put in service as a freighter. At the beginning of the American-Spanish War the "Merrimac" was purchased by the United States government and sent to Cuba with Admiral Sampson's fleet as a collier. The sinking of this vessel in Santiago Bay, for the purpose of obstructing its entrance and preventing the escape of the Spanish fleet within, was one of the most thrilling incidents of the war. See HOBSON, RICHARD P.

Merritt, Wesley, an American military officer; born in New York city, June 16, 1836; was graduated at the United States Military Academy in 1860; assigned to the dragoons and served in the Federal army with gallantry and distinction throughout the Civil War. He was promoted captain April 5, 1862; took part in General Stoneman's raid toward Richmond in April and May, 1863, and was in command of the reserve cavalry brigade in the Pennsylvania campaign of the same year, being commissioned Brigadier-General of volunteers in June; for gallantry at Gettysburg he was brevetted major. He took part in the various engagements in Central Virginia in 1863–1864, and was brevetted colonel, U. S. A., and Major-General, U. S. V., for gallantry at the battles of Yellow Tavern and Winchester, and Brigadier-General and Major-General, U. S. A., for bravery at Five Forks, and his services during the final Virginia campaign. After the war General Merritt was occupied chiefly with frontier duty till 1882, when he was appointed superintendent of the United States Military Academy. In June, 1887, he was ordered to Fort Leavenworth, and in 1897 became Major-General, U. S. A. In 1898 he commanded the land forces of the United States in the Philippine campaign, which culminated in the fall of Manila, Aug. 13. In 1899 he was placed in command of the Department of the East,

at Governor's Island, N. Y., and in 1900 was retired. He died Dec. 3, 1910.

Merry, Robert, an English dilettante; born in London, England, April, 1755. He resigned from the army (1775); became a member of the famous Della Crusca Academy at Florence, Italy (1784–1787); on returning to London, wrote plays and poems under the pseudonym "Della Crusca." His affected style found many imitators, and the school that arose was satirized by Gifford in his "Baviad" and "Mæviad." He married an actress, and came to the United States in 1796. He died in Baltimore, Md., Dec. 14, 1798.

Merry England, a popular name for England. The word merry is used, not in its present sense, or in allusion to the gayety of the people, but according to its earlier meaning, *i. e.*, "agreeable," or pleasant. Thus Spenser speaks of "merry wind and weather," and we at this day often use the phrase, "merry month of May."

Merseburg, a town of Prussian Saxony, on the Saale. Henry the Fowler in 934 gained his great victory over the Hungarians near Merseburg, which suffered much in the Peasants' War and in the Thirty Years' War.

Mersey, a river of England, rising on the borders of the counties of Chester, Derby, and York, and after a S. W. course of 60 miles, in which it receives the waters of the Goyt, Irwell, Bollin, Weaver, and other tributaries, it empties into the Irish Sea, by a large estuary at Liverpool. It is navigable as far as Manchester, 31 miles.

Mersey Tunnel, a passage under the Mersey river, opened in 1886, and connecting Liverpool and Birkenhead by a railway. It is 21 feet high, 26 feet wide, and 31 feet below the bed of the river; is 4½ miles long with the approaches, and is ventilated by means of large fans and a small tunnel which runs alongside. The cost of construction was over $6,000,000.

Mersliakov, Alexis Theodorovich (mär-zlē-ä-kof′), a Russian author; born in Dolmatov, government of Perm, in 1778. He was an ardent classicist; Professor of Rhetoric and Literature at the University of Moscow in 1810. He wrote a number of poems which were set to music and became popular songs. His principal literary works were: "Ancient Poetry and Its Influence on Modern Civilization" (1810); and "Imitation and Translation of Greek and Latin Authors" (1825). He died near Moscow, Aug. 7, 1830.

Merthyr-Tydvil (-tud′vil), or **Tydfil** (so called from the martyrdom here of a Welsh princess of that name), a parliamentary borough and market-town of South Wales, on the confines of the counties of Glamorgan and Brecknock, 24 miles N. by W. of Cardiff, its port, and 178 W. of London.

Meru, in Hindu mythology, a fabulous mountain in the center of the world, 80,000 leagues high. It is the most sacred of all mythical mountains, and the abode of Vishnu.

Meru. See MOERO.

Merv, an oasis in Central Asia, N. of Afghanistan, the principal seat of the Teke-Turcomans, who from this center used to make predatory incursions into Persia and Afghanistan. In 1815 the oasis was subjugated by the Khan of Khiva, to whom it remained tributary for about 20 years. Subsequently Persia attempted to make good the claims which it had long laid to this district, and in 1860 fitted out an expedition for the purpose, which, however, miscarried completely. In 1881 General Skobeleff led a Russian expedition against the Teke-Turcomans, captured their stronghold of Geok Tepe, and received the submission of the people of Merv. The Russians, who are rapidly extending the area of cultivation by means of irrigation, maintain a body of troops here, and have made it the administrative center of the Penjdeh district, a small town having recently sprung up.

Merwar. See UDAIPUR.

Merwings. See MEROVINGIANS.

Méry, Joseph (mā-rē), a French writer; born near Marseilles, France, Jan. 21, 1798. Some of his works became very popular. Among them were the volumes of verse "Poetic Melodies" (1853), "Napoleon in Italy" (1859); the romances "London Nights" (1840), "Héva" (1843), "Novel Novels" (1853); the dramas "The Two Frontins" (1858), "The Fiancée Worth Millions" (1864). With Barthélemy he wrote satirical verses, and by himself librettos for several operas. He died in Paris, June 17, 1866.

Mesa, a high plane or table-land; more especially a table-land of small extent rising abruptly from a surrounding plain; a term frequently used in that part of the United States bordering on Mexico.

Mesembryaceæ (-bri-ā′se-ē), an order of perigynous exogens, alliance Ficoidales. It consists of succulent shrubs or herbs, with opposite simple leaves. The flowers are terminal, though so short-stalked as to appear lateral; they are showy, and generally open under the influence of sunshine, closing on its departure. Petals in many rows. Stamens indefinite in number; ovary inferior or nearly superior, many or one-celled. Stigmas numerous, distinct; ovules indefinite, attached to a central placenta. Fruit capsular, surrounded by the fleshy

calyx opening in a stellate manner at the apex, or splitting at the base. Found chiefly on the hot, sandy plains of South Africa. A few grow in the N. of Africa, in the S. of Europe, in Asia, the islands of the Pacific, and South America. Known genera, 16; species upward of 400.

Mesentery (mes'-), folds of the peritoneum connecting certain portions of the intestinal canal with the posterior wall of the abdomen. Also the membrane which forms the medium of attachment between the small intestines and the abdomen. It is a duplicature or folding of the peritoneum for the jejunum and ileum, the mesocæcum, the transverse and sigmoid mesocolon, and the mesorectum.

Meshhed, Meshed, or **Mashhad** (the "place of martyrdom"), a city of Persia, capital of Khorasan, and the center of important trade routes to Merv, Bokhara, and elsewhere, situated on a tributary of the Hari-Rud, 200 miles N. W. of Herat, and 460 E. by N. of Tēheran; manufactures felt-rugs, carpets, swords, turquoise jewelry, and velvet, cotton, and silk goods. As seen from a distance Meshhed appears a beautiful city, above its broad sweep of walls shining the gilded dome and minarets of the mosque that covers the tomb of Imam Riza, one of the most splendid structures of the East. Imam Riza, a follower of Ali, was the 8th imam of the Shiite sect, to which body of Moslems Meshhed is a sacred city. They venerate it as greatly as the Sunnite Moslems do the city of Mecca, and visit it annually to the number of 100,000 pilgrims. The climate is severe in winter, owing to the elevation, 3,055 feet. In summer the temperature ranges from 76° to 90° F. Near by are the ruins of Tas, the old capital of Khorasan, in which were buried Firdousi, the celebrated poet, Haroun-el-Raschid, the Sultan of the "Arabian Nights," and the Imam Riza. Pop. about 60,000.

Mesihi (mes'i-hē), a Turkish poet; flourished in the 14th century. He is one of the seven poets called by the Turks "the Pleiades," and whose names, written in gold, are suspended in the temple of Mecca. Sir William Jones, in his "Commentaries on Asiatic Poetry," translated one of his idyls.

Meskoutin, or **Hammam Meskoutin** ("the Accursed Baths"), a place in Algeria, 48 miles E. by N. of Constantine, with remarkable hot baths (203° F.), known to the Romans as Aquæ Tibilitinæ. They and the adjoining ferruginous and sulphurous springs (170°) are still used medicinally. The incrustations of carbonate of lime and clouds of steam, etc., give the region a very singular appearance.

Mesmer, Friedrich Anton, or **Franz,** a German physician; born near Constance, Baden, May 23, 1734. He was bred for the priesthood at Dillingen and Ingolstadt, but took up the study of medicine at Vienna, and took his doctor's degree in 1766 with a treatise on the influence of the planets. About 1772 he began to investigate the curative powers of the magnet, and was led to adopt the opinion that there exists a power, similar to magnetism, which exercises an extraordinary influence on the human body. This he called animal magnetism (see MESMERISM), and published an account of his discovery, and of its medicinal value, in 1775. In 1778 he went to Paris, where he created a great sensation. His system obtained the support of members of the medical profession, as well as of others; but he refused an offer of an annual pension of about $4,000 to reveal his secret; and this, combined with other circumstances, gave rise to suspicion, and induced the government in 1785 to appoint a commission, composed of physicians and scientists (Bailly, Franklin, Lavoisier, etc.), whose report was unfavorable to him. He now fell into disrepute, and, after a visit to England, retired to Switzerland, where he spent the rest of his life in complete obscurity. He died in Meersburg, Baden, March 5, 1815.

FRIEDRICH A. MESMER.

Mesmerism (mez'-), the system popularized by Mesmer, and by him called animal magnetism. Mesmer delighted in mysterious surroundings, and affected a strange weird style of dress; but one of his disciples, the Marquis de Puysegur, showed that sleep might be induced by gentle manipulation alone, thus removing mesmerism from the sphere of mystery to one where it might be subjected to scientific investigation. In 1843, Mr. Braid, a surgeon of Manchester, England, investigated the subject. In 1843, Baron von Reichenbach made public his views as to odyl. The phenomena of animal magnetism, electrobiology, hypnotism, mesmerism, and odylic force are practically the same. They have been scientifically investigated, notably by Dr. Carpenter in England and by Professor Weinhold and Dr. Heidenhain on the Continent. The chief phenomena are a hypnotic state induced by the patient gazing fixedly

at some bright object, or by passes made by the operator; muscular rigidity, sometimes to such an extent as to admit of the body resting supported only by the head and heels on two chairs, insensibility to pain, and perverted sensation, as exhibited in a slightly hypnotized patient drinking water and imagining it to be delicious wine or nauseous medicine at the will of the operator.

Mesne (mēn), an English law term, meaning middle, intermediate, intervening; as, a mesne lord, that is, one who holds lands of a superior, which or part of which he sublets to another person; in this case he intervenes between the two, being a tenant of the superior lord, and lord to their inferior tenant.

Mesonero y Romanos, Ramon de (mā-sō-nā′rō ē rō-mä′nōs), a Spanish writer, employing sometimes the pseudonym "El Curioso Parlante" (The Inquisitive Chatterer); born in Madrid, Spain, July 10, 1803. He was connected with the National Library, Madrid (1845). He wrote: "Manual of Madrid" (3d ed. 1844), containing apt pictures of life there; "Madrid Panorama" (2 vols. 1832–1835); "Types and Characters" (1843–1862); "Mementos of Travel in France and Belgium" (1842); "Ancient Madrid" (1861), a scholarly history, etc. He founded and edited the Spanish "Pictorial Weekly." He died in Madrid, in April, 1882.

Mesopotamia (-tā′miä), in ancient geography, a country of Western Asia, situate between the Tigris and the Euphrates. It was called, in the Old Testament, Aram Naharaim, or "Syria between the two waters," and Padan Aram, *i. e.*, "Syria of the Plain," and is first mentioned in the Scriptures as the country where Nahor and his family settled (Gen. xxiv: 10). It was long part of the seat of the very ancient Babylonian dominion, and subsequently of the Mede, Persian, and Macedonian. The Romans obtained possession of Mesopotamia in 165. Jovian surrendered it to the Persians in 363. The Carmathians overran it in 902, and the Turks conquered it between 1514–1516. It is now comprised in the pashalics of Bagdad and Diarbekr. In old times it was remarkable for its fertility, and sustained a crowded population, but the neglect of irrigation has reduced it to barrenness, and it is now inhabited only by roving bands of Arabs and Kurds.

Mesozoa (mes-o-zō′ä), a term applied by Van Beneden to a number of extremely simple animal parasites, found in cuttle fishes, brittle stars, and some worms. Their cells are in two layers, the inner forming reproductive elements; they have no mouth or gut, and are sometimes very like the larval forms (*planulæ*) of some jelly fish and other stinging animals. The name refers to their apparent median position between the single-celled Protozoa and the many-celled Metazoa.

Mesozoic, a term introduced by Phillips to designate the group of geological systems, the fossil remains of which differ equally from those of the Palæozoic ("ancient-life") and Cainozoic ("newer-life") eras. It is synoymous with the terms Secondary, and includes the Triassic, Jurassic, and Cretaceous systems.

Mesquit, or **Mesquite** (mes-kēt′), the shrub or tree *Prosopis juliflora*, of the United States and Mexico. Its wood is of a brown or red color, is heavy and hard and susceptible of a fine polish. It yields a gum resembling gum arabic. Its fruit pod called the "mesquit bean," is used as a fodder for cattle.

Mesquita, Salvador de (mās-kē′tä), a Brazilian poet; born in Rio Janeiro, in 1646. His reputation as a poet was assured when he wrote his sacred drama "The Sacrifice of Jephtha" (1680). His best tragedies are "Demetrius," "Perseus," and "Prusias of Bithynia" (1690 to 1700). He died in Rome, beginning of 18th century.

Mess, in sea language, a particular company of the officers or crew of a ship, who eat, drink, and associate together; in military language, a sort of military ordinary, established and regulated by the rules of the service, for all the officers in a regiment, and supported by their joint subscriptions, supplemented by a small government allowance. Similar institutions are extended to the non-commissioned officers of a regiment, but the technical meaning of messing as applied to officers does not hold with regard to common seamen and soldiers.

Messala, Corvinus Marcus Valerius (mes′sā-lä), a Roman consul. He was the friend of Brutus and Cassius, and fought on their side at Philippi, 42 B. C. He afterward attached himself successively to Antony and Octavius, served at the battle of Actium, 31, and the same year was chosen consul. He subdued Aquitania, of which he was made proconsul, and was honored with a triumph. For a short time he held the office of prefect of Rome, 26, but the same year retired, continuing, however, to hold the office of augur. Messala was the friend of Horace and Tibullus, of Mæcenas and Asinius Pollio, and other distinguished men of the age; was the zealous patron of literature and art; and one of the most eminent Roman orators. He died probably, about 3 B. C.

Messalina (-lī′nä), the name of two Roman empresses. MESSALINA VALERIA, who had for her fifth husband the Emperor Nero,

who had murdered her fourth husband, Atticus Vistimus. After the death of the emperor, in the year 68, she devoted herself to literary pursuits. MESSALINA VALERIA, daughter of Valerius Messalinus Barbatus, who became the wife of Claudius, and shared with him the imperial throne. Her licentious conduct is unparalleled in history, for she not only made her husband's palace the scene of her debaucheries, but often quitted it at night, and acted as a common prostitute. When summoned by the enraged emperor, after some fresh extravagance, in the year 48, she attempted to kill herself, but lacked courage, and her enemy Narcissus, who dreaded the result of the interview, caused her to be dispatched by a soldier.

Messenger, in law, a person appointed to perform certain ministerial duties in bankruptcy or insolvency, such as to take charge of the estate of the bankrupt or insolvent, and to transact certain other duties in reference to the proceedings in bankruptcy or in insolvency. In nautical language, a rope passing from the capstan to the cable to which it is fastened by nippers. The winding of the messenger on the capstan hauls in the cable, and the nippers are successively taken off that part of the cable that is approaching the capstan, and put on that part which has just come inboard, through the hawse hole.

Messenia (-sē′ni-ä), in ancient Greece, the W. of the three peninsulas that project S. from the Peloponnesus; bounded on the E. by Laconia, and on the N. by Arcadia and Elis. It was composed chiefly of fertile plains, separated by mountain chains and watered by the Pamisus and other streams, and yielded abundant corn and wine. The original Pelasgic inhabitants were conquered by the Dorians, but soon absorbed their conquerors and rose to great prosperity. This excited the envy of the Spartans, who waged two long wars (743–724 and 685–668) against the Messenians. Most of those who survived the second war emigrated to Sicily, where they took possession of Zancle, and changed its name to Messana, the present MESSINA (*q. v.*). Those who submitted to Sparta were made helots; but they revolted and waged a third war of 10 years' duration (from 464). The survivors settled in Naupaktos. After the battle of Leuctra (370) Epaminondas invited the descendants of the Messenians back to Greece, and they joyfully responded to his invitation. Their independence continued till the Roman conquest in 146 B. C. Messenia is the name of a nomarchy of the modern kingdom of Greece.

Messiah, or **Messias** (-sī′as), in Jewish history and faith, the Anointed One; a certain Personage or Being regarding whom Daniel prophesied. He was called "the Prince," was apparently identified with the "most Holy" (One), was to appear at the end of "seven weeks and three score and two weeks" from the issue of the decree to rebuild Jerusalem, was in 62 weeks to be "cut off, but not for Himself," after which Jerusalem was to be destroyed by foreign invaders (Dan. ix: 25, 26). In Psalm ii: 2, the Lord and His anointed might be rendered the Lord and His Messiah. Three classes of men were officially anointed under the Jewish dispensation: (1) Priests, and especially high priests (Exod. xxviii: 41; Levit. iv: 3, 5, 16; Num. xxxv: 25; (2) Kings (I Sam. ix: 16, xvi: 3; II Sam. xii: 7; I Kings i: 34, xix: 16); (3) Prophets; Elijah, before his translation, was directed to anoint Elisha, his successor (I Kings xix: 16; see also Isaiah lxi: 1–3). Presumably then the Messiah spoken of by Daniel would discharge priestly, kingly, or prophetic functions, or two out of the three, or all of the three. The name "the Prince" would suggest that kingly functions would be specially prominent. During the later and more calamitous period of the old Hebrew monarchy, there were increasingly ardent desires for the coming of the Messiah, who was regarded chiefly as deliverer from foreign oppressors. In Jewish belief that advent is still to be expected.

In Christian history and faith, the Anointed One is in Greek *Christos*, from *chrio* = to anoint. So thoroughly are the words identified, that the Hebrew *mashiachh*, which occurs 39 times in the Old Testament, is in every case rendered in the Septuagint christos. When Jesus of Nazareth consented to accept the appellation "the Christ," or simply "Christ," as His official designation, He claimed to be the Messiah of Daniel's prophecy (Matt. i: 16, xvi. 20, xxvi: 63; Mark viii: 29, xiv: 61; Luke iii: 15, ix: 20, xxii: 67; John i: 41, vi: 69, etc.). All Christendom has acknowledged the claim.

Messina (mes-sē′nä) (ancient Messana, or Messene), a city of Italy, in the N. E. of Sicily, on the Strait of Messina, 56½ miles N. E. of Catania, and 120 N. E. of Palermo; manufactures damasks and satins; trade very considerable; the exports consist principally of silk, oil, wine, coral, fruits, etc.; the imports are cotton and woolen fabrics, hardwares, and other articles of colonial produce. The town runs parallel with the strait, and has, for its finest part, the Marina, a long line of buildings facing the harbor, and running parallel with it for more than a mile. A broad quay separates it from the water. The town sweeps along the swelling eminences, and gradually rises so as to present almost

every public edifice in a striking point of view. The whiteness of the buildings forms a beautiful contrast to the dark-green of the forests behind. The harbor, which is formed by a projecting tongue of land, curved in the shape of a sickle, is four miles in circumference, the finest in the Mediterranean, and can accommodate more than 1,000 ships. The entrance is 700 yards wide. In 1783 and 1908 the city was largely destroyed by earthquakes.

MESSINA CATHEDRAL (DESTROYED BY THE EARTHQUAKE OF 1908)

Messina, Strait of, a channel of the Mediterranean, separating Italy from Sicily; length, 24 miles; width varying, 2½ to 14 miles. Since 1879 a scheme for making a railway tunnel under the strait has been under discussion.

Messuage (-swij), a dwelling-house

with the adjacent buildings and curtilage appropriated to the use of the household; a manor house.

Mestayer, William A. See HAUPT, WILLIAM AYRES.

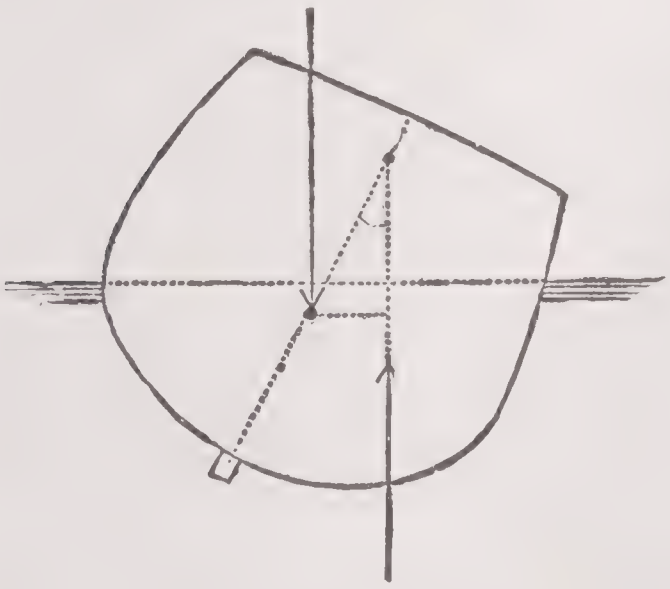
Mestizos (mes-tē′zōs), people of mixed origin in countries where Spanish Europeans have settled and intermingled with the natives, as in the Philippines.

Meta (mā′tä), a river of South America, rising on the E. slope of the N. E. range of the Andes, about 40 miles S. of Bogota (United States of Colombia), flowing a general E. N. E. course into Venezuela, and entering the Orinoco river; length, about 500 miles.

Metabola (-tab′o-lä), a sub-class of insects, containing those having complete metamorphosis. The larva, pupa, and imago are all very different in appearance, and these several states constitute three quite distinct phases of life. The larva is known as a maggot, a grub, or a caterpillar. The pupa, which is always quiescent, is sometimes called a chrysalis. Dallas divides it into two sections: Mandibulata, containing the orders *Coleoptera*, *Hymenoptera*, and *Neuroptera;* and Haustellata, containing the orders *Lepidoptera*, *Diptera*, and *Aphaniptera*.

Metacarpus (-kar′pus), the bony structure of the palm of the hand, between the wrist and the fingers; it comprises five shafted bones.

Metacenter, the point of intersection of the vertical line passing through the center of gravity of a floating body *in equilibrio*, and a vertical line through the center of



METACENTER.

gravity of the fluid displaced, if the body be turned through a small angle, so that the axis takes a position inclined to the vertical. If the metacenter is above the center of gravity, the position of the body is stable; if below it, it is unstable.

Metallurgy. For the specific treatment of the ores of copper, gold, iron, silver, tin, zinc, etc., see the articles on those metals.

Ancient Metallurgy.— The art of smelting ores was probably discovered by observing the effect of a big fire on some rich ore that happened to be in the way. Gold is always found native, and silver and copper sometimes. The ancient Egyptians worked in gold, silver, and bronze with a degree of skill that could only have been reached by gradual steps extending over thousands of years. In India and some other parts of Asia malleable iron is made directly from rich ores in furnaces scarcely bigger than chimney cans, by a process in use from time immemorial; and by a similar process savages in some parts of Africa also smelt iron. It is supposed by some archæologists that most parts of Africa passed directly from the stone to the iron age, but there seems to be evidence that in some places on that continent the making of various articles of the copper of the country has been long practised by aboriginal tribes.

Among the remains found in the lake dwellings of Central Europe are crucibles for melting metals, ingots of copper and tin, and in one crucible traces of gold were found. Bronze implements are abundant, but the considerable number of copper hatchets which have now been discovered has raised the question as to whether in prehistoric times a copper age has not preceded those of bronze and iron. Copper is more easily smelted than iron; and bronze being an alloy of copper and tin, must somewhere have been preceded in its application to hatchets or other articles by unalloyed copper, though this may not have been the case in Europe. Some copper hatchets, and other implements of this metal, are the only evidence we have that the ancient Mexicans made any use of metal tools; though their artificers were skilled in casting gold and silver, and in hammered work and chasing, and tin as well as copper ore was mined, and the two combined as bronze. The early tribes inhabiting the country about Lake Superior, where native copper is plentifully found, made knives and ornaments of the metal by hammering it cold, in some cases, it is believed, with stone implements. Small chisels, rings, idols, and other objects made of gold and of ancient date, some of which are of thin, flat beaten plates, have been obtained in the republic of Colombia, South America. Silver articles of a rude archaic character appear to be rare. It is likely that the working of these native metals in the cold state in certain limited areas preceded the art of manipulating any metal by heat

Modern Metallurgy.— As now understood this is the art of extracting metals

from their ores. The operations are partly mechanical and partly chemical. Those processes which depend principally on chemical reactions for their results have reference chiefly to the roasting and smelting of ores, and are described under the heads of the different metals. But there are certain preliminary operations of a mechanical kind which metallic ores undergo, such as crushing, jigging, washing, etc., which we shall describe here, as they are essentially the same for the ores of lead, copper, tin, zinc, and indeed most of the metals. Till comparatively recent times ore, or rather ore-gangue, as it came from the mine was in the first instance broken by hammers before being passed on to crushing rollers or stamps to be reduced to smaller pieces or grains. In the year 1858 Mr. E. W. Blake of New Haven, Conn., invented a stone or ore crusher which has become so extensively used that it has, except in special cases, superseded hand labor for breaking up large pieces of ore. After passing through this or some similar crusher, the vein stuff or impure ore is next taken either to the crushing rollers or to the stamping mill.

For pulverizing some ores — *e. g.*, tinstone and auriferous quartz — a stamping mill is used. It consists of a series of upright shafts with a weighty piece of iron at the bottom of each. They are raised by means of an axle with projecting cams, and then falling by their own weight act like hammers. Except in chlorination and amalgamation works (see GOLD), the wet process of stamping is generally adopted — that is, the cast iron or steel shoes of the stamps work on cast iron or quartz bottoms placed in stamp troughs filled with water.

Sizing apparatus or sorting machines are employed for dividing the crushed ore stuff into grains of several sizes. A common hand riddle is the simplest form of sizing implement. One kind of apparatus in use consists of a series of flat-bottomed sieves with graduated meshes placed on different levels and mechanically agitated so as to pass the stuff across the perforated bottoms. The first sieve separates the largest grains, the second the next in size, and so on. A rotating drum sieve or trommel is, however, more frequently employed. It is placed horizontally, and is to some extent conical in shape. Sometimes it is one long continuous trommel in sections, in which case the finest stuff passes through the first section, the next larger through the second, and so on through, say, five or six divisions to the largest grains. In other cases a system of separate conical trommels, in which the sizing takes place from large to small grains, is employed. With the trommel water is used, and though its axis may be quite level, the falling angle of its shell together with its motion impels the ore stuff from the smaller to the larger end. Trommels are used for clearing off earthy matter and for draining off water from ore as well as for sizing.

After the ore stuff has been sorted according to the size of the grains, the next step is to separate by specific gravity the pure ore from the gangue or non-metallic minerals associated with it. If the reduced particles be those of vein stuff containing more than one kind of ore, these are also separated by gravity. If equal-sized grains of galena, blende, and quartz, whose respective densities are 7.5, 4, and 2.7, are allowed to fall freely in some depth of water, the three substances will separate into layers at the bottom, in which case the lead ore (galena) will form the lowest, the zinc ore (blende) the middle, and the quartz the top layer. But in hydraulic jiggers (some are pneumatic) the column of water, at most under three inches, is too shallow to admit of separation by simply dropping the grains. Consequently these are placed in a sieve immersed in water, and subjected to a repeated up-an-down motion, in which the ascent of the jigging stuff takes place by jerks, but in the descent it falls freely. In this way the pure ore, or at least the best ore, accumulates at the bottom, and is usually sufficiently rich for smelting. The gangue on the surface is skimmed off or otherwise removed. In hand-jigging the sieve is vigorously jerked in a tub of water; in the brake-jigger the jerking motion is produced by a hand-lever and connecting rod; and in continuous jiggers, mechanical contrivances are used to carry into different receptacles the mineral grains separated on the sieve in layers without interrupting the jigging process.

The dressing of fine sandy, mealy, or slimy ore-stuff, which is not suitable for jigging, is effected on buddles or sloping tables. Buddles are inclined planes, often circular, or rather conical in shape, over which the fine stuff suspended in water descends. In doing so the heavier metallic particles fall at the top of the table or cone while the lighter waste is carried down to the foot. See MINERAL PRODUCTIONS, UNITED STATES.

Metals. Though each metal is considered in a separate article, there are various points regarding the general physical and chemical characters of these bodies, and the method of classifying them, which require notice. A metal, from the chemical point of view, is an element which can replace hydrogen in an acid and thus form a salt. Hydrogen itself is, chemically, considered to be a metal. Those elements which are non-metallic in this sense are called metalloids.

Metals

Among the chief chemical properties of metals are their strong affinities to certain of the non-metallic elements. All the metals, without exception, combine with oxygen, sulphur, and chlorine, and often in several proportions, forming oxides, sulphides (formerly termed sulphurets), and chlorides. Many of them combine with bromine, iodine, and fluorine. The other other compounds of this nature, excepting carbide (formerly carburet) of iron, or steel, and the hydrides of arsenic and antimony (commonly known as arseniuretted and antimoniuretted hydrogen), which are of importance in toxicology, may be passed over without notice. The metallic oxides are, without exception, solid bodies, white or colored, and usually present an earthy appearance. Hence the old name of metallic calx applied to these oxides. Those oxides which are termed basic possess the property of directly uniting with the so-called oxy-acids (such as sulphuric, nitric, carbonic, and silicic acid), and of forming new chemical compounds of the second order, termed salts. The compounds of the metals with chlorine, iodine, bromine, and fluorine — such, for instance, as chlorine of sodium, or common salt, ClNa — are termed haloid salts. The same metal may often combine both with chlorine and with oxygen in more than one proportion. For example, we have subchloride of mercury, Hg_3Cl_2; suboxide of mercury, Hg_2O; chloride of mercury, $HgCl_2$; oxide of mercury, HgO. For the compounds of the metals with sulphur, see SULPHUR.

The following are the most important of the physical properties of the metals: (1) All metals, unless when they are in a finely-pulverized form, exhibit more or less of the characteristic luster termed metallic. Two of the non-metallic elements, iodine and carbon, in some forms also present a metallic luster. (2) All metals are good conductors of heat and electricity, though in very unequal degrees. (3) With the exception of mercury, all the metals are solid at ordinary temperatures. With the exception of gold, copper, calcium, and strontium, the metals are, when light is only once reflected from them, more or less white, with a tendency to blue or gray. Most of them have been obtained in crystals, and probably all of them are capable of crystallizing under certain conditions. (4) Metals are remarkable for their opacity, except when they are chemically reduced to extremely thin films. (5) All the metals are fusible, though the temperatures at which they assume the fluid form are very different (see MELTING POINT); and some of them, as mercury, arsenic, cadmium, zinc, etc., are also volatile. (6) Great weight, or a high specific gravity, is popularly but erroneously regarded as a characteristic of a metal; while platinum, osmium, and iridium (the heaviest bodies known in nature) are more than 20 times as heavy as water, lithium, potassium, and sodium are actually lighter than that fluid. (7) Great differences are observable in the hardness, brittleness, and tenacity of metals. While potassium and sodium may be kneaded with the finger, and lead may be marked by the finger-nail, most of them possess a considerble degree of hardness. Antimony, arsenic, and bismuth are so brittle that they may be easily pulverized in a mortar; while others, as iron, gold, silver, and copper, require great force for their disintegration. Taking iron and lead as representing the two extremes of tenacity, it is found that an iron wire will bear a weight 26 times as heavy as a leaden wire of the same diameter. See DUCTILITY: MALLEABILITY.

Metals enter into combination with one another when they are fused together, and such a combination is termed an ALLOY (*q. v.*), unless when mercury is one of the combining metals, in which case the resulting compound is termed an AMALGAM (*q. v.*). It is doubtful whether all alloys are true chemical compounds. Definite compounds of the metals with each other do, however, certainly exist, and are sometimes found native, as, for example, the crystallized silver and mercury compound represented by the formula AgHg.

In consequence of their strong affinities for the metalloids the metals are seldom found in a free or uncombined state, even in the inorganic kingdom, and never in animals or plants. The more common metals, in consequence of their strong affinity for oxygen and sulphur, are very rarely met with in the uncombined state; but some of those which are less abundant, such as gold, silver, and platinum, are found uncombined, in which case the terms native and virgin are applied to them; and other metals, as mercury and copper, occur both in a free and in a combined state. Many native alloys are found, but the ordinary sources of the metals are oxides, sulphides, chlorides, and carbonates, sulphates, and other salts. These are termed the ores of the metals. The methods of obtaining the metals from their various ores fall under the head of METALLURGY (*q. v.*).

Various classifications of the metals have been suggested by different chemists. The following is probably one of the most convenient:

(I.) The LIGHT METALS, subdivided into —

(1) The metals of the alkalies — viz., potassium, sodium, cæsium, rubidium, lithium.

(2) The metals of the alkaline earths — viz., barium, strontium, calcium, magnesium.

(3) The metals of the true earths — viz., aluminium, glucinum, zirconium, yttrium erbium, terbium, thorinum, cerium, lanthanum, didymium.

(II). The HEAVY METALS, subdivided into —

(1) Metals whose oxides form powerful bases — viz., iron, manganese, chromium, nickel, cobalt, zinc, cadmium, lead, bismuth, copper, uranium, thallium.

(2) Metals whose oxides form weak bases or acids — viz., arsenic, antimony, titanium, tantulum, niobium (or columbium), tungsten, molybdenum, tin, vanadium, osmium.

(3) Metals whose oxides are reduced by heat — noble metals — viz., mercury, silver, gold, platinum, palladium, iridium, ruthenium, rhodium, osmium. (Several of the rare metals are here omitted.)

Another classification is that by which the metals are arranged in six groups, each group being named after a metal which possesses the common characters in a well-marked degree: viz. (1) the sodium group, (2) the calcium, (3) the iron, (4) the copper, (5) the platinum, and (6) the antimony groups. See MINERAL PRODUCTIONS, UNITED STATES.

Metal-work, Artistic. Of early gold and silver work one of the most renowned objects is the altar made of these two metals in the church of St. Ambrose at Milan. It was executed by Wolvinus in the 9th century, and contains figures in relief of Christ and the Apostles, with ornamental borders in enamel. Another very fine example of work in gold and enamel is the Pala d'Oro (altar front) of St. Mark's, Venice, by Byzantine artists of the 10th or 11th century. Some specimens of Celtic art, partly in precious metal, such as the Tara Brooch and the Ardagh Chalice — the latter supposed to be of the 10th century — are of exquisite beauty. The shrine of the Magi in Cologne Cathedral is a magnificent reliquary of the 12th century, in which the figures are of gold and the architectural decorations covered with enamels and precious stones. A considerable number of specimens of ecclesiastical gold and silver work of the 13th century remain, including a few of great interest. Of 14th century examples — a time when the goldsmith's art ceased to be employed exclusively in the service of the Church — the splendid silver reliquary in the church of Orvieto, by Ugolino of Siena, is very remarkable. Perhaps the two most important monuments of the goldsmith's art made in the Middle Ages are the altar of St. James, Pistoia, and that of the Baptistery of St. John at Florence. They were begun in the 14th century, and a number of the most famous Italian artists were in succession engaged on them for a period of 150 years. Both are of silver, one of them being decorated with subjects from the life of St. James, and the other with scenes from the life of St. John. Giglio of Pisa, Pietro Tedesco, Ricciardi, Cipriano, and Filippo were among the artists engaged on the St. James altar; and Cioni, Ghiberti, Cenni, Verrocchio, and Pollaiuolo worked at that of St. John. Some of the greatest artists in Italy in the 14th and 15th centuries practised to some extent the goldsmith's art, including Lucca della Robbia, Ghiberti, Brunelleschi, Donatello, and Jacopo della Quercia. In the 16th century Cellini's is the greatest name, though well authenticated works by him in the precious metals are few in number. There are some very artistic productions in pewter by the French artist François Briot, who lived in the 16th century.

Bronze is a metal in which many fine works have been executed, and these are often of large size. Few early examples exist of which the artists are known. Stanracius of Constantinople cast in the 11th century the bronze gates of St. Paul's-without-the-Walls at Rome, destroyed in 1823, but of which drawings exist. A century later an artist named Barisanus made the fine bronze door of the cathedral of Monreale in Sicily. One of the most artistic productions in this metal of the 13th century is the candelabrum in Milan Cathedral, 15 feet high. The E. door of the Baptistery at Florence, on which Ghiberti was engaged from 1425 to 1452, is considered a marvelous work of art. Another door in this building, by A. Pisano, completed in 1430, after being in progress for 20 years, is also an admirable production. P. Vischer's shrine of St. Sebald at Nuremberg is a beautiful monument which, though quite different in form from the objects named above, resembles them in the design being an intimate combination of small works in sculpture and architectural ornament. A fountain in the Maximilian-strasse, Augsburg, executed by H. Gerhard in 1593, has been much admired. For want of space only two more bronzists can be named — B. Morel, who did the great candelabrum in Seville Cathedral, and L. Bernini, who in the 17th century executed many clever works in Italy.

There is perhaps no class of metal objects in which artistic skill is more marvellously displayed than in some of the rich suits of armor made in the end of the 15th, but chiefly in the 16th century. These are far the most part of iron or steel, with ornament in *repoussé* or engraved; sometimes with both combined, and occasionally with damascening in gold and silver. Among those who practised the armorer's art in Italy the most famous names are Michelangelo, Filippo Negrolo, Romero, and some

members of the Piccinini family. In Germany Kollman of Augsburg, and in France Antoine Jacquard stood high. Some of the finest suits of armor made at this period are in the Museum of Arms at Dresden, and in the Louvre and Musée d'Artillerie, Paris.

Wrought iron work, rude but effective, appears on the wooden doors of some Romanesque churches of the 12th century. In the 13th and 14th centuries the work in this metal became more refined, and among admirable examples of the latter period may be mentioned the screens round the tombs of the Scala family at Verona, and a screen in the church of Santa Croce, Florence. Screens, grilles, and other objects with open wrought iron ornament, beautifully designed, and ranging over a period from the 13th to the 16th century, but especially those made during the 15th and 16th, are found in many churches in Germany, Spain, France, and England. In the latter country the early grille over Queen Eleanor's tomb, Westminster, and the later screen to Edward IV.'s at Windsor are fine examples; so also are the still later (18th century) railing panels made for Hampton Court Palace by Huntington Shaw. The canopy of a draw well at Antwerp by Quentin Matsys is one of the best works of its kind in hammered iron. Many of the elaborately chiseled iron locks and hinges made at Nuremberg and Augsburg in the 15th and 16th centuries are wonderfully beautiful. The National Museum at Munich is especially rich in specimens of these.

Metamerism (-tam'-), in chemistry, the character in certain compound bodies differing in chemical properties, of having the same chemical elements combined in the same proportion and with the same molecular weight; thus aldehyde (C_2H_4O) and oxide of ethylene (C_2H_4O) have their elements in the same proportion and the same molecular weight, 44. Metameric bodies do not, however, belong to the same class or series of compounds.

Metamorphic Limestone, crystalline, or, as it was called by the older geologists, Primary Limestone. In general it occurs in thin beds forming a foliated schist, resembling gneiss or mica-schist, and alternating with those rocks, in which case it often contains crystals of mica, sometimes with quartz, hornblende, talc, chlorite, garnet, etc. At other times, it is a white, crystalline, granular marble, capable of being used for sculpture. It is largely developed in the Alps, and more sparingly in the hypogene districts of Norway, Sweden, and Scotland.

Metamorphic Rocks, or **Metamorphic Strata,** in geology, the term — first proposed by Lyell in 1833, and since universally adopted — for the stratified crystalline rocks — that is, rocks which have been presumably laid down originally by the action of water, and then transformed by fire, chemical agency, pressure, or all combined. Metamorphic action is divided into local — affecting only small portions of rock, or small areas, and regional — affecting rocks over considerable regions. The metamorphic rocks constitute one of the five great classes of rocks. The chief are gneiss, eurite, hornblende schist, serpentine, actinolite schist, mica-schist or micaceous schist, clay slate, argillaceous schist or argillite, chlorite schist, quartzite or quartz rock, and crystalline or metamorphic limestone. Besides these which were probably the first sedimentary, the other classes of rocks have in places undergone metamorphosis.

Metamorphosis (-mor'fo-sis), a change or transformation in the form, shape, structure, or character of anything.

In botany, a change, especially of an abnormal character, in an organ. It may be progressive or retrogressive. Calyx, corolla, stamens, and pistils are all transformed leaves. This interesting discovery — foreshadowed by Jung or Jungius in 1678, Linnæus in 1763, and Caspar Friedrich Wolff in 1759 — was first clearly enunciated by Goethe in 1790. In the peony, *Pœonia albiflora,* a whole series of the connecting links may be observed between the form of the lower leaves and that of the petals, the higher leaves and then the bracts being the connecting links. In the white water-lily, *Nymphœa alba,* a similar gradation may be observed between petals and stamens. In the double-flowered cherry the pistils will sometimes be found to have reverted to the appearance of leaves.

In entomology, a series of transformations which insects undergo in their progress from the egg to full maturity. Macleay divided metamorphosis into obtect, as in Lepidoptera and Trichoptera; coarctate, as in Hymenoptera and Diptera; incomplete, as in Coleoptera and Aptera; and semi-complete, as in Orthoptera and Hemiptera. Now only two divisions are generally recognized — viz., perfect when the pupa is inactive, and imperfect when it is the reverse. In the Lepidoptera (butterflies and moths), the metamorphosis is complete. They may stand as types in this respect of the whole class. The animal emerges from the egg as a caterpillar with six legs, which will become the future legs of the perfect insect, and some prolegs, destined to disappear. Its function in the larval state is to eat, which it does with such vigor and persistency that its skin, time after time, becomes too small to contain its expanding body, and has to be renewed. When the caterpillar is full grown it ceases to eat, becomes quiescent, and has developed

around it a horny case, in which it lies like a corpse in its coffin. In due time it makes its way out of its chrysalis as a full-developed winged animal. There are analogous changes more or less complete in the other orders.

In zoölogy, metamorphosis takes place in many other animals besides insects. Thus a barnacle (Lepas) or an acorn-shell (Balanus) is at first a free and swimming creature, which ultimately becomes sedentary and attached to rocks or ships' bottoms. Metamorphosis exists also in Annelids, in Mollusks, in Medusas, etc.

Metaphor, a figure of speech by which a word is transferred from an object to which it properly belongs to another, in such a manner that a comparison is implied though not formally expressed; a simile without any word implying comparison; a short simile. Thus, "That man is a fox," is a metaphor; but "That man is like a fox," is a simile. "He bridles his temper," is a metaphor, expressing that a man restrains or controls his temper, as a bridle serves to restrain or control a horse.

Metaphysical Poets, a term first applied by Dr. Johnson in his life of Cowley to the group of which Donne is the most striking example. They were men of learning, and to show their learning was their whole endeavor; they neither copied nature nor life, hence their thoughts are often new but seldom natural; the most heterogeneous ideas are yoked by violence together, nature and art being ransacked for illustrations, comparisons, and allusions; they failed, as might have been expected, in moving the affections or attaining the sublime, but what they wanted they endeavored to supply by hyperbole. Their constant weakness is the tendency toward conceits and similes that are merely fantastic and ingenious, which mars a modern reader's pleasure in almost every poem of Donne and Cowley.

Metaphysics, a term popularly employed to denote a science dealing with subjects incapable of being dealt with by physical research. Broadly viewed, the Aristotelian metaphysic was the science of the first principles of being, the science of the first principles of knowing, and the science of God, as the beginning and ending of all things; and these three were the foundation of scholastic philosophy, which found its highest expression in Thomas Aquinas. Metaphysics "is made by him conversant with being as such and its modifications. In itself each *ens* is *res* and *unum;* in distinction from others it is *aliquid*; as in harmony with the action of the knowing faculties, it is *verum*; and as harmonizing with the will, it is *bonum*." The Roman Catholic metaphysic of the present day is, to a great extent, Thomist, and is divided into General, or Ontology, and Special, embracing Cosmology, Psychology, and Natural (as distinguished from Moral and Dogmatic) Theology. The Leibnitzo-Wolfian metaphysic is noteworthy for its rationalistic tendency. Its ontology treats of the existent in general; its rational psychology, of the soul as a simple non-extended substance; its cosmology, of the world as a whole; and its rational theology, of the existence and attributes of God. The metaphysic of Kant was rationalist.

Metaphyta (-fī′-), many-celled plants, in contrast to the single-celled protophytes.

Metargon (-ar′-), an atmospheric element discovered by Professor Ramsay and Dr. Norman Collie, of England, in June, 1898. By means of liquid air they succeeded in liquefying a quantity of argon. It formed a colorless fluid, but two other products also resulted. These were a lighter gas, which failed to liquefy, and a solid deposit which gathered on the sides of the tube. The spectrum of this latter material, frozen out of argon, proved to be complex, but totally different from that of argon, and its behavior at low temperatures was markedly different, though its density was practically identical. It was proved to consist of a single element, occupying the same position in regard to argon that nickel does to cobalt, having the same atomic weight, yet different properties. This substance, therefore, its discoverers regarded as a distinct elementary body, though in some respects in close relation to argon from which it was separated, and very appropriately named it metargon. Of course, metargon at an ordinary temperature is a gas. The lighter gas, which failed to liquefy, its discoverers named neon.

Metastasio, Pietro Antonio Domenico Buonaventura (mā-täs-tä′zē-ō), an Italian poet; born in Assisi, Italy, Jan. 13, 1698. He was the son of a common soldier, named Trapassi. When he was only 10 years of age, his talents of extemporizing in verse attracted the notice of Gravina, who took him under his protection, called him (by a translation of his name into Greek) Metastasio, paid great attention to his education, and on his death, in 1717, left him his whole estate. The young poet, being thus placed in an easy condition, devoted himself to his favorite study, and, under the guidance of the celebrated singer, Maria Romanian (afterward Bulgarelli), created the modern Italian opera. Charles VI. invited him to Vienna, in 1729, and appointed him poet-laureate, with a pension of 4,000 guilders. Thenceforward no gala took place at court which was not graced by his verses. The Empress Maria Theresa bestowed upon him magnificent presents, as also did Ferdinand VI., King of Spain. Thus honored

and beloved, his life presented a calm uniformity for half a century, during which period he retained the favor of the imperial family undiminished, his extraordinary talents being admirably seconded by the tenor of his private character, and his constant observance of the conventional properties of high life. He composed no less than 26 operas and 8 sacred dramas, besides innumerable minor pieces. The poetical characteristics of Metastasio are sweetness, correctness, purity, gentle pathos, and elevated sentiment. He died in Vienna, April 12, 1782.

Metatarsus, the part of the foot popularly known as the "instep."

Metaurus (-tâ′-), a river of Central Italy, still called the Metauro or Metro, emptying into the Adriatic near Fano. On its banks the Romans defeated the Carthaginians under Hasdrubal in 207 B. C.

Metayer (-tā′yur), one who cultivates the soil under an engagament with his landlord, not paying a fixed rent, either in money or in kind, but a certain proportion, generally one-half, of the produce, the landlord furnishing the whole or part of the stock, tools, etc.

Metazoa (-zō′-), many-celled animals, composed of tissues, originally developed from three cell layers. The group comprises all the higher animals, from sponges to man, and is opposed to the Protozoæ, which are microscopic or one-celled animals.

Metellus, Quintus Cæcilius (-tel′lus), surnamed MACEDONICUS, a Roman consul; born of a distinguished plebeian family. While prætor, 148 B. C., he defeated and took prisoner Andriscus, the pretender to the throne of Macedonia. He then commanded against the Achæans, and had nearly closed the war before the arrival of Mummius. On his return to Rome he had a triumph, received the surname Macedonicus, and, in 143, was chosen consul. The same year he was sent to Spain as pro-consul, and carried on the Celtiberian war, which was finished by Q. Pompeius. He was afterward censor, and died full of honors in 115.

Metellus, Q. Cæcilius, surnamed NUMIDICUS, a Roman consul, nephew of the preceding; educated at Athens. After holding various public offices, he was chosen consul, 110 B. C., and was charged with the conduct of the war against Jugurtha, King of Numidia. He had virtually brought it to a close, when, by an intrigue of his ambitious legate, Caius Marius, he was superseded in command by the latter. He was well received at Rome, 107, both by senate and people, and received a triumph. He became one of the firmest supporters of the aristocratic party, was censor in 102, and, through the influence of Marius, was exiled two years later. To prevent civil strife and bloodshed on his account, he quietly left Rome and went to Rhodes, whence he was recalled within a year. His eloquence is highly spoken of. Died 99 B. C.

Metellus, Q. Cæcilius, surnamed PIUS, a Roman consul, son of the preceding; contributed by his earnest persuasions to the recall of his father from exile, 99 B. C., and thus acquired his honorable surname. He served in the Social and Samnite wars, and joined the party of Sulla against Marius, winning several great victories. He was chosen consul in 80, and then for some years commanded against Sertorius in Spain, Pompey being associated with him from 76. After the death of Sertorius, Metellus returned to Rome, and. with Pompey, had the honor of a triumph. Metellus was pontifex maximus, and died probably in 63.

Metempsychosis (-si-kō′sis), transmigration; the passage of the soul from one body to another.

Meteor, a luminous body appearing for a few moments in the sky, and then disappearing, exploding or descending to the earth; a shooting star. On any clear night an occasional meteor may be seen, but the most brilliant displays are confined to particular dates. A very notable one is on Nov. 13 or 14. In 1864, Prof. H. A. Newton, of Yale College, predicted a display in 1866, and determined the length of the meteoric cycle, the annual period, and the probable orbit round the sun of the November stream. The display which came on Nov. 13, 1866, was splendid. It was seen all over Europe, at the Cape of Good Hope, and elsewhere. About 8,000 meteors were counted at Greenwich, and it is supposed that 1,000 more may have escaped observation. They came from a radiant point 149° 12′ of right ascension, and 23° 1′ of N. declination, between Gamma and Epsilon Leonis, just N. of the bright star Regulus. On an average, each meteor was visible about three seconds, and drew a cord of silver radiance, from 20 to 40 degrees in length. In November, 1867 and 1868, considerable star showers were seen in the United States. Similar displays have been seen in November of the years 902, 931, 934, 1002, 1101, 1202, 1366, 1533, 1602, 1698, 1799, 1832, and 1833. That of Nov. 12, 1799, was one of the finest. It was seen by Humboldt and Bonpland at Cumana, in South America. Professor Adams places the more magnificent displays at intervals of 33¼ years apart.

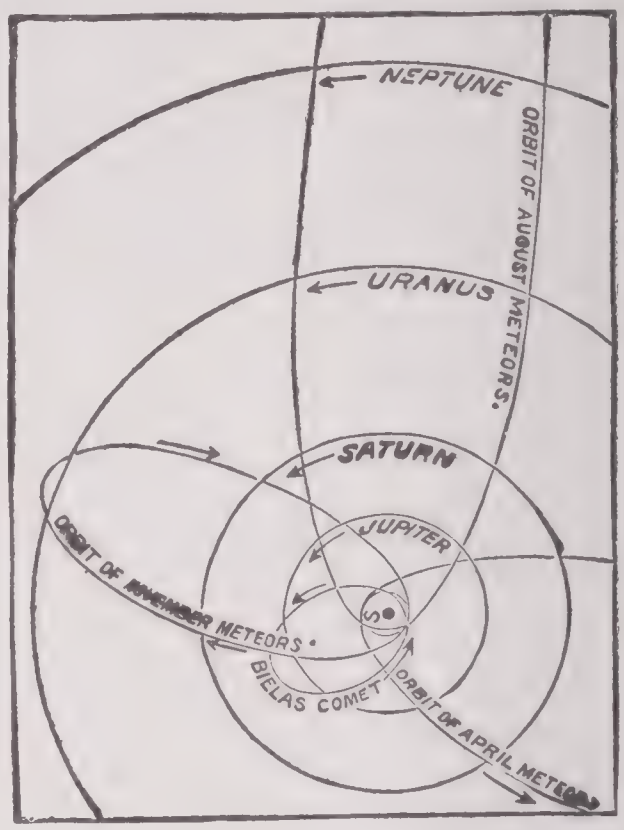
It is believed that a ring of meteors revolves round the sun, portions of it very thickly studded with them, while at others they are only sparsely scattered. Every year the earth's orbit cuts through the ring, though only at intervals of about 33 years through the part where they are most

crowded. The meteors themselves are of iron, which, striking the atmosphere of the approaching earth with planetary velocity, ignite and go to dust. Leverrier considers that in A. D. 127 the attraction of the planet Uranus brought them into their present orbit. Heis and Alexander Herschel recognize about 100 other meteor systems; hence it has been found needful to distinguish them by names. The November meteors coming from the constellation Leo are called Leonids. The next in importance appear about Aug. 10, and come from the constellation Perseus. They are therefore named Perseids. Of old they were the Tears of St. Lawrence. They appear generally much earlier in the evening than the Leonids. In 1866 Prof. Alexander Herschel, son of Sir John Herschel, studying the August meteors with a spectroscope, found some of them to consist in large measure of sodium vapor, and to be "nothing else but soda flames." There are also Lyrids, Geminids, Orionids, Draconids, Aquariads, Andromedes, etc. Professor Schiaparelli, of Milan, has shown that the orbits of particular comets often wonderfully coincide with those of meteoric rings. A small comet, called Temple's, invisible to the naked eye, coincides with the orbit of the November meteors, and a large one, called Tuttle's comet, visible to the naked eye in 1862 with that of the Perseids.

The following is the generally accepted classification of meteors:

1. Telescopic meteors, only rendered visible to the naked eye by the aid of telescopes.
2. Shooting stars, visible to the naked eye, and comparable to the different apparent magnitudes of the fixed stars in brightness.
3. Bolides and Fireballs, or very luminous meteors, comparable in brilliancy to the planets Jupiter and Venus, and to the different phases of the moon, and sometimes even rivaling the sun by appearing with much splendor in broad daylight, the term bolides being usually applied to the smaller, and fireballs to the larger kinds.
4. Detonating or "Areolitic" meteors, fireballs which produce an audible explosion, like a distant cannon, a peal of thunder, or an earthquake shock, by their concussion with the air, and which differ accordingly from the last (as "forked" lightning often does from distant and "sheet" lightning) only by the thunder-clap that not unfrequently reverberates from fireballs of the largest and brightest class; or, finally, as
5. Stonefalls and Ironfalls (the latter very rare occurrences), or the falls of meteorites, either singly or in a shower, it may be of many thousands of fragments, from a fireball, which, especially if seen in the daytime, when these occurrences are usually observed, is almost always a large meteor of the last-named description.

On Dec. 21, 1876, a detonating meteor exploded almost directly over the city of Bloomington, Ill., at a height of about 75 miles. Its detonating was so tremendous as to shake the city like an earthquake. Fragments of the meteor formed a cluster of fire-balls 5 miles wide and 40 miles long. The main portion of the meteor, with a rumbling roar like thunder, passed on E., and out of our atmosphere, over the Atlantic Ocean. On Feb. 10, 1896, a remarkable meteor exploded over the city of Madrid. Though it appeared during the daylight, its brilliancy was such as to dazzle



TRACK OF METEOR SHOWERS.

the eyesight of persons in Madrid and to make it visible as far away as Gibraltar. It exploded at a height of about 15 miles, and so tremendous was the detonation that it was heard and its tremors felt over a radius exceeding 50 miles.

Meteorology, that branch of science which observes, registers, classifies, and compares the various and varying phenomena of our atmosphere. It remarks, at the same time, the connection of those phenomena with heavenly bodies, and with the solid and liquid materials of the earth, in reference to their reciprocal and combined influence in determining the character of different climates, and with the view of learning the meteoric history of every region of our globe, of ultimately investigating the laws of atmospheric change and the plan of meteoric action; the theory, in fact, of meteorological phenomena, on which depends essentially the fitness of the various portions of the earth's surface for the production of different vegetable and other substances, and for the support of animal life.

Forecasting the Weather.— Birds and beasts are all more or less sensitive to coming changes in the weather, and by observation of their movements, sure warning of changes in the weather may be obtained. Among other instances it is observed that sea birds, as stormy weather comes on, fly inland in search of food; wild fowl leave the marshy grounds for higher localities; swallows and rooks fly low before and dur-

ing bad weather; frogs are unusually noisy before rain; sheep huddle together near bushes and trees.

It was not till the discovery of the barometer, in 1643, that the first great step was made toward a knowledge of the nature of our atmosphere. We were then, by its help, enabled to ascertain the weight and pressure of the great aërial ocean which surrounds us, and to learn when and where it was in a state of calm or storm. The invention of the thermometer, shortly afterward, gave the means of determining its temperature. The hygrometer for showing the amount of moisture it contained, and the anemometer for giving the direction and force of the wind, are also instruments of great importance to the meteorologist. The indications of these instruments, combined with the careful observation of atmospheric appearances, interpreted by the results of former observations, will enable the individual observer generally to predict the kind of weather that may be expected in his immediate locality for a day or sometimes longer in advance. A strip of seaweed forms a very useful hygrometer for practical purposes, provided it be not kept in a room warmed artificially. In fine weather it will keep dry and have a somewhat dusty feeling, but with an increase of moisture in the air will become limp and sticky, indicating a probable change of weather in the shape of rain.

Since the discovery of the barometer, the science of weather forecasting has made much progress in its details, but, for the individual observer, the method remains much the same now as before. The principal rule in use for forecasting the weather at present may be briefly stated as follows: A rising barometer usually foretells less wind or rain, and a falling barometer more wind or rain, or both; a high barometer, fine weather, and a low one the contrary. If the barometer has been about its ordinary height at the sea level, and is steady or rising, while the thermometer falls and the air becomes drier, N. W., N., or N. E. wind, or less wind, may be expected; and, on the contrary, if a fall takes place with rising thermometer and increasing dampness, wind and rain may be looked for from the S. E., S., or S. W.; a fall of the barometer, with low thermometer, foretells snow, with the barometer below its ordinary height a rise foretells less wind, or change in the direction toward the N., or less wet; but when the barometer has been low, the first rising usually precedes strong wind or heavy squalls from the N. W., N. or N. E., and continued rising foretells improving weather. If the barometer falls and warmth continues, the wind will probably back, and more S., or S. W. winds will follow.

Meteorology

In N. latitudes the heaviest N. gales occur after the barometer first rises from a very low point. A rapid rise generally indicates unsettled weather; slow rise or steadiness, with little moisture in the atmosphere, fair weather. A considerable and rapid fall signifies stormy weather and rain. The barometer generally falls with a S. and rises with a N. wind; though sometimes the contrary happens, and then the S. wind is dry and the weather fine, or the N. wind wet and violent. When the barometer sinks considerably, high wind and rain or snow will follow; wind from tne N., if the thermometer is low for the season; from the S., if high. When a gale sets in from the E. or S. E. and wind veers by the S., the barometer will continue falling till the wind becomes S. W., when, after a lull, the gale will be renewed. The N. E. wind tends to raise the barometer most, and the S. W. to lower it most.

Instances of fine weather often happen with a low barometer, and are generally followed by a duration of wind or rain, or both. Predictions founded solely on the indications of the barometer and thermometer may be made with more certainty if combined with careful observation of the appearance of the sky, and the atmospheric effects peculiar to the particular locality. A rosy sky at sunset, whether clouded or clear, a grey sky in the morning, a low dawn (that is, when the first signs of the dawn appear on the horizon), all indicate fair weather. A red sky in the morning indicates bad weather, or much wind; and a high dawn (or when the first signs of the dawn are seen above a bank of clouds), presages wind.

From the clouds we may draw the following conclusions: Soft-looking and delicate clouds foretell fine weather, with moderate breezes; hard-edged clouds, wind; rolled or ragged clouds, strong wind. A bright yellow sky at sunset also presages wind, and a pale yellow sky wet. Dew and fog both indicate fine weather, while remarkable clearness of the atmosphere near the horizon (causing distant objects to appear very distinct and nearer than usual) is one of the most characteristic signs of coming wet.

At the present day, by the help of the electric telegraph, the meteorologist can obtain from as many stations as he desires the height of the barometer, direction and force of wind, etc., data which will inform him of the condition and movements of the aërial ocean at a definite time. He then marks on a map the height of the barometer at each place, and, drawing lines through all the places where the quicksilver stands at the same height, at any convenient interval he obtains a series of lines of equal pressure or weight, called shortly isobars, which show the height or depression at

those places as the contour lines on a map show the different altitudes of the mountains and valleys. The thermometer readings, treated in the same way, are called isotherms. To make these synoptic charts (as they are called) complete, the force and direction of the wind, the amount of humidity, character of clouds, and other weather signs are also marked down, so that the chart may furnish a view of the weather at that particular time over the area from which reports have been obtained. Supposing now that at the same time the next day a new set of data are received and marked on another chart, a comparison of the two will show the nature and direction of the change going on, and enable the meteorologist to predict, to a certain extent, what will be the immediately coming weather. This is a general description of the way in which the forecasts of weather, printed in the daily papers, are made. The interpretation of these synoptic charts may not appear to the reader to be a very difficult operation, but it must be remembered that meteorology is purely a science of observation, and as such will be most successfully handled by the observer of the greatest experience. From want of knowledge concerning the laws which govern the fluctuations of the weather, failures in the forecasts must happen now and again, and no reason can be given why certain states of the atmosphere, which previous observation would lead us to believe should be stable, suddenly break up without any apparent warning. See WEATHER BUREAU.

Methodists, a name first applied by a student of Christ Church to John and Charles Wesley, and some other young men at Oxford, who were in the habit of meeting together in 1729 for the purpose of strengthening each other's pious resolutions and engaging in religious conversation. They aimed particularly at a more rigid compliance with the precepts of the New Testament than usual in the Establishment, and devoted themselves to works of love, such as instructing poor children, visiting the prisons, etc. On account of their methodical observance of the rules of religion and the regularity of their lives they were nicknamed the "Holy Club," and afterward, as stated above, "The Methodists," a name which has adhered to them, and which they have adopted, though Wesley himself wished that the name might never be mentioned, but be buried in oblivion. Of the members of this small society the principal were JOHN WESLEY (*q. v.*) founder, his brother Charles, and GEORGE WHITEFIELD (*q. v.*), who joined it in 1735. In 1735 Wesley went out to Georgia to engage in the conversion of the heathen. There he remained two years, and becoming acquainted with some of the Moravian Brothers, was much struck with their severe simplicity and pious devotion. He then visited Herrnhut, and after his return to England collected a small society in London, which held its conferences in a private house without any disposition at this time to secede from the Church. This Wesley himself calls the first Methodist society, and in it the germ and first beginnings of Methodism are to be found.

He was driven to what may be called irregular proceedings, by the clergy of the Establishment having refused their pulpits to the Methodist preachers. The concourse of auditors being too great to be accommodated in any church, they began to preach in the open air, and to organize a separate church on the presumed apostolical model. The peculiar character of this field preaching, which was distinguished from the philosophical indifference of that of the Established clergy by its vehemence, religious enthusiasm, and popular style, and which dwelt on the fall and depravity of man, on the atonement, on the restoration through the merits of a crucified Saviour, on repentance, and on regeneration, with all the eloquence which a sincere zeal could inspire, had a great effect in increasing the numbers of the society. Whitefield, the boldest and most zealous apostle of Methodism in eloquence, courage, and fire, the Paul of his sect, often collected hearers to the number of 12,000 in the fields, churchyards, and even at fairs, and by the thunders of his eloquence and the terrors of his denunciations, produced such an effect on his audience that many of them were turned to faith and holiness on the spot. These sudden conversions were considered as the outpourings of grace and came to be considered by the Methodists as desirable results of their preaching. They soon gave up the practice of field preaching and built houses of worship (tabernacles), partly to protect themselves from exposure to the weather, and partly to avoid the outrages which they experienced from the rabble.

Though they suffered much from the violence of the populace, yet, as the government made no opposition, they now proceeded to the regular establishment of their church constitution, Wesley feeling that a more definite and extensive organization than he had first given them was now imperatively demanded. The first conference, therefore, was held in 1744. It was composed of six clergymen, who proceeded to the consideration of the three topics: What to teach; How to teach; and What to do. The first two days were occupied with the discussion of several doctrines, evangelical and Arminian, which were defined with precision. On the three following days they discussed the relations of the Methodist societies to the Established Church, and secession from it was discoun-

Methodists

tenanced. In a second conference held five years later Methodism took an organic and definite form, as Wesley's opinions regarding "church order" had undergone a great and material change. An annual conference was now instituted and class meetings and love feasts sanctioned. Methodism had henceforth its ministers, lay preachers, leaders, trustees, and stewards. The empire was divided into circuits for ministerial labor, for which there was an available ministerial force of about 70 men. From this date till 1791, when Wesley died, Methodism gradually diverged from the Church of England, and became entirely independent of it. It is now a distinct religious body, governed by an annual conference, having at its head a president and secretary, whose term of office lasts but for a year. In each district the ministers hold half-yearly meetings, the several chairmen being appointed by the conference. There are also quarterly circuit meetings of ministers and lay officers. The supreme legislative and judicial power is vested in the conference, to which the half-yearly and quarterly district and circuit meetings are subordinated. The number of members at Wesley's death was 76,968; but the denomination has increased with such marvelous rapidity that in 1891 there were said to be in different parts of the world 17,000,000 adherents.

In their religious services English Methodists use the liturgy of the Established Church, with some alterations. It appears that the offices for the ordination of priests and deacons, and for the consecration of bishops, are altered into forms for the ordination of deacons, elders, and superintendents; the Thirty-nine Articles are by omissions reduced to 25; the Nicene and Athanasian creeds are rejected, the Apostles' Creed only being retained; and the apocryphal books of the Old Testament are rejected. The most important of the various sects that have seceded from the original Wesleyans are: (1) The New Connection, as it is called, which arose in 1797 out of a separation from the Wesleyan establishment on grounds of church government and discipline. The leader in the secession was the Rev. Alexander Kilham. (2) The Primitive Methodists, originated in Staffordshire in 1810. Their leader was Hugh Bourne, and they are the most numerous of the sects that have gone off from the original body. (3) The Bible Christians, founded in 1815 by a Cornish lay preacher, are found chiefly in the W. of England. (4) The United Methodist Free Churches are an amalgamation of three different secessions — the Protestant Methodist Association formed in 1828; the Wesleyan Methodist Association which dated from 1834; and the Wesleyan Reform Association founded in 1849. The union was consummated in 1857. (5) The Wesleyan Reform Union, which consists of those who seceded during the agitation in the Wesleyan societies in 1849, but refused to amalgamate with the United Methodist Free Churches.

The society of the Wesleyan Methodists in the United States is known as the Methodist Episcopal Church. Its members of the Wesleyan body first established themselves in New York in 1766. In 1784, after the Revolutionary War, the necessity of the formation of an independent society having been recognized, Wesley set apart and ordained a bishop for the infant church, who presented his credentials at the conference held at Baltimore Dec. 25 of the same year. Wesley granted to the bishop, his coadjutor, and the other preachers, permission to organize a separate and independent church. In 1830 those who were dissatisfied with the episcopal form of church government seceded and formed a new organization called the Methodist Protestant Church. A dispute on the slave question caused a second secession in 1843, named the Wesleyan Methodist Connection of America, followed next year by a much larger secession on the same question. This took the name of the Methodist Episcopal Church, South. The Welsh Calvinistic Methodists do not constitute a secession from the followers of Wesley. They originated partly in the preaching of Whitefield, who was a Calvinist, and partly in that of Howell Harris, a Welsh clergyman of the Church of England.

The English Wesleyan Methodists have theological colleges at Richmond Hill, Surrey; Didsbury, Lancashire; Headingley, Yorkshire; and at Birmingham. There is a Free Methodist and a Primitive Methodist college at Manchester, and a New Connection college at Ranmoor, Sheffield. The only Wesleyan college in Ireland is in Belfast.

The following shows the strength of the principal Methodist bodies in the United States, as reported in 1910:

Branches.	Ministers.	Churches.	Members.
Methodist Episcopal..	18,160	28,235	3,159,913
Union American M. E.	138	255	18,500
African M. E.....	6,353	5,483	452,126
African Union Methodist Protestant	200	125	4,000
African M. E. Zion...	3,421	3,291	545,681
Methodist Protestant .	1,348	2,380	188,122
Wesleyan Methodist .	570	605	19,485
Methodist Episcopal, South	7,287	15,757	1,780,778
Congregational Methodist	337	333	15,529
Colored M. E.....	2,863	2,809	233,911
Primitive Methodist ...	77	97	7,295
Free Methodist	1,104	1,132	32,166
Evangelist Missionary..	87	13	4,600

The ministry is itinerant, the term of incumbency being limited, and the appointments made by the bishops and their councils (composed of presiding elders or subbishops). In doctrinal points they coincide with the Wesleyan Church, with but

few minor differences, and may properly be regarded as an integral part of the great body of Wesleyans.

Methuen, Paul Sanford, 3d Baron, an English military officer; born Sept. 1, 1845, was educated at Eton and in 1864 became lieutenant of the Scots Guards. He served in Ireland, Egypt, Beuchanaland, was military attaché at Berlin, and saw active service in the Ashanti, Egyptian, and Boer wars. In the latter he was made commander of the 1st Division, 1st Army Corps, in 1899, and rendered signal service under Lords Kitchener and Roberts. On March 7, 1902, while leading a force of 1,200 men to Litchenburg, he was attacked by the Boers under General Delarey. The British were completely routed, losing four guns, several hundred men in killed and captured, among the latter being Lord Metheun, who was, however, released on March 13.

Methyl, an organic radical homologous with ethyl. Its formula is CH_3, but as it cannot exist in the free state, two such groups of atoms unite together to form ethane, $CH_3 — CH_3$. As in the case of ethyl, methyl is the center of a whole group of substances known as the methyl group. Thus, the hydride of methyl, CH_3H, known as light carburetted hydrogen, marsh gas, or fire damp, is well known as the cause of explosions in coal mines. It is a light, inodorous gas, half as heavy as air; nonpoisonous and very inflammable, forming an explosive mixture with seven volumes of air. Methyl alcohol, CH_3OH, is obtained as a by-product in the manufacture of beetroot sugar, and also by the dry distillation of wood. It is a colorless, mobile liquid, resembling ordinary alcohol in many of its properties. Methyl oxide or methyl ether $(CH_3)_2O$, corresponding to ethyl ether or common ether, is a gas at ordinary temperatures, very soluble in water and alcohol, and capable of being condensed to a liquid by pressure and cold. It is largely prepared for use in freezing machines, owing to the intense cold which results when the liquefied gas is allowed to evaporate. It is prepared by the action of sulphuric acid on wood spirit. Besides the above, methyl enters into the constitution of many ethereal salts and amines, such as methyl chloride, acetate, and salicylate. The salicylate, $CH_3C_7H_5O_3$, is interesting as being the ethereal oil of *Gaultheria procumbens*, from which pure methyl alcohol and pure salicylic acid can both be made.

Methylated Spirit, a mixture of 9 parts of alcohol, sp. gr. 0.920, with 1 part of pyroxylic or wood-spirit. This addition of wood-spirit renders it unfit for drinking, though it scarcely interferes with its power as a solvent.

Metis, the first wife of Jupiter, whom he was said to have devoured, after which Minerva was formed within his head.

Metlahkatla, or **Metlahkatlah,** name of the oldest and most successful mission among the Indians of British Columbia, founded about 1857, by William Duncan, an English missionary who developed a model community from a tribe of the lowest cannibals. In 1887, having by petition to the United States government received the grant in perpetuity of Annette Island, Alaska, the community removed to that place, where it became very prosperous under the name of New Metlahkatla. In 1898, a bill infringing on the rights of these settlers was introduced in Congress by prospectors wishing to exploit the mineral resources of the island; but the measure was defeated.

Metonic (-ton'-) **Cycle,** the cycle of the moon, a period of 19 solar years, after which the new and full moon fall on the same days of the year as they did 19 years before. This cycle was the invention of Meton, a celebrated Athenian philosopher, who flourished about 432 B. C. The Metonic cycle contained 6,940 days, which exceeds the true length of 19 solar years by 9½ hours nearly. On the other hand, it exceeds the length of 235 lunations, or synodic revolutions of the moon, by 7½ hours only. The framersof the ecclesiastical calendar altered the distribution of the lunar months when they adopted this cycle, in order to accommodate them to the Julian intercalation. By this alteration every three periods of 6,940 days were followed by one of 6,939. Consequently the mean length of the cycle was 6,939¾ days, which coincides exactly with 19 Julian years. In the ecclesiastical calendar the number of the year in the cycle is called the golden number. The cycle is supposed to commence with the year in which the new moon falls on the 1st of January.

Metope (met'ō-pē), in architecture, the interval or square space between the triglyphs in the Doric frieze.

Metra, an instrument, a combination of the thermometer, clinometer, goniometer, level, magnifying lens, measure for wire gauze, plummet, platina scales, anemometer, etc., by which the temperature, direction, and dip of rocks, the angles of cleavage and crystallization, the level of workings, the latitude, etc., can be determined.

Metric System, the system adopted by the French convention in 1795, in which all measures of length, area, capacity, and weight are based on the length of a quadrant of the meridian measured between the equator and the pole. The ten-millionth part of this quadrantal arc was adopted to be the linear measuring unit, which they called "mètre," applying it equally to superficial

and solid measures, taking for the unit of the former the square of the decuple, and for that of the latter the cube of the tenth part of the meter. A meter is = 1.09362311 yards or 39.370432 inches, the standard meter being taken as correct at 0° C., and the standard yard, as correct at 16 2-3° C. (See WEIGHTS AND MEASURES.) They chose also for the measuring unit of weight the quantity of distilled water equal in bulk to the same cube at a certain temperature. They also decided that the multiples and sub-multiples of each kind of measure, whether of weight, capacity, surface, or length, shall be always taken in the decimal or decuple proportion, as the most simple, natural, and easy for calculation. The meter is the basis of calculation; from it are derived: Of area: the are, 1 square decameter; of capacity, the liter, 1 cubic decimeter; of weight: the gramme, 1 cubic centimeter of water. The names of the graduations below the unit are formed from the Latin, and above the unit are formed from the Greek.

Metrochrome, an instrument for measuring color. It consists of three hollow wedges of glass, of exactly the same angle and capacity, and accurately graduated on the edge of the same number of equal degrees. These wedges are so arranged between two screens that any portion of their tapering sides may be presented at will to an aperture through which a direct view may be had, or a ray of light thrown.

Metrograph, a controller of the speed of railway trains, which indicates at every moment and every mile the speed of the train, and the arrival and departure at each station.

Metronome, an instrument for beating and dividing the time in music; a musical time keeper. It has a small pendulum which, being set in motion by clock-work, beats audibly a certain number of times in a minute; and this number may be altered by moving a sliding weight so as to give it the speed required. To be correct, the metronome should beat seconds when set at 60.

Metropolitan, originally a bishop resident in a metropolis or the chief city of a province, now a bishop having authority over the other bishops of a province; that is, an archbishop. In the Greek Church, the title of a dignitary intermediate between patriarchs and archbishops.

Metropolitan Museum of Art. See ART, METROPOLITAN MUSEUM OF.

Metrosideros (-si-dē′ros), a genus of trees and shrubs, natural order *Myrtaceæ*. *M. vera,* known as iron wood, is a tree, a native of Java and Amboyna. Of the wood of this tree the Chinese and Japanese make rudders, anchors, etc. *M. robusta* is the rata of New Zealand, where it is employed in ship-building and in other ways. The trees of this genus have thick, opposite, entire leaves, and heads of showy red or white flowers.

Metternich (met′ter-ni*h*), **Clement, Prince von,** an Austrian statesman; born in Coblentz, Prussia, May 15, 1773. Educated at Strasburg, he early acquired information regarding public affairs by travels in Germany, Holland, and Great Britain; and having soon afterward entered the diplomatic service, acted as secretary at the Congress of Rastadt, in 1799, where his abilities at once attracted notice, and led to his being appointed secretary of the Austrian embassy at St. Petersburg, in 1802, and Austrian ambassador, in succession, at the courts of Dresden, in 1803, and Berlin, in 1805. After the peace of Presburg, he was appointed ambassador to Paris, in 1806; and in that delicate situation, though representing a vanquished monarch, he succeeded in conciliating all who came in contact with him, by the urbanity of his manners, and the skill with which he maintained his difficult and important position. In 1809 he was appointed chancellor of state, on the resignation of Count Stadion, under whose auspices he had risen to eminence, and whose known hostility to France compelled his retirement after the peace of Schönbrunn; and for nearly 40 years from that period, he exercised, almost without control, the highest authority in the Austrian empire. One of his first aims after entering on his high office was to bring about a marriage between Napoleon and an Austrian archduchess, as a means of purchasing a respite for the empire. The negotiations for this purpose he conducted with Champagny, and after Napoleon was divorced from Josephine, Metternich escorted Maria Louisa to Paris. But this expedient of a humiliating sacrifice could not be permanent; and in 1813, after the great French disasters in Russia, war, at the instigation of Metternich, was again formally declared by Austria against France. In the autumn of that year the Grand Alliance was signed at Tœplitz, and on the field of Leipsic Metternich was raised to the dignity of a prince of the empire. In the subsequent treaties and conferences the newly created prince took a very prominent part, and he signed the treaty of Paris on behalf of Austria. In 1815 he presided over the Congress of Vienna, and took a prominent part in the various congresses that were held in succession at Paris, Aix-la-Chapelle, Carlsbad, Laybach, and Verona; inculcating on all occasions, as far as in him lay, the principles of the divine right of kings, and repressing every aspiration of the people after civil,

political, and religious liberty. In 1848 he was compelled to flee from Vienna; but he returned in 1851, and though he never again assumed office, his counsels are said to have swayed the emperor down to the moment of his death. He died in Vienna, June 11, 1859.

Mettray (muh-trā′), a village of France, 5 miles N. of Tours; noted for its great agricultural and industrial reformatory, the parent of all such institutions. It dates from 1839.

Metz, the strongest fortress of the German imperial territory of Alsace-Lorraine, and the capital of the district of Lorraine; before 1871 the main bulwark of France in her N. E. frontier, and capital of the department of Moselle. In August, 1870, Bazaine was compelled to retire into Metz with his army; and after an investment of 70 days, during which no attempt was made to take the city by force, Europe was startled to hear of the capitulation of Metz, by which 180,000 men and immense military stores fell into German hands (Oct. 27, 1870). By the treaty of Frankfort Metz was annexed to Germany as part of Lorraine. Known to the Romans as Divodurum; it was afterward called Mettis. Pop. (1905) 60,419.

Meudon (muh-dôn*g*′), a village 5 miles W. of Paris, containing a château, rebuilt by Mansard for the Dauphin in 1695, and fitted up for Marie Louise by Napoleon in 1812, which was reduced to ruin during the bombardment of Paris in 1871. The Forest is a favorite holiday resort. A chapel, dedicated to Notre Dame des Flammes, commemorates the terrible railway accident of May, 1842, in which over 100 persons were burned alive. Rabelais was curé of Meudon.

Meulen, Antoine François van der, (muh′len), a Flemish painter; born in Brussels, Jan. 11, 1632. He was appointed by Colbert in 1666 battle-painter to Louis XIV., and thenceforward accompanied that king in his military expeditions. A long series of Van der Meulen's battle pictures hang in the Louvre. He died in Paris, Oct. 15, 1690.

Meung, Jean de (muh*ng*), or **Jean Clopinel** (klo-pē-nel′), a French satirist; born in Meung, Loiret, France, about 1250; flourished under Philip the Fair; translated many books into French; and became rich and prosperous. His "Testament," in single-rimed quatrains, with all its raillery, reveals a genuine piety. But his great work is his continuation to the length of 22,817 lines of the "Roman de la Rose," left unfinished in 4,670 lines by William of Lorris before 1260. He preserved the original meter, but completely altered the treatment, substituting for its tenderness, refinement, and elaborate allegorizing, sharp, satirical pictures of actual life, forming an invaluable mirror of the Middle Ages. He died before November, 1305.

Meurthe-et-Moselle (murt-ā-mō-sel′), a department in France; formed after the treaty of 1871 with Germany out of what remained of the former departments of Moselle and Meurthe; it has four arrondissements, Briey, Lunéville, Nancy, and Toul; area, 2,025 square miles; pop. (1906) 517,508. The department belongs to the plateau of Lorraine, and is drained by the Moselle and its tributaries. It has very fertile soil, producing corn, wine, potatoes, fruit, beet-root for sugar, hops, etc.; possesses valuable iron mines; and is the first department in France for iron and steel, and the third for glass; there are also important manufactures of pottery, woolens, cottons, chemicals, tobacco, paper, beer, artificial flowers and embroidery work; rock salt is mined in large quantities. In point of popular education it ranks second among the French departments, Doubs being first. Capital, Nancy; pop. (1906) 110,570.

Meuse (muhz), a river of Western Europe, flowing through the N. E. part of France, Belgium, and Southern Holland; rises in the department of Haute-Marne, France, 10 miles N. E. of Langres, and after a N. E. course of 400 miles nearly half of which is in France, it enters the North Sea by three mouths, the Meuse on the N., the Flakkee in the middle, and the Grevelingen on the S. It is navigable three-fourths of its length, as far as Verdun, department of the Meuse.

Meuse, a department in France, touching Belgium in the N.; area, 2,405 square miles; pop. (1906) 280,220. Capital, Bar-le-Duc.

Mexican Nun, The, a name given to JUANA YÑEZ DE LA CRUZ, a Mexican poet; nun of the convent of San Gerónimo; born in Mexico, Nov. 12, 1651. She was sometimes called "The Tenth Muse." She is famous for the beauty of her stanzas "Learning and Riches"; "Death in Youth"; etc. Died in Mexico, April 17, 1695.

Mexican War, a war between the United States and Mexico, growing out of the annexation of Texas in 1845. Texas claimed the Rio Grande as her N. W. frontier, while Mexico insisted on the Nueces river. The United States supported the position taken by Texas, and war between the two countries was declared in 1846. During that year Gen. Zachary Taylor won the battles of Palo Alto and Resaca de la Palma and forced Monterey to surrender. On May 23, 1847, he gained the victory of Buena Vista. In June of the same year General Scott took Vera Cruz and

marched on to the City of Mexico. On the way he fought the battles of Cerro Gordo, Contreras, Churubusco, Molino del Rey, and Chapultepec. His capture of the City of Mexico, Sept. 14, 1847, virtually ended the war, and the treaty of Guadaloupe-Hidalgo was signed Feb. 12, 1848.

Mexico, a republic of North America; bounded on the N. by the United States; on the E. by the Gulf of Mexico and the Caribbean Sea; on the S. and S. E. by Guatamala and British Honduras; and on the W. and S. W. by the Pacific Ocean; **area, 767,005 square miles; pop. (1900)** 13,605,919.

Topography.— For the most part Mexico consists of an immense tableland. The prevailing formations are metamorphic, but partly overlaid by igneous rocks of every geologic epoch, rich in metalliferous ores. In the highest ranges granites and other igneous rocks prevail, with deposits of sulphur and pumice, and other recent volcanic discharges. In the N. chalk and sandstones become prevalent. The most important range is the Sierra Madre (over 10,000 feet); parallel with this run the sierras of the E. coast and of Lower California. The surface of the country is also much broken up by short cross-ridges and detached peaks, the principal being the Cordillera de Anahuac culminating in Nevado de Toluca (19,454) feet, the highest point on the North American continent, and Popocatepetl (17,523). The Pico de Orizaba, E. of Popocatepetl, is 18,205 feet high. On the Atlantic side the plateau descends abruptly to the narrow strip (about 60 miles) of gently sloping coast land; toward the Pacific, where the coast lands vary in width from 40 to 70 miles, the descent is more gradual. Of the present lakes the only one of great size is Chapala, which is traversed by the Rio Grande de Santiago; but considerable bodies of water collect in depressions in the uplands during the heavy rains. The rivers of Mexico are of little use for navigation. S. of the Rio Grande del Norte, on the Texan frontier, they are mostly impetuous mountain torrents, or flow through rocky gorges, sometimes 1,000 feet deep. Only in the narrow strips between the plateau and the coast are they available as channels of trade.

Climate.— In the plateau region the climate is almost that of perpetual spring, and the atmosphere is remarkably free from moisture, but so scarce is rain that plateau agriculture is largely dependent on irrigation. An immense desert tract extends between Chihuahua and Zacatecas. On the coast lands water is abundant, but the climate is so unhealthful that few white men can labor there.

Mexico

Agriculture.— The vegetation of Mexico shows great varieties. In the lowlands dyewoods and valuable timbers, medicinal plants, india-rubber, palms, oranges, bananas, many varieties of cactus, olives, sugar, coffee, cocoa, rice, indigo, cotton, tobacco, maize, etc., abound. The plateau besides yielding a number of the foregoing also produces mahogany, ebony, rosewood, oak, and pine; copal, rubber, and numerous gums, cassia, jalap, ipecacuanha, and other medicinal plants, cartamo, logwood, and various other dyes. In 1897 the principal agricultural products were rice, 21,136 tons; maize, 42,954,684 hectol; wheat, 263,987 tons; sugar, 65,803 tons; panocha, 61,856 tons; molasses, 44,847 tons; brandies, 5,474,450 hectol; henequen, 50,226 tons; cotton, 32,915 tons; coffee, 21,838 tons; tobacco, 8,956 tons; logwood, 75,638; and rum, 812,690 hectol.

Mineralogy.— The country is rich in minerals, many of which have been worked from an early date. Silver, especially, has been an important industry ever since the conquest. Gold is also produced. Copper is largely mined in some sections, being found in a pure state in Chiapas and Guanajuato, and elsewhere associated with gold. Other important minerals are iron, including enormous masses of meteoric iron ore. The mountain, Cerro de Mercado, a mile from Durango, is a solid mass of magnetic iron ore. Other mineral products are lead, sulphur, zinc, quicksilver, platinum, cinnabar, asphalt, petroleum, salt, marble, alabaster, gypsum and rock-salt. There are about 100,000 persons regularly employed in the mines, and the total yield of ore is valued at about $30,000,000. In 1896–1897 the gold output was valued at $3,909,782; and the silver, $58,855,816.

Manufactures.— Till recent years very little manufacturing was done in Mexico, the number of factories using steam not greatly exceeding 100 prior to 1888. Cotton, woolen underwear, carpets, and cloths are now made in considerable quantities. There are also many cigars and cigarette factories, flour mills, distilleries, powder mills, soap factories, paper mills, tile factories, etc. Furniture, saddles, jewelry, silver ornaments, Mexican hats, etc., are also manufactured largely. In 1896 there were 107 cotton factories with 13,660 looms, 448,156 spindles, and 13,826 horsepower. These consumed 53,273,397 pounds of raw cotton.

Commerce.— The great bulk of Mexican exports consists of the precious metals — coin, bullion, and ores; but the amount of agricultural products has greatly increased within a few years. In 1899–1900 the total exports aggregated in value $158,247,933, of which the principal articles were: Sil-

Mexico

ver, $39,422,839; silver coin, $10,872,874; silver ore, $12,693,445; gold, $7,078,599; coffee, $10,898,678; henequen, $26,099,388; wood, $2,223,415; hides, $4,165,179; cattle, $5,732,004; tobacco, $2,344,882; etc. The total imports amounted to $61,318,175, including $31,026,415 from the United States; $10,483,200 from Great Britain; $6,752,138 from France; $6,673,846 from Germany; $2,919,162 from Spain; and $3,458,414 from other countries.

Communications and Shipping.— In 1899 there were 8,040 miles of railway, and 127 miles of tramway in operation, all constructed since 1872, when the first railroad in the country was built, from Vera Cruz to Mexico City. The length of telegraph lines was 41,532 miles, of which 27,608 miles were owned by the government and the rest by States, railroads, and corporations. There were 337 State offices, and 2,178,181 messages were sent in 1898. There were also 7,459 miles of telephone lines. In 1899 the postoffices numbered 1,870. In 1898–1899 the post, inland and international, carried 122,620,216 letters and post cards. The receipts were $1,595,818; disbursements, $1,991,921. The shipping consisted of 17 steamers of 4,081 tons, and 51 sailing vessels of 9,317 tons. There were also numerous small vessels employed in the coasting trade. The foreign and coasting trade of 1898 entered 10,527 vessels of 4,085,200 tons, and cleared 10,452 vessels of 3,880,940 tons.

Education.— The public schools are nonsectarian and are supported by the National and State governments. Primary instruction is compulsory in nearly all parts of the republic, and all classes are desirous of having their children educated. The higher branches of education are taught in seminaries and colleges. There are also schools of medicine, law, engineering, fine arts, mining, agriculture, arts and trades, music, and commerce. In 1897 there were 10,298 schools, 669,560 pupils, an average attendance of 462,994, and disbursements of $4,425,512. The number attending the higher schools was estimated at 21,000.

Religion.— The prevailing faith is Roman Catholic, which was the State religion till 1857. On Sept. 25, 1873, the government declared that it recognized no State religion. Monastic orders have been prohibited, and in the larger cities clergymen are not permitted to appear on the streets in ecclesiastical garments. In 1889 there were 10,112 Roman Catholic churches and chapels in the country, and 107 Protestant churches.

Finances.— The budget estimate for the revenue and expenditures for the year ending June, 1900, was as follows: Revenue, from import and export duties, internal taxation, and various other receipts, $54,913,000; expenditures, for administration of the government, payment on public debt, etc., $54,886,756.

Government.— The government of Mexico is that of a republic. The constitution adopted on Feb. 5, 1857, with later modifications, closely resembles that of the United States. The several States have absolute control of their internal affairs. The President, who is chosen every four years, and is now eligible to consecutive reëlections, is assisted by a cabinet of seven secretaries, viz.: Foreign Affairs; Interior; Justice and Public Instruction; Fomento, Colonization and Industry; Communications and Public Works; Finance and Public Credit; and War and Marine. The legislative power is vested in a Congress, composed of a Senate and House of Representatives. Representatives, whose terms are two years, are elected by popular vote on the basis of one representative for every 40,000 population. The Senate consists of 56 members, two from each State, and two from the Federal District, who serve four years, and are elected in the same manner as the representatives. The justices of the Supreme Court, which occupies the same position as that of the United States, are chosen by popular suffrage and serve for six years. There are two annual sessions of Congress, the first from April 1, to May 30, and the second from Sept. 16, to Dec. 15, and a permanent committee of both houses sits during recesses.

History.— The history of ancient Mexico exhibits two distinct and widely differing periods — that of the Toltecs and that of the Aztecs. The 8th century is the traditional date when the Toltecs are related to have come from the N. Their capital was established at Tula, N. of the Mexican valley. Their laws and usages stamp them as a people of mild and peaceful instincts, industrious, active and enterprising. It is related that a severe famine and pestilence all but destroyed the Toltec people in the 11th century, and near the end of the next century, a fresh migration brought, among other kindred nations, the Aztecs into the land. Within two centuries and a half this last people had become predominant. But their rule was, in a great degree, a reversion to savagery.

The Aztecs founded, about 1325, the city of Tenochtitlan, or Mexico; a hundred years later they had extended their sway beyond their plateau valley, and on the arrival of the Spaniards, their empire was found to stretch from ocean to ocean. Their government was an elective empire, the deceased prince being usually succeeded by a brother or nephew, who must be a tried warrior; but sometimes the successor was chosen from among the powerful nobles.

The monarch wielded despotic power, save in the case of his great feudal vessals; these exercised a very similar authority over the peasant class, below whom, again, were the slaves. The Mexicans apparently believed in one supreme invisible creator of all things, the ruler of the universe; but the popular faith was polytheistic. At the head of the Aztec pantheon was the frightful Huitzilopochtli, the Mexican Mars. In every city of the empire his altars were drenched with the blood of human sacrifice. The victims, usually prisoners of war, were borne to the summit of the great pyramidal temples, where the priests, in sight of assembled crowds, bound them to the sacrificial stone, and, slashing open the breast, tore from it the bleeding heart and held it up before the image of the god. In the years immediately preceding the Spanish conquest, not less than 20,000 victims were annually immolated, including infants, for the propitiation of the rain gods.

Cortez landed at Vera Cruz in 1519. Before his energy, and the superior civilization of his followers, the power of the native empire crumbled away. In 1540 Mexico was united with other American territories — at one time all the country from Panama to Vancouver's Island — under the name of New Spain, and governed by viceroys (57 in all), appointed by the mother country. The intolerant spirit of the Catholic clergy led to the suppression of almost every trace of the ancient Aztec nationality and civilization, while the commercial system crippled the resources of the colony; for all foreign trade with any country other than Spain was prohibited on pain of death. Mexico ranked first among all the Spanish colonies in regard to population, material riches, and natural products. In 1810 the discontent, which had been gaining ground against the viceregal power during the war of the mother country with Napoleon, broke into open rebellion under the leadership of a country priest named Hidalgo. After his defeat and execution in 1811, Morelos, another priest, continued the struggle till he shared the same fate in 1815; and a guerilla warfare was kept up until, in 1821, the capital was surrendered by O'Donoju (a Spaniard of Irish descent), the last of the viceroys. In the following year General Iturbide, who in 1821 had issued the plan de Iguala, providing for the independence of Mexico under a prince of the reigning house, had himself proclaimed emperor; but the guerilla leader Guerrero, his former ally, and Gen. Santa Ana raised the republican standard, and in 1823 he was banished to Italy with a pension. Returning the following year he was taken and shot, and the federal republic of Mexico was finally established.

For more than half a century after this (till 1876), the history of Mexico is a record of nearly chronic disorder and civil war. In 1836 Texas secured its independence, for which it had struggled for several years, and which Mexico was compelled to recognize in 1845. In that year Texas was incorporated with the United States; but its W. boundary was not settled, and war ensued between Mexico and the United States (see MEXICAN WAR). From the fall of Santa Ana in 1855, down to 1867, great confusion prevailed.

In 1853 Benito Juarez became president, but his claims were contested by General Miramon, the head of the reactionary or clerical party, and the country was plunged in civil war. During this period of internal disorder, the Cortes passed an act suspending all payments to foreigners for two years, an act that drew upon the Mexican government the serious remonstrance of those European powers whose subjects had just cause of complaint; and the result was the dispatch of a fleet of English, French, and Spanish ships into the Mexican Gulf for the purpose of enforcing satisfaction. In 1861 the Spaniards disembarked a force at Vera Cruz; and this step was soon followed by the arrival before that city of the allied fleet. Preparations to advance at once upon the capital alarmed the provisional government, and brought about an armistice, with a view of negotiating a treaty for the future regulation of commercial intercourse between Mexico and the European powers. This treaty was drawn up and provisionally ratified by the different commanders, but was not confirmed on the part of France, and consequently the French troops retained occupation of Mexican territory after the Spaniards and English had declined to join in further hostile demonstrations. In April, 1862, Emperor Napoleon formally declared war against Mexico; but the French never met with the welcome they expected from the people, and finally had to withdraw, without permanent success, in 1867, largely because of the attitude of the United States. MAXIMILIAN (*q. v.*), who had become Emperor of Mexico under French support, was executed in the same year, and Juarez returned to practically absolute power. On the death of Juarez in 1872, the chief justice, Lerdo de Tejada, assumed the presidency, in which, after a revolution, he was succeeded in 1876 by Gen. Porfirio Diaz, one of the ablest of Mexican soldiers and administrators, who has been successively reëlected since 1884. In 1905 the monetary unit was made the silver peso, or dollar, the legal value of which is fixed at .75 gramme of pure gold.

MANUEL DE ASPIROZ.

Mexico, a city and capital of the republic of Mexico, situated within the State of Mexico in the Federal District (463 square miles), about 7,400 feet above sea-level, near several lakes, and at about an equal distance from Vera Cruz on the Mexican Gulf, and Acapulco on the Pacific; is laid out with great regularity; principal public buildings the cathedral, about 500 feet in length, and 420 feet in width, forming one of the sides of the central square; palace of government; college of mines, a noble building, but now somewhat dilapidated; mint, with a front of 360 feet by 250 in depth; town house, has university, etc.; numerous convents, hospitals, churches, theaters, etc.; manufactures of comparatively limited extent, and trade mostly in the hands of foreigners. Mexico has a mild climate, and a pure and healthy atmosphere. It is on the site of the ancient city of Tenochtitlan, which was destroyed on the capture of Mexico by the Spaniards in 1521. Pop. (1910) 356,000; Federal District, 700,000.

Mexico, Gulf of, a basin of the Atlantic Ocean, closed in by the United States on the N., by Mexico on the W. and S., and its outlet on the E. narrowed by the jutting peninsulas of Yucatan and Florida, which approach within 500 miles of each other; length from S. W. to N. E. over 1,100 miles; area 716,200 square miles. Over a fourth of this area the ocean lies at a depth of between 1,000 and 2,000 fathoms, while 58,000 square miles is deeper still. The shores are very shallow, less than 100 fathoms deep over 400,000 square miles, etc. In the middle of the E. outlet is planted the island of Cuba, dividing the strait into two — the Strait of Florida and that of Yucatan, the former connecting the gulf with the Atlantic Ocean, the latter with the Caribbean Sea. Of the numerous bays, the largest is the Bay of Campeachy (Campeche). The coasts are mostly low and sandy or marshy, and are lined with numerous lagoons; the best of the few good harbors are those of New Orleans, Pensacola, and Havana. The gulf is visited from September to March by violent N. E. gales called nortes. There are very few islands. The principal rivers it receives are the Mississippi and the Rio Grande del Norte.

Meyer, Adolf, an American physician; born in Zurich, Switzerland, in 1866; studied medicine at the University of Zurich in 1885–1890; then turned his attention to the study of neurology; came to the United States in 1893 and settled in Chicago, Ill., where he became pathologist of the Illinois Eastern Hospital for the Insane, and docent in neurology at the University of Chicago. In 1895 he was made docent in psychiatry at Clark University, and director of the clinical work and laboratory of the Worcester (Mass.) Insane Hospital. In December, 1901, he was appointed director of the New York State Pathological Institute.

Meyer, Conrad Ferdinand (mī'er), a Swiss novelist; born in Zurich, Switzerland, Oct. 12, 1825. His style is graceful, and he excels in character-drawing and in genre pictures of descriptive work. His chief novels are "Jörg Jenatsch" (1876), a story of Switzerland in the 17th century, and "The Saint" (1880); two of the best historical novels of modern German literature. His poetical skill is best displayed in "Hutten's Last Days" (1872), in "Poems" (1882), and in "Engelberg." He died in 1898.

CONRAD F. MEYER.

Meyer, Heinrich August Wilhelm, a German commentator; born in Gotha, Jan. 10, 1800. He studied at Jena, was pastor at Harste, Hoye, and Neustadt, retired in 1848, and settled in Hanover. His name survives in his "Commentaries on the New Testament," a monument of exegetical science (commenced 1832). Later editions showed constant improvements, and since his death this work has been continued by Weiss, Wendt, Beyschlag, and others. The English translation in Clark's series is in 20 volumes (1873–1882). Meyer died in Hanover, June 21, 1873.

Meyer, Joseph, a German publisher and industrial organizer; born in Gotha, May 9, 1796. A man of great energy and liberal ideas, he started several industrial enterprises, the most important being the issue of great serial works by subscription at low prices, such as the German classics, the "Konversations-lexikon" (Cyclopædia), "People's Library of Natural Philosophy, Historical Library," etc. His publishing business, the "Bibliographical Institute," was founded at Gotha, but in 1828 was transferred to Hildburghausen, in 1874 to Leipsic. He died in Hildburghhausen, June 27, 1856.

Meyerbeer, Giacomo (mī'er-bār), a German composer; born in Berlin, Prussia, Sept. 5, 1791. His genius showed itself so early that at six years of age he played at a concert, and at nine was one of the best pianists in Berlin. He was taught afterward by Clementi and the Abbé Vogler at Darmstadt. He subsequently visited Italy,

and fell under the influence of Rossini, in imitation of whose style he composed several operas. The first work which made him a man of mark was the "Crusade in Egypt." It was produced at Venice in 1824, and at Paris two years later. Meyerbeer became the favorite composer of the Parisian public, whose taste he satisfied by the popular works which followed, and which are now well known throughout the world. "Robert the Devil" was produced at the opera of Paris in 1831; "The Huguenots" (1833); "The Prophet" (1849); "Star of the North" (1854); and "Dinorah" (1859). He left the manuscript of another great opera, "L'Africaine" (The African Woman), which was produced in Paris in 1865. Besides his operas, Meyerbeer, wrote a "Stabat," a "Miserere," a "Te Deum," an oratorio, cantatas, and many songs. He was supreme in the French opera for more than 30 years, was associate of the Institute, and officer of the Legion of Honor, member of the Academy of Fine Arts at Berlin, and chapel-master to the King of Prussia. He died in Paris, May 1, 1864.

Meynell, Alice (Thompson) (mā'nel), an English author; born in London, England. She spent much of her childhood in Italy, and married (1877) Wilfrid Meynell, editor of "Merry England." She wrote "Preludes" (1875; 2d ed. 1893), illustrated by her sister, Lady (Elizabeth) Butler; "Rhythm of Life" (1893); "The Children" (1896); "The Spirit of Place" (1898); etc.

Meyr, Melchior (mīr), a German author; born in Ehringen, near Nördlingen, Bavaria, June 28, 1810. He resided in Berlin (1841–1852) and Munich (1852–1871). His best-known works were: "Stories from the Ries" (4th ed. 1892), containing delightful descriptions of peasant life in his native district; they are among the very best German village tales. Among the best of his other productions were "Duke Albert" (1852) and "Charles the Bold" (1862). He published also "Poems" (1857), religious-philosophical writings, tragedies, and romances. He died in Munich, April 22, 1871.

Mézeray, François Eudes de (māz-rā), a French historian; born in Ruy, near Falaise, Normandy, France, in 1610. Richelieu made him historiographer, and gave him a pension. His principal work was a "History of France" (1638–1651), published afterward in improved form as "Chronological Abstract of the History of France" (1668). His method was a radical departure in historical writing, and the forerunner of modern histories, being of the people as well as of sovereigns. He died in Paris, July 10, 1683.

Mezereon (-zē're-on), *Daphne Mezereum*, a small shrub with deciduous obovate or spathulate lanceolate leaves; flowers generally in threes; silky-pink or white; very fragrant. Berries red, ovoid. Acrid and poisonous; the berries are cathartic; the leaves used as a vesicant.

Mezereum Bark, the bark of mezereum; used as an ingredient in the compound decoction of sarsaparilla, in chronic rheumatism, toothache, scrofula, skin diseases, and syphilis, and externally with mustard, in the compound mustard liniment, as an irritant and vesicant. An ointment is made of it and commonly used in the United States.

Mézières (mā-zyar'), the capital of the French department of Ardennes, on a bend of the Meuse, opposite Charleville, and 155 miles N. E. of Paris; principal building the flamboyant church, restored in 1884, in which Charles IX. was married in 1570. Strongly fortified by Vauban, and protected by a citadel, in 1521 it was successfully defended by the Chevalier Bayard, with 2,000 men, against 40,000 Spaniards under Charles V.; in 1815 held out for two months against the Allies, who besieged it after the battle of Waterloo; and in the Franco-German war of 1870–1871 capitulated after a frightful bombardment. Pop., commune (1901), 7,884.

Mezquite. See MESQUIT.

Mezzanine (met'sä-nēn), a low window occurring in attics and entresols. Sometimes applied to an entresol. A mezzanine story is a half story; one lower than the stories above and below it. In theaters: (1) A floor between the stage and the bottom of the deep cellars of large theaters, from which floor the short scenes and traps are worked, the large scenes going down through openings into the cellar; hence the name, from being midway between the stage and cellar floor. (2) The space beneath the stage, between it and (1) as ground floor may mean either the floor itself or the room on the ground floor.

Mezzofanti, Giuseppe (met-sō-fän'tē), an Italian cardinal; born in Bologna, Sept. 17, 1774; was ordained priest in 1797, and later appointed to the chair of Arabic at Bologna; he was deprived because of his inability to take the oath to the Cisalpine Republic, but was reinstated later. In 1831 he settled in Rome with the rank of Monsignore, and two years after succeeded Cardinal Mai as Keeper of the Vatican Library. In 1838 he was raised to the dignity of cardinal. Mezzofanti's European reputation was founded, not on his writings, but on the almost miraculous extent of his lin-

guistic acquirements. Toward the end of his life he understood and spoke 58 different tongues. As early, indeed, as 1820 Lord Byron called him "a walking polyglot, a monster of languages, and a Briareus of parts of speech." Yet he was not in the strict sense a critical or scientific scholar, or even otherwise a man of great intellectual power. He died in Rome, March 15, 1849.

Mezzotint (met'sō-), a process of engraving on copper. The smooth plate is abraded with a roughened file-like tool, and myriads of tiny points are raised over the surface of the plate. These points catch and hold the ink, and an impression taken from a plate in this condition would give a soft velvety mass of black without variety of light and shade. A burnisher is next used to get rid of the raised points where half tones and lights are wanted. Sometimes where very brilliant high lights are required, they are cut away so as to insure a smooth surface of copper. By means of this burnishing process, all gradations of light and shade are obtained from the white of the smooth copper to the black of the roughened plate. The process dates from about the middle of the 17th century.

Mfumbiro (mföm-bē'rō), a mountain of Central Africa, 10,000 feet high; in lat. 1° 30′ S. and lon. 30° 30′ E., and W. of Victoria Nyanza, just within the borders of the British East Africa Company's territories.

Miami (mī-am'i), a river rising in Hardin co., O.; flowing a general S. W. and S. course through Logan, Shelby, Miami, Montgomery, Butler, and Hamilton counties, and entering the Ohio river at the extremity of the State.

Miani, or **Meanee** (mē-ä'ne), a village of India; on a branch of the Indus, 6 miles N. of Haidarabad; the scene of a battle fought Feb. 17, 1843, in which Sir Charles Napier defeated the Ameers of Scinde.

Miantonomah, The (mī-an"tō-no'mä), a twin-screw iron, double-turreted monitor of the United States navy; 990 tons displacement; length 359 feet, 6 inches; breadth, 55 feet, 10 inches; mean draft, 14.6 inches; armor, 7 inches on sides and 11.5 inches on turrets; main battery four 10-inch breech-loading rifles; secondary battery two 6-pounder and two 3-pounder rapid-fire guns, and two 1-pounder rapid-fire cannon. Crew, 13 officers and 136 men; cost, $3,178,046.

Miautsé (myou-tzā'), an aboriginal hill tribe of Southern China, who have contrived to maintain a practical independence and many curious local usages. They consist of numerous clans, still occupying large portions of Kwang-se, Kwei-chow, Kwang-tung, and Yun-nan. Some of them own Chinese sway; other tribes are absolutely independent. They are smaller than the Chinese, and unlike in features as in character. Physique and language indicate their affinity with the Annamese, Siamese, and various other inhabitants of the Indo-Chinese peninsula.

Mica, a name originally given to the shining, scaly constituent of many rocks and earths. The great diversity of chemical composition and other characters led to its division into several species, which were supposed to have distinctive crystallographic and chemical characters. The word is now used to designate a group of minerals having certain characters in common, the most important of which is the eminently perfect basal cleavage, which affords very thin, tough, and shining laminæ. The species hitherto distinguished are, Phlogopite, Lepidolite and Cryophyllite (regarded as orthorhombic); Biotite (hexagonal); Lepidomelane (hexagonal?); Astrophyllite and Muscovite (orthorhombic, but with monoclinic habit). Tschermak, who has recently optically investigated this difficult group of minerals, refers them all to the monoclinic system, his examinations showing that the axis of elasticity is inclined a few degrees to the normal to the plane of cleavage. Bauer confirms these results. Tschermak divides the micas into two groups — those which are characterized by having the optic-axial plane perpendicular to the plane of symmetry, and which includes Anomite, Lepidolite, Muscovite, Paragonite, and Margarite; and those which have the optic-axial plane parallel to the plane of symmetry, and which embraces Meroxene, Lepidomelane, Phlogopite, and Zinnwaldite. Rammelsberg, as the result of a chemical investigation of this group, divides them into the alkali micas, magnesium mica, iron-magnesium mica, lithium-iron mica, and barium mica. The species and Anomite, Astrophyllite, Biotite, Cryophyllite, Euchlorite, Fuchsite, Haughtonite, Lepidolite, Lepidomelane, Margarite, Margarodite, Meroxene, Muscovite, Oellacherite, Paragonite, Phengite, Phlogopite, Siderophyllite, and Zinnwaldite.

Micaceous (-kā'shus) **Rocks,** rocks of which mica is the chief ingredient, as mica slate and clay slate.

Micah, the name of various persons spelled Micah, Michah (I Chron. xxiv : 24, 25), or Micha (II Sam. ix: 12) mentioned in the Old Testament. Specially: (1) A priest (Judges xvii., xviii.) believed to have been a descendant of Moses, written Manasseh (xviii : 30). (2) The prophet called Micah the Morasthite, perhaps to distinguish him from Micaiah, the son of Imlah, who lived in the reign of Ahab.

Morasthite means of Moresheth, probably Moresheth-gath (Micah i : 14). Scarcely anything is known of him, except what may be gathered from his prophecies.

In the Old Testament canon : The 6th in order of the "minor prophets," *i. e.*, of the minor prophetic books. The title states that "the word of the Lord came to Micah the Morasthite in the days of Jotham, Ahaz, and Hezekiah, kings of Judah." The visions, seen, however, were concerning Samaria and Jerusalem, the capital of the 10 tribes, it will be observed, standing before that of the two (i. 1). Jeremiah attributes at least the prophecy in Micah iii. 12 to the reign of Hezekiah (Jer. xxvi : 18, 19). The corruptions of the 10 tribes and of the two are denounced; and the prophet foretells the destruction of both Samaria and Jerusalem (i. 5, 6; iii. 8-12); the captivity in Babylon (iv : 10); the world-wide spiritual influence to be ultimately exercised by Jerusalem and Zion, and the rise of a ruler to be born in Bethlehem, "whose goings forth have been from of old, from everlasting" (v : 1, 2). The most natural division of the book is into three sections, ch. i.-ii., iii.-v., and vi.-vii., each beginning with a formula calling on the people to hear (i : 2, iii : 1, vi : 1). Passages in Micah resemble others in Isaiah (see Micah iv: 1–5 and Isa. ii: 1–5). Micah is quoted or alluded to in Matt. ii : 5, 6, x : 35, 36; Mark xiii : 12; Luke xii : 53; John vii : 42. The canonical authority of the book has never been doubted.

Mica Schist (shist), or **Mica Slate,** a slaty metamorphic rock composed of mica and quartz. The mica is usually muscovite (potash mica), though sometimes it is biolite (magnesian mica). The rock usually splits along the micaceous folia. Occasionally mica seems to constitute the whole mass of the rock. Next to gneiss, mica schist is the most common metamorphic rock. It sometimes passes gradually into others of the same series. The addition of felspar making it become gneiss, and a decrease in the amount of quartz with an increase of chlorite makes it chlorite schist. Sorby has seen traces of ripple rocks. Various imbedded minerals occur, as quartz, garnet, etc.

Mice. See Mouse.

Michael, the name given to one of the chief angels, who, in Dan. x : 13-21, is described as having special charge of the Israelites as a nation; and in Jude 9, as disputing with Satan about the body of Moses, in which dispute, instead of bringing against the arch-enemy any railing accusation, he only said, "The Lord rebuke thee, O Satan!" Again, in Rev. xii : 7-9, Michael and his angels are represented as warring with Satan and his angels in the upper regions, from which the latter are cast down upon the earth. This is all the reference to Michael which we find in the Bible.

Michael I., Emperor of Constantinople, successor of Nicephorus, 811, abdicated, on occasion of a military sedition, in favor of Leo the Armenian, 813. Died in 846. Michael II., succeeded Leo the Armenian, 820; died in 829. Michael III., succeeded in the third year of his age, 842, under the guardianship of his mother, Theodora. In 859 he was persuaded by his uncle, Bardas, to assume the power himself, and his mother shortly after died of grief in a convent. In 866 he put Bardas to death, and made Basil, the Macedonian, his associate in the empire, who killed him in 867. Michael IV., was raised to the throne by Zoe, after she had poisoned her husband, Romanus Argyrus, 1034. He died in 1041. Michael V., nephew of the preceding, occupied the throne a few months after his death, and was dethroned by Zoe and Theodora, 1042. Michael VI., succeeded Theodora in 1056, and was dethroned by his officers, who elevated Isaac Comnenus to the imperial dignity in 1057. Michael VII., son of Constantine Ducas and Eudoxia, succeeded his father, 1067; and being dethroned by Nicephorus Botoniates in 1078, retired to a monastery, and died Archbishop of Ephesus. Michael VIII., surnamed Palæologus, regent of the empire during the minority of John Lascaris, whom he deprived of his eyes and throne in 1260, and in the following year took Constantinople. He was excommunicated by Pope Martin IV., as the supporter of heresy and schism. He died in 1288. He is not to be confounded with Michael Palæologus, who was crowned emperor in 1214, and governed the empire under his father, Andronicus the Elder. He died in 1220.

Michael, the 1st of the name, grand-duke of Russia, reigned in 1175. The 2d, grand-duke of Kiev, killed by the Tartars, 1245. The 3d (or the second), grand-duke of Russia, succeeded 1304; put to death by the Tartars, 1317. The 4th, first czar of Russia, of the house of Romanoff, called Michael Feodorovitch, born in 1598, elected 1613, died in 1645. He was succeeded by his son Alexis.

Michael Angelo. See Angelo.

Michaelis, Johann David (mē-*hä*-ā′-lis), a German Biblical scholar; born in Halle, Prussia, Feb. 27, 1717; took an active part with Haller in the formation (1751) of the Göttingen Academy. In 1750 he had been elected to fill the chair of Oriental languages in addition to that of philosophy. He died Aug. 22, 1791.

Michaelmas, the feast of St. Michael the Archangel. It falls on Sept. 29, and is

supposed to have been established toward the close of the 5th century. In England, Michaelmas is one of the regular terms for settling rents.

Michaelmas Daisy, a name applied to various perennial species of aster, which are common inhabitants of flower-borders, growing to the height of two feet, and blooming about Michaelmas.

Michal, the younger of Saul's two daughters, in love with David, and whom Saul reluctantly gave to him in marriage, (I Sam. xiv : 49; xviii : 20-29). She saved her husband's life from assassins sent by her father, by a stratagem which gave him time to escape (I Sam. xix : 14, 15). Her father then gave her in marriage to Phalti (I Sam. xxv : 44), from whom David some years after recovered her (II Sam. iii : 12-21). When David brought the ark of God to Jerusalem, she conceived and expressed great disgust at his pious joy, and the affections of the king remained alienated from her till her death (II Sam. vi: 16-23).

Michaud, Joseph François (mē-shō′), a French historian; born in Albens, Savoy, June 19, 1767. He studied at the college of Bourges, and went to Paris soon after the beginning of the Revolution, espousing the royalist side, and narrowly escaped death during the Reign of Terror. In 1813 he was received into the French Academy, became a member of the Chamber of Deputies in 1815, and about the same time was named reader to the king. He lost the latter office in 1827, in consequence of his opposition to the proposed law of the press. The great work on which Michaud's reputation rests is his "History of the Crusaders." He died in Passy, Sept. 30, 1839.

Michel, Louise, a French anarchist; born in Upper Marne, France, May 29, 1830. In 1860 she opened a school in Paris, Quartier Montmartre. Having taken part in the Commune uprising of 1871, she was sentenced to be deported for life to New Caledonia, but was set free by the amnesty of 1880 and returned to Paris, where she became prominent as an anarchist agitator. In 1883 she was sentenced to be imprisoned for six years for inciting to the plundering of the bakers' shops; she declined a pardon in 1885. In 1894 she was living in London, England. In 1897 she planned a visit to the United States, in company with prominent English and other anarchists. Having in September of that year undertaken a fortnight's lecturing tour in Belgium, she and her associates were expelled by the police. She died Jan. 9, 1905.

Michelet, Jules (mēsh-lā), a French historian; born in Paris, France, Aug. 21, 1798. In 1821 he was called to the chair of history in Collège Rollin, where he was also Professor of Ancient Languages and of Philosophy till 1826. The next year he was made maître de conférences in the École Normale, and after the revolution of 1830 was appointed chief of the historical section of the archives of France, and was chosen by Guizot to continue his literary lectures in the Sorbonne. His academical lectures became distinguished for appeals in favor of democracy and for assaults on the Jesuits. No professor of history in the college had ever attracted so large and enthusiastic an audience, and the Clerical party used all their influence to have him silenced, in which they were for a time successful. In 1848 he was restored to his chair, and gave to his lectures the design and character of democratic propagandism till his course was closed by the government of Louis Napoleon in March, 1851, when he lost all his offices. His principal historical works are: "History of France" (18 vols. 1833–1866); "History of the French Revolution" (7 vols. 1847–1853); "Roman History"; "The Beginnings of "French Law"; and others of less importance. Several of his works on social subjects deserve mention: "On the Jesuits" (1843), written in collaboration with Edgar Quinet; "Woman, Priest, and Family" (1844); "The People" (1846). About 1856 he turned into another path, and wrote and successively published works on natural history and philosophy. He died in Hyérs, France, Feb. 9, 1874.

Michiels, Alfred Joseph Xavier (mē-shi-āl′), a French historian; born in Rome, Dec. 25, 1813; studied law originally; wrote "Studies of Germany" (2d ed. 1850); "History of Literary Ideas in France in the 19th Century" (3d ed. 1862); "Journey of a Virtuoso in England" (4th ed. 1872); "History of Flemish and Dutch Painting" (new ed. 10 vols. 1865–1876); "Architecture and Painting in Europe" (3d ed. 1873); "Secret History of the Austrian Government" (4th ed. 1879); "Count Bismarck" (1871); the popular "Tales of the Mountains" (1857); and "Political Dramas" (1865); etc. He died in Paris, Oct. 28, 1892.

Michigan, a State in the North Central Division of the North American Union; bounded by Lake Superior, Lake Michigan, Lake Huron, Ohio, Indiana, Wisconsin, and Ontario; admitted to the Union, Jan. 26, 1837; number of counties, 83; area, 57,430 square miles; pop. (1900) 2,420,982; (1910) 2,810,173; capital, Lansing.

Topography.—The State is divided by the Great Lakes into two peninsulas, the lower of which occupies nearly two-thirds of the

MICHIGAN
SCALE OF MILES
0 10 20 30 40 50
State Capital
County Seats
Size of type indicates relative importance of places
LAKE SUPERIOR
602 feet above mean sea level
DOMINION OF CANADA
INTERNATIONAL BOUNDARY LINE
LAKE MICHIGAN
LAKE HURON
GREEN BAY
WISCONSIN
To Ashland and Duluth
To Duluth
To Michipicoten River
Michipicoten Island
Caribou Island
Keweenaw Point
Whitefish Bay
Isle Royal
(To Keweenaw Co.)
Marquette
Ishpeming
Escanaba
Gladstone
Menominee
Sault Ste. Marie
Cheboygan
Petoskey
Alpena
Ironwood
Calumet
Houghton
Hancock
Iron Mt.
Manistique
ONTONAGON
BARAGA
MARQUETTE
IRON
DICKINSON
MENOMINEE
DELTA
SCHOOLCRAFT
LUCE
CHIPPEWA
MACKINAC
EMMET
CHEBOYGAN
PRESQUE ISLE
CHARLEVOIX
MONTMORENCY
Straits of Mackinac

Hammond's 8 x 11 Map of Michigan.
Copyright, 1908, by C.S. Hammond & Co., N.Y.

A 88° 30′ B 88° C 87° 30′ D 87 E 86° 30′ Long. F 86° West G 85° 30′ from H 85° Greenw. I 84° 30′ J 84° K 83° 30′ L 83° M

Michigan

land area. The surface of the S peninsula is generally level, broken by conical hills rising to an altitude not exceeding 200 feet. It is divided by a low watershed running N. and S., the larger portion of the State being on the W. of this and gradually sloping toward Lake Michigan. The N. peninsula is mountainous; the Porcupine range, rising to an altitude of 2,000 feet above the sea, forming the watershed between the streams flowing into Lake Superior and Lake Michigan. The surface on either side of this range is rugged. There are numerous lakes and marshes in both peninsulas, and the coast is much indented. Keweenaw, White Fish and the Big and Little Noquette bays are the principal indentations on the N., while the Grand and Little Traverse, Thunder and Saginaw bays indent the S. peninsula. The State has numerous large islands, the principal ones being the Manitou, Beaver and Fox groups in Lake Michigan; Isle Royale, and Grande Isle, in Lake Superior; Marquette, Bois Blanc, and Mackinaw in Lake Huron; and Nebish, Sugar, and Drummond Islands in St. Mary's Strait. The rivers are small, short and shallow, and but few are navigable. The principal ones include the Au Sable, Thunder Bay, Cheboygan, and Saginaw, flowing into Lake Huron; Ontonagon, and Tequamenon into Lake Superior, and the St. Joseph, Kalamazoo, Grand, and Escanaba, into Lake Michigan.

Geology.—The geological formation of the State is greatly varied. Primary boulders are found over the entire surface, the N. part being principally of primitive origin, while Secondary deposits cover the entire S. peninsula. The Upper Peninsula exhibits Lower Silurian sandstones, limestones, copper and iron bearing rocks, corresponding to the Huronian system of Canada. The central portion of the S. peninsula contains coal measures and rocks of the permo-Carboniferous period. Devonian and sub-Carboniferous deposits are scattered over the entire State.

Soil.—The soil is of a varied composition and in large areas is very fertile, especially in the S., but the N. peninsula for the most part is rocky and mountainous and the soil unadapted to agriculture. The climate is tempered by the proximity of the lakes and is much milder than in other localities with the same latitude. The principal forest trees include basswood, maple, elm, sassafras, butternut, walnut, poplar, hickory, oak, willow, pine, birch, beech, hemlock, witch-hazel, tamarack, cedar, locust, dogwood, and ash.

Mineralogy.—Michigan has a great mineral wealth, especially in copper and iron. In 1899 the output of copper was 147,400,338 pounds, and the iron output amounted to 9,146,157 tons, valued at $13,707,899. The State ranks first in the United States in its iron production and second in copper. The coal mined during the year amounted to 624,908 short tons, valued at $870,152, and the stone production included sandstone, valued at $320,192, and limestone, valued at $371,210. Other mineral products are lead, gypsum, barytes, marl and lime.

Agriculture.—The soil of S. Michigan is especially adapted to fruit and berry growing, grapes, cranberries, cherries, strawberries, apples, pears, peaches, and plums are raised to a large extent. In 1900 the principal farm crops were corn, 38,888,460 bushels, valued at $14,388,730; hay and forage, 2,926,694 tons, valued at $21,792,987; oats, 33,689,536 bushels, valued at $8,759,279; wheat, 9,271,746 bushels, valued at $6,324,045; potatoes, 16,630,941 bushels, valued at $4,324,045; barley, 904,806 bushels, valued at $425,259; rye, 1,041,068 bushels, valued at $499,713; and buckwheat, 310,240 bushels, valued at $158,222.

Manufactures.—In 1900 there were reported by the United States census 16,806 manufacturing establishments, employing $284,047,233 in capital, and 162,336 persons; paying $66,458,947 in wages, $25,491,813 for miscellaneous expenses, and $199,153,711 for raw materials; and having an annual output valued at $356,387,412. The principal articles of manufacture were lumber, flour and grist mill products, foundry and machine shop products, furniture, tobacco, iron and steel, clothing, and shipbuilding. Shipbuilding is carried on at Port Huron, Wyandotte, and Detroit; and Belding has extensive silk interests. Other important manufacturing cities are Grand Rapids, Lansing, Saginaw, Battle Creek, Albion, Traverse City, and Muskegon.

Commerce.—The imports of merchandise at the ports of Detroit, Huron, Grand Rapids, Michigan, and Superior during the year 1900 aggregated in value, $6,023,623; and exports, $31,290,741. The collections for internal revenue in the State amounted to $4,925,024.

Banking.—On Oct. 31, 1901, there were reported 86 National banks in operation, having $11,643,775 in capital; $6,243,526 in outstanding circulation; and $5,773,560 in United States bonds. There were also 207 State banks, with $13,672,440 capital, and $3,723,526 surplus; 55 private banks, with $671,304 capital, and $104,48 surplus; and 5 trust and loan companies with $950,000 capital and $194,000 surplus. The exchanges for the year ending Sept. 30, 1901, at the United States Clearing Houses at Grand Rapids, Kalamazoo, and Detroit amounted to $467,236,999, an increase over those of the preceding year of $92,337,983.

Education.—In 1900 the children of school age numbered 721,698; the enrollment in public schools 504,983; and the average daily attendance, 350,000. There

were 15,924 teachers, 8,035 public school buildings, and school property valued at $19,338,173. The receipts for the previous year amounted to $6,660,800 and the expenditures $7,297,691. For higher education there were 261 public high schools, 441 private and select schools, and in these schools, 52,239 pupils were enrolled; 3 State normal schools and 3 private normal schools, and 11 colleges and 1 university. All these institutions are coeducational. The colleges include the University of Michigan, at Ann Arbor; Agricultural College, at Lansing; College of Mines, at Houghton; Adrian College, at Adrian; Albion College, at Albion; Alma College, at Alma; Battle Creek College, at Battle Creek; Detroit College, at Detroit; Hillsdale College, at Hillsdale; Hope College, at Holland; Kalamazoo College, at Kalamazoo; and Olivet College, at Olivet.

Churches.—The strongest denominations in the State are the Roman Catholic; Methodist Episcopal; Regular Baptist; Lutheran; General Conference; Lutheran, Independent Synods; Presbyterian; Congregational; Protestant Episcopal; Reformed; German Evangelical Synod; and United Brethren. In 1899 there were 4,460 Evangelical Sunday-schools with 49,880 officers and teachers and 355,200 scholars.

Postoffices and Periodicals.—In 1901 there were 2,190 postoffices of all grades; and 811 periodicals, of which 77 were daily, 5 tri-weekly, 21 semi-weekly, 604 weekly, 1 bi-weekly, 6 semi-monthly, 89 monthly, 3 bi-monthly, and 5 quarterly.

Railroads.—The total length of railroads within the State on Jan. 1, 1901, was 8,250 miles, of which 152 miles were completed during the previous year.

Finances.—On July 1, 1901, the war loan bonds of 1898 amounted to $416,800, and the Trust Fund Debt, $6,437,608. The sinking funds applicable to the retirement of the war bonds were $288,740. The equalized property valuation in 1901 amounted to $1,587,100,000, and the State tax rate, $2,-431 per $1,000.

State Government.—The governor is elected for a term of two years, and receives a salary of $4,000 per annum. Legislative sessions are held biennially beginning on the first Wednesday of January, and are unlimited as to length of session. The legislature has 32 members in the Senate and 100 in the House, each of whom receives $3.00 per day and mileage. There are 12 Representatives in Congress. The State government in 1901 was Republican.

History.—This region was first visited by Jean Nicolet in 1634, at Sault Ste. Marie, at which locality Father Marquette made the first permanent white settlement in 1668. French settlements were also made at Mackinaw and Green Bay, and in 1701 Detroit became the seat of a French colony under Cadillac. The country passed to the English at the end of the French and Indian War, and during the war of the Indians under Pontiac for the extermination of the whites the garrison of Mackinaw was butchered and Detroit suffered a long siege. The country was held by the English after the close of the Revolution, being delivered to the Americans in 1796. Michigan became a portion of the Northwestern Territory, and in 1802 was annexed to the Territory of Indiana. On Jan. 11, 1803, it was set aside as a separate Territory. It suffered severely during the War of 1812, Detroit and Mackinaw being captured by the British, and the Territory held till the successes of the Americans in 1813. In 1818, all the region N. of Illinois and Indiana was incorporated with Michigan. In 1823, the legislative power was transferred by Act of Congress, from the governor and judiciary to a council of nine persons selected by the President from 18 nominees by the citizens at large; and the judicial term was reduced to four years. In 1825 the council was increased to 13 members, selected as before. Michigan was admitted into the Union as a State, Jan. 26, 1837, and in 1838 the capital was removed from Detroit to Lansing.

AARON T. BLISS.

Michigan, Lake, one of the North American Great Lakes, of which it is the second in size, and the largest lake wholly within the United States. The shores are low. In the N. portion are the islands of the Manitou group, of which the largest is Beaver, 50 miles long. The lake is connected with Lake Huron by the Straits of Mackinac, and with the Mississippi by the Illinois and Michigan canal and the Chicago Drainage canal. There are important fisheries of lake trout and whitefish. The more important rivers emptying into it are the Fox in Wisconsin, the Menominee on the border between Wisconsin and Michigan, and the St. Joseph, Muskegon, Grand, Kalamazoo, and Manistee in Michigan. Of the harbors, the chief are Chicago, Milwaukee, Escanaba, and Grand Haven. Elevation above sea-level, 581 feet; area, 22,450 square miles; length, about 330 miles; mean breadth, 75 miles; mean depth, about 870 feet.

Michigan, University of, a coeducational non-sectarian institution in Ann Arbor, Mich.; chartered in 1837; has grounds and buildings valued at over $1,960,000; endowment, $300,000; scientific apparatus, etc., $1,220,000; volumes in the library, over 258,000; ordinary income, about $1,300,000; average number of faculty, 425; students, including summer school, 5,800.

Michigan Agricultural College, a coeducational, non-sectarian institution in East Lansing, Mich.; opened in 1857; has endow-

ment exceeding $980,000; property $1,000,000; volumes in the library, 31,000; average number of faculty, 120; students, including summer school, 1,400.

Michigan City, a city of Indiana; situated in Laporte co., on Lake Michigan, and on the Michigan Central and other railways; 56 miles E. of Chicago. There are important manufactures of chairs, gloves, hosiery and knit goods, railway cars, lumber, and lumber products; and the trade in lumber, salt, and iron ore is considerable. Here are located a United States life-saving station and the State prison for N. Indiana; and the city also has a public library and a park on the lake-front. Michigan City was settled in 1833 and incorporated in 1836. Pop. (1890) 10,776; (1900) 14,850; (1910) 19,027.

Michoacan (mē-chō-ä-kän′), one of the states of Mexico, on the Pacific Coast; area, 22,874 square miles; capital, Morelia. It is to a large extent elevated and mountainous, among the mountains being the volcano of Jorullo; and has rich mines of gold, silver and other minerals. Pop. (1900) 930,033.

Mickiewicz, Adam (mits-kē-ā′vĭch), a Polish poet; born near Novogródek, Lithuania, Dec. 24, 1798. He was the greatest of Slavic poets. Banished from Poland for political reasons, he resided principally at Paris after 1828, and was professor of the Slavic Languages and Literature at the College of France (1840-44). His great work was the epic "Pan Tadeusz" (Lord Thaddeus [of Warsaw]: 1834), a picture of Lithuanian life in 1812; though another epic, "Conrad Wallenrod" (1828), written while an exile in Russia, is hardly less renowned. Other important works were: a third epic, "Gražyna" (1822); the ballad "Dziady" (1823); "Crimean Sonnets" (1826); "The Books of the Polish People and of the Polish Pilgrimage" (1832). He died in Constantinople, Nov. 26, 1855.

Micmacs, a tribe of Algonquin Indians, the first with whom the English came in contact in America; they remained hostile to the English and their colonies till 1760. They number from 3,000 to 4,000, and are mostly in Nova Scotia, New Brunswick, Quebec, and Prince Edward Island.

Microbes. See BACTERIA.

Microcosm and **Macrocosm.** The belief of the ancients that the world or cosmos was animated, or had a soul, led to the notion that the parts and members of organic beings must have their counterparts in the members of the cosmos. Thus, in a hymn ascribed to Orpheus, the sun and moon are looked on as the eyes of the animating godhead, the earth and its mountains as his body, the ether as his intellect, the sky as his wings. The natural philosophers of the 16th century—Paracelsus at their head—took up this notion anew in a somewhat modified shape, and considered the world as a human organism on the large scale, and man as a world, or cosmos, in miniature; hence they called man a microcosm (Greek, "little world") and the universe itself the macrocosm ("great world"). With this was associated the belief that the vital movements of the microcosm exactly corresponded to those of the macrocosm, and represented them as it were in copy. From this it was an easy transition to the further assumption, that the movements of the stars exercise an influence on the temperament and fortunes of men (see ASTROLOGY). Heylin gave the title "Microcosmus" to a work on cosmography in 1621, and Lotze entitled his great work definitive of man's position in the universe "Mikrokosmus" (1856–1864).

Microcosmic Salt, a substance used in blowpipe analysis; it may be prepared by mixing concentrated solutions of phosphate of soda and chloride of ammonium. It has the composition $NaNH_4HPO_4$, $4H_2O$.

Microlestes (-les′tez), a genus founded on the remains of *Microlestes antiquus,* the earliest known mammal. Only a few teeth have as yet been discovered. The earliest horizon on which microlestes is found is in a bone bed in the Keuper [Upper Trias] of Würtemberg; but it has also been detected in the higher Rhætic beds. It is impossible to decide whether microlestes was placental or marsupial. Most probably it was marsupial; and it appears to be closely allied to the recent Australian banded ant-eater.

Micrometer (-krom′-), an instrument used with a telescope or microscope to measure small distances, or the apparent diameters of objects which subtend very small angles. Micrometers are variously constructed. The field of the telescope may be provided with a graduated scale, or a metallic ring, or a diaphragm having parallel and intersecting spider-lines or fine wires. The micrometer with a graduated scale is used for measuring distances by direct comparison.

Micrometer Screw, a screw attached to optical and mathematical instruments as a means for exact measurement of very small angles. The great space through which the lever of the screw passes, in comparison with the longitudinal motion due to the pitch, affords the means for a positive motion which is imperceptible on the object moved, though appreciable in its results. If the thread of a micrometer screw in an instrument has 50 threads to an inch, and carries a pointer which traverses a graduated circle divided into 20 equal parts, the revolution of the micrometer screw for a distance equal to one of the divisions will move the object to which the screw is attached $\frac{1}{1000}$ of an inch; that is, $20 \times 50 = 1{,}000$.

Microörganism, any microscopic being of the animal or vegetable kingdom; in a special sense, one belonging to the vegetable group BACTERIA (*q. v.*).

Microphone, an instrument for increasing the intensity of low sounds by communicating their vibrations to a more sonorous body which emits a more audible sound. It it variously constructed, the most usual method being with a piece of charcoal held loosely between two other pieces in such a manner that it is affected by the slightest vibrations conveyed to it by the air or any other medium. The two external pieces are placed in connection with a telephone, and, when the ear is placed at the ear piece of the telephone, the slightest sound on the wooden support of the microphone is so magnified that even the tread of a fly appears as loud as the tramp of a horse.

Microscope, an optical instrument by which objects are so magnified that details invisible or indistinct to the naked eye are clearly seen. In a simple microscope the magnifying power is interposed directly between the eye and the object, in the manner of a magnifying glass; and though the power may consist of several lenses, they combine as one; a triple set of which either lens can be used singly, or any two, or all in combination, is usual. In a compound microscope, an aërial magnified image of the object is projected by one lens in the manner of a magic lantern, and this image is looked at and further magnified by a second power as in the simple microscope. The first lens is called the object glass or objective; the second the ocular or eye-piece. The most important by far is the object glass. The shorter its focus the larger is the image produced. Of late years glasses have been produced of extraordinary power. The highest power yet made is of $\frac{1}{80}$ inch focus; this tiny object consists of many lenses so combined as to give good definition, and under such a power the small circular section across a human hair would occupy many times the field of view. The eye pieces are also made of various powers. The instrument further requires a stage on which the objects can be placed and held; underneath which must be a mirror for directing the light to the object when viewed transparently. In using high powers, fine mechanical movements are employed to adjust the object; and the best instruments have underneath a finely-adjustable substage, for the use of various illuminating apparatus.

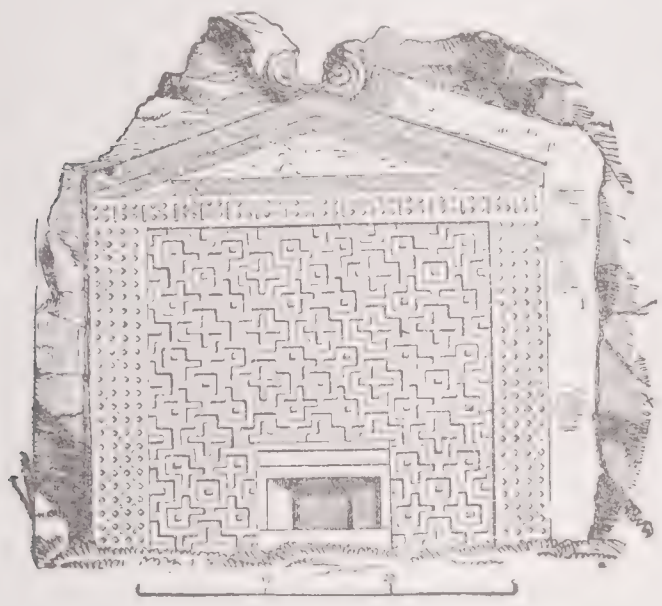
An instrument which presents an image to only one eye is called a monocular microscope; but there are several methods of dividing by prisms the pencil of rays from the objective into two sets, which diverge to eye pieces so placed, that both eyes can be used; such an instrument is called a binocular microscope. In all the usual forms of microscope, the image of the object appears inverted, and for most objects this is of no consequence. For dissecting under high powers this is, however, inconvenient; and for such and other purposes, instruments are constructed which, by prisms or lenses, reinvert or right the object, which thus appears in its true position; such are called erecting microscopes. In the solar microscope a lens condenses the sun's rays on an object, which is thus so intensely illuminated that the objective can project a greatly enlarged image on a white screen. In the electric microscope the rays from the electric light are similarly used, and in this way microscopic photographs of long messages, on tiny slips of collodion, were enlarged and transcribed during the siege of Paris in 1870. The oxy-hydrogen microscope similarly employs the light from lime made incandescent by the oxy-hydrogen flame. This is a far cheaper and more convenient light than the former, but of much less power; very lately, however, this form of microscope has been so greatly improved that magnifications of 1,200 to 2,000 diameters can be obtained with it.

Microscopium (-skō′pi-um) ("the Microscope"), one of the 14 new constellations which Lacaille added to the heavens in connection with his work at the Cape of Good Hope. It is a very inconspicuous constellation, its brightest star being of only 5.1 magnitude, and lies between Indus, Sagittarius, Capricornus, Piscis Austrinus, and Grus.

Microtasimeter (-sim′e-tur), an instrument invented by Thomas A. Edison, and announced by him in 1878; in it he uses the principle of the carbon microphone to measure infinitesimal pressure.

Microtome (mik′rō-tōm), an instrument for cutting thin sections of portions of plants and animals preliminary to their microscopic examination. The objects to be cut are imbedded in some material such as paraffin or celloidin, or frozen in gum, which makes the slicing of minute or delicate objects readily feasible. The cutting used to be done by holding the prepared object in one hand and wielding a razor in the other, but this method, apt to yield section of unequal or insufficient thinness, has given place to the use of some form of microtome, which is at once quicker and more effective. These instruments are quite simple devices by which a sliding razor slices a fixed but adjustable object, or by which the object is made to move up and down across the edge of a razor. As typical forms may be noted the freezing microtomes of Rutherford and others; the sliding microtomes common on the Continent; the ingenious "Rocker" of the Cambridge Instrument Company; a favorite instrument in British laboratories.

Midas (mī'das), in Greek legend, a King of Phrygia, son of Gordius and Cybele, and pupil of Orpheus. For his kindness to Silenus he was promised by Dionysus whatever he should ask, and in his folly he asked that everything he touched should become gold; but, as the very food he touched was at once changed into gold, he was soon fain to implore the god to take back his fatal gift. He was told to bathe in the sources of the Pactolus, and from that day to this its sands have yielded grains of gold.



TOMB OF MIDAS, 600 B. C.

Once, when Apollo and Pan were engaged in a musical competition on the lyre and the flute, Midas was called in to decide between them. He gave the palm to Pan, whereupon Apollo changed his ears to those of an ass. He concealed the deformity under his Phrygian cap, but could not hide it from his barber, who felt so heavy the burden of a secret he dared not reveal that he dug a hole in the ground and whispered into it, "King Midas has ass's ears." He then filled up the hole, and his heart was lightened; but out of the ground sprung up a reed which ever whispered the shameful secret to the breeze.

Middelburg, capital of the Dutch province of Zealand, in the island of Walcheren, 4½ miles N. E. of Flushing. In former times it was one of the leading mercantile cities of the United Provinces, sending many ships to the East and West Indies, and the Levant (Thomas Cromwell was one of its merchants); but its commercial importance has greatly declined. Pop. about 18,000.

Middle Ages, that period in the history of Europe which begins with the final destruction of the Roman empire, and by some historians considered to end with the Reformation; by others with the discovery of America; by others with the conquest of Constantinople; and again by some with the invention of the art of printing; all of which may be right, according to the special purpose of the historian. In general, it may be said the Middle Ages embrace that period of history in which the feudal system was established and developed, down to the most prominent events which necessarily led to its overthrow, though its consequences and influences are still very observable in the States of Europe. The first centuries of the Middle Ages are often termed the Dark Ages, a name which they certainly deserve. Still, however, the destruction of Roman institutions by the irruption of barbarous tribes is often unduly lamented, and the beneficial consequences attending it overlooked. True it is that many of the acquisitions which had cost mankind ages of toil and labor were lost in the general wreck, and only regained by the efforts of many successive generations; the flowers of civilization were trampled under foot by barbarous warriors; the civil development of society suffered a most severe shock; those nations to which Roman civilization had extended previous to the great invasion of the Teutonic tribes were thrown back in a great measure to their primeval barbarism, and the unruly passion for individual independence in the N. tribes greatly retarded the development of public and private law, and in some countries has entirely prevented a regular civil constitution.

While, however, the injury which the world suffered from the destruction of Roman civilization has been often overrated there is on the other hand a class of persons who laud the condition of Europe during the rudeness of the feudal ages in a spirit of romantic exaggeration, much like that of certain philosophers who have treated the savage state as that best fitted to nourish and preserve virtue, the one showing ignorance of history the other, of man. Any one may speculate as he pleases on such subjects but such speculations are foreign to the spirit of history, whose proper office is to state facts and show the influence of past ages on the succeeding. The feudal system filled Europe with powerful barons possessing large landed estates and commanding the services of numerous armed adherents, and with inferior lords protected by the former. They were all possessors of land, with arms perpetually in their hands, too proud to follow any laws except those of honor which they had themselves created, and despising all men of peaceful occupations as ignoble, created to obey and serve. If, therefore, the classes not belonging to the military caste wished to preserve their independence they could succeed only by union, which would afford them the means of mutual protection and enable them to exercise their various callings unmolested, and thereby acquire wealth in money and goods, which

Middle Ages

would serve as a counterpoise to the landed possessions of the feudal aristocracy. This necessity gave rise to cities. Small cultivators, at first under the protection and superintendence of the counts, bishops, and abbots, to whom they subsequently became so formidable, arose and attained (particularly in the 11th century), through their own industry and skill, to a state of prosperity which enabled them to purchase their freedom, and soon to obtain it by force. They did not remain stationary; small States began to grow into great ones; and the most of them became so bold as to acknowledge no superior except the highest authority of the country to which they belonged. Strong, high walls, impenetrable by the rude military art of the time, secured, in conjunction with the valor of the citizens, the freedom of the cities and protected them from the tyrants of the land; well-ordered civil institutions preserved peace and prosperity within and were secured by the wealth acquired by trade and manufacturing industry. Many of the nobility themselves, attracted by the good order and prosperity of the cities, established themselves there and were ambitious of obtaining the offices of government in these commonwealths. In fact they soon usurped the exclusive possession of them in many of the cities. The looser the social organization in any State and the more intolerable the pride of the nobility, the greater became the prosperity and power of the cities, which grew at length so great that in Germany and Italy these republics were formidable even to the emperor. In Arragon the third estate was fully developed as early as the 12th century. In England the cities in conjunction with the barons obtained the Magna Charta in 1215; and in France they increased in consequence, from the circumstance that Louis the Fat and his successors, particularly Philip the Fair, 200 years after him, found it their best policy to protect them against the nobility, and thereby increase their own means of resisting that order. But the cities of these countries never attained the importance of those of Germany and Italy. What single cities could not accomplish was effected by the union of several, as the league of the Lombard cities in Italy; the Hanseatic, Rhenish, and Suabian leagues in Germany appeared at the same time as great and formidable powers. Under the protection of such associations and sheltered by the walls of the cities, all arts and trades and every kind of civilization made rapid progress. Many of the important inventions which we now prize so highly originated among the citizens of these small free States, or were suggested by their active commercial and manufacturing spirit.

With constitutions similar to those of antiquity, the same spirit appeared to be awakened; all the virtues and vices of Athens, Sparta, and Rome were found in the free States of Italy, where even the climate resembled that of the republics which had perished 1,500 years before. There was the same love of country and valor, the same party contests, the same changes of administration and ambitious intrigues, the same (though differently directed) love of arts and knowledge. But the communities were not exempt from the influence of the domineering spirit of the times which they opposed. The overwhelming power of individuals, so dangerous to all free States, became through this spirit doubly formidable, and compelled the oppressed portion of the citizens in the same distress which had given rise to their parent city, to have recourse to the same means of relief. They bound themselves together for the protection of their rights. Such associations, usually formed among people of the same trade, and having for their object, next to security from external enemies, the maintenance of internal order in these stormy times, were called corporations or guilds and were under the direction of a master. The strictest regulations appeared necessary for the attainment of this object. No one, without serving an apprenticeship of years and advancing through certain degrees could become a member. At a later period admission into the corporation was purchased by individuals who did not follow the business of the members, but wished to share in the advantages of the associations. For in the 14th century the corporations became so powerful as to obtain almost exclusive possession of the government of the cities, which till this period the nobility had mostly retained in their own hands. The corporations now taught them that as they did not contribute to the prosperity of the city by their industry it did not become them to govern it. The nobility, so far as they continued in the city after this removal from power, preserved themselves in close connection and those who resided in the country formed confederacies against the power of the cities. Associations, which to the best men appeared the only means of security from the disorders of the time, became so universal that almost everywhere persons of the same trade or profession were closely united and had certain laws and regulations among themselves.

So also the most remarkable institution of that time, its characteristic production — chivalry — exhibited all the peculiarities of the corporations. War was the profession of the nobles. No one of their order who was not a knight could bear a lance or command cavalry; and the services of years as an attendant or squire were necessary

to entitle even one of the highest order to be dubbed a knight. But squire, knight, and baron were all inspired with the same spirit of honor, pride, love, and devotion. The religious zeal of the Middle Ages produced actions almost inconceivable to the cooler spirit of our time. We see hundreds of youths and maidens, in the flower of their age shutting themselves up in gloomy walls, or retiring to wild deserts and spending their lives in prayer and penance; we yearly see thousands barefoot and fasting traveling many hundred miles over sea and land to worship at the Holy Sepulcher; we see hundreds of thousands thronging thither from age to age with the cross and sword, at the risk of life, to deliver the Holy Land from the pollution of infidels.

This enthusiastic spirit was peculiarly suitable to soften the ferocity of the age, but ambitious men artfully turned it to their own selfish purposes. Intolerance, the destruction of the Jews and heretics, the luxurious splendor of the papal court, and the all-absorbing system of the hierarchy, were the unhappy fruits of this mistaken spirit. In opposition to the secular power, resting on the feudal system and supported only by armies of vassals, the Pope formed, from the archbishops, bishops, and priests, still more from the generals of religious orders, provincials, abbots, and monks, an immense army invincible through its power over the conscience and through the spiritual weapons which belonged to it and to its head. From the general belief in his possession of the power to make happy and unhappy in both worlds, to bind and loose for eternity, the Pope ruled with absolute sway the minds of Christians. All the kings of the West acknowledged him as the living vicegerent of Christ. Many were vassals to him, many tributary, almost all obedient and subject to him, or in a short time victims of a vain resistance. At the time in which little idea was entertained of restraining the sovereign lords of the land by constitutional laws, and when the spirit of the times allowed them to dare whatever they could do, it was, it is true, an inestimable advantage that the Pope aided the people for centuries in opposition to their usurpations; but the practical result of such a system was a spiritual despotism which held the minds and consciences of men in a state of subjection of a most degrading character. In vain did men like Arnold of Brescia, and the Waldenses, Wyclif, Huss, and their followers endeavor to overthrow the hierarchy by reminding the people of the simplicity and purity of the primitive church. They found their contemporaries accustomed to the supremacy of the church, not yet ripe for freedom of mind, and inattentive to their remonstrances; and their noble endeavors in a great measure failed.

Middle Ages

The ages of which we have been speaking, so full of battles and adventures, of pride and daring, of devotion and love must have been poetic times. The knights were particularly disposed to poetic views by lives spent between battle and love, festive pomp and religious exercises. Hence we see poets first appearing among the knights in the 12th century. In Southern France where chivalry was first established, we see the first sparks of modern poetry. The Provençal troubadors, who principally sang at the court of Berengarius of Toulouse, are the founders of it. Soon after them the French trouvères and the German minnesingers sang in their mother tongue; the Italians at first, from mistrust of their vulgar tongue, in the Provençal; and the English, from the same cause, in the French language. But the minstrels soon formed, among the latter also, a national poetry; and the Italians at a later period, after the great Dante brought the Tuscan dialect into honor, obtained by the improvement of it a high poetic fame. In Spain the Catalonian poetry was the same as the Provençal, but the Castilian and Portuguese borrowed more from the Arabians. With lyric poetry the epic was also developed in great beauty and power. Its mystic tone, its indefinite longing for something more elevated than the realities of earth entitle us to distinguish this epic from the ancient by the name of romantic.

The romantic epics of the Middle Ages are mostly confined to three cycles of stories. Italy remained a stranger to these, but her great Dante was worth them all, and stood high above them, though the tone of love and devotion which predominates in his poem sprang from the character of the times. The first of these cycles of stories is the truly German "Nibelungen" and the stories of Siegfried, Attila, Dietrich of Berne, Otnit, Hugdietrich, and Wolfdietrich, and other heroes of the time of the general migration of the nations which belong to it. Next to these stories stand the equally old tales of the British King Arthur, his "Round Table," and the "Sangraal" (Holy Grail), which, in accordance with old English or Cymric fables, were sung in France, and afterward by German minstrels, and to which "Titurel," "Parzival," "Tristan," "Iwain," "Lohengrin," "Gawain," "Daniel of Blumenthal," the "Enchanter Merlin," and others belong. To these two was added a third, originally French, collection of stories of Charlemagne and his peers, of Roland, the "Enchanter Malegys," and the "Four Sons of Haymon." The romance of "Amadis de Gaul" belongs peculiarly to the Spanish, and to neither of these three collections.

Besides these subjects the poetic appetite of the Middle Ages seized on the historic events of ancient and modern times, particularly the deeds of Alexander the Great,

and the crusades; likewise on Scripture history, and even on the subjects of the ancient epics of Homer and Vergil, for new poetical works. But whether from political causes, or, as we believe, from the downfall of chivalry and from an increasing spirit of reflection, the last centuries of the Middle Ages were highly unfavorable to poetry. The voice of the minstrel was almost entirely silent in Germany, France, and Spain, even in the 14th century; but Italy had now its Petrarch and Boccaccio, and England its Chaucer. In the 13th century there was not a story in the cycles above mentioned which was not eagerly sung by many poets and more than 1,400 love songs by 136 poets of this century are contained in the Manesse collection alone; but hardly a single poet appeared among the knights after the 14th century.

The epic poems of former times gave place to prose romances in which their stories were diluted, and the lyric poetry in France and Germany fell into the rude hands of the master singers, who, by a studied observance of rules, preserved its formal existence. So did it continue till the 15th century, which, attentive only to the great events that were in preparation and the struggles which preceded them, and actuated by the spirit of reflection from which they proceeded, was far removed from that free flow of feeling which had given birth to the poetry of the past time.

It was not till the end of the Middle Ages, when the early spirit of poetry lived only in remembrance, that Ariosto took the stories of Charlemagne's peers from the nursery, and gave them new dignity. Spain and England received a new national poetry from Cervantes and Shakespeare. But how great is the difference between these creative geniuses — complete masters of their subjects, who poured forth their whole souls in their poetry, so that one knows not which most to admire, the feeling which inspires, the fancy which adorns, or the understanding which regulates them, and whose humorous (often ironical) tone proclaims them the offspring of modern times — and those simple poets of the Middle Ages, who took the world as it was and were rather the organs of the spirit of poetry in the people than independent poets!

Among the arts of the Middle Ages architecture was distinguished by its peculiar character. In the noblest buildings of antiquity the form of the first rude dwelling-houses is not to be mistaken; they appear only as the ornamented forms of abodes which necessity created, and can only be called fine buildings; but the Gothic architecture of the Middle Ages was founded on a deep and great conception. This conception, which appears in the union of the grandeur of great masses with the most finished delicacy of parts, was the representation of the world. The other arts which in the 14th and 15th centuries came from Greece into the Western world, attained their greatest splendor in the Middle Ages upon the Lower Rhine and in Italy.

The weak side of the Middle Ages is the scientific. The youthful spirit of the time, bent upon action, could not devote itself to a sedentary life and continued study. The efforts of Charlemagne to encourage science and instruct the people hardly produced any effect beyond his life, for they were not in the spirit of the time. Several centuries after him the German tribes considered no knowledge of use but that of managing the lance and the steed. The barbarism was so great that most of the laity, even the most distinguished, could scarcely read or write. He who was instructed in these was considered a distinguished scholar, and he who obtained more knowledge, particularly in mathematics or natural science, exposed himself to the danger of being burned as a sorcerer. But the monks, by their retired situation and the leisure which they enjoyed as well as by the necessity of some knowledge of the Latin language, which the Roman Catholic ritual required, were driven to a more literary employment, to which they were educated in the schools of the cathedrals and convents. But their literary labors were confined to the copying of the old writers, particularly the fathers of the Church, and the accounts of the occurrences of the times in meagre chronicles. Nevertheless we are indebted to them. Through their activity the valuable remains of ancient times, materials and incitements to new improvements, have been in a great measure preserved to us, and from their annals we gather most of our knowledge of the events and manners of that time. Moreover, the Latin language which was common to all the people of the West, not merely in the affairs of the Church but in science and public transactions, and the study of the literature of Rome contributed much to promote intercourse and improvement.

Notwithstanding the general ignorance, however, as the spirit of man is hostile to a partial development, the need of thinking was again felt in Europe; the taste for knowledge awoke here and there, partly by means of the monasteries, but afterward through the arts and industry which prevailed in the cities; study was encouraged by Henry II. of England, the Hohenstauffen, St. Louis, the Alphonsos, and other intellectual princes. From these times (the periods of Lanfranc, Abélard, John of Salisbury, and others) the Middle Ages produced distinguished individuals whom the coldness of their contemporaries in the cause of science only urged to a more ardent pursuit of it. Meantime the necessity was felt of defending the doctrines of the

Church against unbelief and heresy. This led to the sharpening of the intellect by dialectics; hence the Church dogmatics or theology was formed, from which philosophy at length proceeded. As in scholastic theology the dogmas of the Church were early received as authority, so in the domain of laws the Roman code soon obtained a complete ascendency; and the jurisconsults of that time were never weary in studying it, learning it by heart, and explaining it by glossaries and illustrations. The students of philosophy pursued the same course with the subtle Aristotle, for whom the Middle Ages, though acquainted with him only through Arabic translations or *rifaciamentos*, had an unbounded respect. Unfortunately, however, for the progress of philosophy, these commentaries, glosses, and abridgments occasioned the neglect of the original.

When the union of scholars in particular places gave birth to universities, these received the stamp of the time both in the corporate character which was given them and the absorbing interest which was taken in the study of the dialectics. Only jurisprudence, theology, and what was called philosophy (which was in fact the art of disputing with subtlety upon every subject), were taught; and these sciences, especially since the middle of the 12th century, had degenerated into a mere tinkling of scholastic sophistry. Medicine, as regards any useful purpose, was taught at this time only by some Arabs and students of Salerno who had been instructed by them; in other respects it was a slave of astrology, and an object of speculation to ignorant impostors, principally of the Jewish nation. Philology flourished in the time of Lanfranc and Abélard, but was again forgotten in the 11th and 12th centuries. Notwithstanding the unprofitable character of what was taught at this time, teachers stood in high esteem, and the highest academic rank was considered equal to knighthood. The universities on their side showed themselves worthy such honor by their independence of Pope and prince. With all its worthlessness the disputatious spirit of the time had this good effect, that truths were advanced and maintained in the universities which were alarming to the vigilant hierarchy; and Luther's theses in Wittenberg contributed in no small degree to bring on the Reformation, and thereby to the shedding of new light on science. Yet the Reformation did not (as many are inclined to believe) give the first signal for higher intellectual endeavors and freedom of thought; it was rather produced by this striving and this freedom, which had originated some centuries before, with the flight of the Greek scholars from Constantinople and the invention of the art of printing, had been encouraged by the lovers of science among the princes of Italy, and had shone forth, even in Germany, in the brotherhood of Deventer, in Wessel, Erasmus, Celtes, Reuchlin, and others. But with the appearance of these men, with the rise of the sun of the new day, the romantic twilight of the Middle Ages faded away.

Middleboro, a town in Plymouth co., Mass.; on the Namasket river, and on the New York, New Haven, and Hartford railroad; 35 miles S. of Boston. It is one of the oldest towns in Plymouth county, having been incorporated June 1, 1669, and has many points of historic interest. The town includes the villages of North Middleboro, Four Corners, Nemasket, Puddingshire, Tack Factory, Thomastown, Waterville, the Green, South Middleboro, Rock, and Eddyville. There are gas and electric lights, high school, Eaton Family School, National and savings banks, and weekly newspapers. It has manufactories of shoes, straw goods, open grates, and woolen goods, besides sawmills, iron foundry, marble works, etc., and an assessed property valuation of nearly $4,000,000. Pop. (1890) 6,065; (1900) 6,885; (1910) 8,214.

Middle Kingdom, The (Chinese, Tchang-kooe), a name conferred on their country by the Chinese, who imagine that it is located in the middle of the earth.

Middlesborough, a river port and municipal and parliamentary borough of England, in the North Riding of Yorkshire, 6 miles from the mouth of the Tees and 44 miles N. of York; streets well laid out; the usual institutions of a modern and progressive town; docks extensive and commodious; total tonnage entered and cleared (1898), excluding coastwise traffic, 1,708,011; has numerous blast-furnaces and rolling mills, foundries, engineering works, ship yards, nail works, bolt and nut works, etc; salt is being extensively worked, there being a thick bed of rock salt at a depth of 1,300 feet. In 1829 the site of Middlesborough was occupied by a solitary farm-house; its rapid growth has been due to its suitability as a port for the Durham coal-fields, and to the smelting of iron ore abounding in the adjacent Cleveland Hills, an industry begun in 1840. The borough was incorporated in 1853, and returns one member to Parliament. Pop. (1901) 91,300.

Middle States, New York, New Jersey, Pennsylvania, and Delaware, in allusion to the fact that at the time of the adoption of the Constitution they were the central commonwealths of the federation.

Middleton, Conyers, an English theological writer; born in Richmond, Yorkshire, England, Dec. 27, 1683. His life was one of embittered controversy, in which he gained immediate opprobrium and material harm, but enduring intellectual considerations. He died July 28, 1750.

Middleton, Thomas, an English dramatist; born about 1570. The place of his birth is uncertain, but probably London, where his life was passed, saw its beginning. Little is known of his career beyond the fact that he was employed to write court masques and pageants while he held the office of city chronologer. It would appear that about 1593 he studied law at Gray's Inn. A few years later he began to write for the stage, both alone and in collaboration with others. His plays at first dealt with ancient history and similar subjects, but afterward he turned his attention to the life of his own time. One of his best masques—he wrote about 20—is "The World Lost at Tennis" (1620). His comedies include: "A Trick to Catch the Old One" (licensed 1607); "The Family of Love" (licensed 1607); "The Phœnix" (1607); "Michaelmas Term" (1607); "A Mad World, My Masters" (1608); and "The Witch" (first printed in 1778), supposed by some to have furnished Shakespeare with the machinery of the witches in "Macbeth," while others maintain that Middleton borrowed from Shakespeare. Middleton was associated with Fletcher and Jonson in writing "The Widow" (1652), and with Rowley in the production of "The Changeling" and "The Spanish Gipsy" (1653). He was no less successful in tragedy than in comedy, and in single passages he is often brilliant.

Middletown, a city and county seat of Middlesex co., Conn., on the Connecticut river, and the New York, New Haven, and Hartford railroad; 15 miles S. of Hartford. It is the seat of WESLEYAN UNIVERSITY (*q. v.*), the State Industrial School for Girls, the Berkeley Divinity School, and a State Insane Asylum; contains the county court house, National and savings banks, and the Russell Public Library; and has electric light and street railroad plants, improved waterworks, and manufactories of ship hardware, elastic webbing, rubber goods, pumps, hammocks, sewing machines, etc., and an assessed property valuation of nearly $6,500,000. Middletown was incorporated in September, 1651, and named in November, 1653. Pop. (1890) 9,013; (1900) 9,589; (1910) 11,851.

Middletown, city in Orange co., N. Y., on the Wallkill river, and on the New York, Lake Erie and Western, the New York, Ontario and Western, and the New York, Susquehanna and Western railroads; 66 miles N. W. of New York city. There are a Union School, Middletown Academy, the Thrall Public Hospital, the State Asylum for the Insane, waterworks, public library, National banks, and several daily and weekly newspapers. The city is the center of a large country trade in live-stock and garden produce. Here are located the machine shops of the New York, Ontario and Western railroad, and there are manufactories of woolen hats, wood type, shirts, blankets, files, saws, sheet steel, condensed milk, Russia leather, etc. The assessed property valuation exceeds $4,000,000. Middletown was chartered as a city in 1888, up to which year it was a part of Wallkill township. It was important in the early history of New York as a half-way station on the old Minisink road, which ran from the Hudson to the Delaware river, and was much used by emigrants on their way to Western New York. Pop. (1890) 11,977; (1900) 14,522; (1910) 15,513.

Middletown, a city in Butler co., O.; on the Miami river, the Miami and Erie canal, and the St. Louis, the Cincinnati, Hamilton and Dayton, the Cleveland, Cincinnati, and Chicago, the Middletown and Cincinnati, and the Cincinnati, Jackson, and Mackinaw railroads; 34 miles N. of Cincinnati. Here are waterworks on the Holly system, and electric street railroad, electric lights, National and private banks, and several daily and weekly newspapers. The city has manufactories of paper, tobacco, bicycles, and agricultural implements, and an assessed property valuation of nearly $5,000,000. Pop. (1900) 9,215; (1910) 13,152.

Middletown, a borough in Dauphin co., Pa.; on the Susquehanna river, and on the Philadelphia and Reading, and the Pennsylvania railroads; 10 miles S. E. of Harrisburg. It contains the Emaus Orphan Home, waterworks, a high school, National banks, daily and weekly newspapers, and an electric road connecting it with Harrisburg. It is located in an agricultural and lumbering region, and has extensive iron works, planing mills and sash factory, car works, tannery, furniture factory, a flour mill, foundry, etc. Pop. (1900) 5,608; (1910) 5,374.

Midhat Pasha (mē′dhät pä-shâ′), a Turkish statesman; born in Bulgaria, in 1825; was educated in Constantinople; entered the Turkish civil service; attracted attention by his administrative capacity; became governor of Bulgaria in 1862; and was ultimately in 1876 created grand vizier. In this position he was supreme in the palace, and caused Abdul Aziz and Murad V. to be deposed. In the following year, however, he was himself banished; and in 1881, after a judicial investigation into the murder of Abdul Aziz, he was condemned and exiled to Arabia, where he died, May 8, 1884.

Midi (mē-dē′), **Canal du,** or **Canal du Languedoc** a canal from the Garonne near Toulouse, France, to the Étang de Thau, near Agde; length, 149 miles; opened in 1681. It connects the Mediterranean with the Atlantic.

Midianites (-īttz), an Arab race, descended, according to Scripture, from Midian, the son of Abraham by Keturah. They occupied great part of the country between the Red Sea and the Plains of Moab, and

had their headquarters E. of what is now the Gulf of Akabah. They were at least partly nomadic, but their caravans brought gold and incense from the S. to Palestine, and traded between Egypt and Syria. Some of them lived near Sinai; to them belonged Jethro, priest or sheik of Midian, father-in-law of Moses. The Midianites were very troublesome neighbors to the Israelites till Gideon's victory over them. Their national god was Baal-Peor. In Midian proper, to the E. and S. E. of the Gulf of Akabah, the Romans had valuable mines. Sir Richard Burton was convinced that gold was still to be found there, and as an outcome of visits paid in this interest wrote his "Gold Mines and Ruined Cities of Midian" (1878) and "Midian Revisited" (1879). Later travelers have not confirmed his opinion; but petroleum seems to occur. Midian ceased to be Egyptian and became Turkish again in 1887.

Midnight Sun, Land of the. See LAND OF THE MIDNIGHT SUN.

Midrash, in Hebrew literature, the oldest Jewish exposition of the Old Testament. It was of two kinds — the Halachic or Legal and the Hagadic or Homiletic interpretation. The rules regulating those two kinds of exegesis were collected and systematized by Elieser ben Jose, a Galilean, in the 2d century.

Midshipman, in the United States navy, the naval cadet whose duty it formerly was to render such service as was required of him by the various officers on the ship, such as carrying messages, etc. In the British navy, the highest in rank of the petty officers. Before being appointed to this rank he must have served at least one year as a cadet, and have passed the prescribed examinations. After six years' service, and the passing of further examinations, he is promoted to the rank of sub-lieutenant. He receives instruction, literary and professional, and his special duties are to pass on the orders of the superior officers to the men, and to superintend the carrying out of them. In zoology, an American sea fish allied to the toad fish and known as of the genus *Porichthys.*

Midsummer Day, the feast day of the nativity of St. John the Baptist, and commonly reckoned to be June 24. On midsummer eve, or the eve of the feast of St. John, it was the custom in former times to kindle fires (called St. John's fires) on hills in celebration of the summer solstice. It is also the second quarter-day in England for the payment of rent.

Midwifery, a branch of medicine or surgery, also called obstetrics, being the art of aiding and facilitating childbirth, and of providing for the preservation of the health and life of the mother during and after her delivery.

Mieris, Frans Van (mē′ris), a Dutch genre painter; born in Leyden, April 12, 1635. He was a favorite pupil of Gerard Dow. He preferred subjects from the life of the higher classes, excelled in painting rich stuffs, plate, and jewels, his coloring being at once clear and delicate, deep and rich. His pictures, usually of small size, bring enormous prices, and are found in all the chief galleries. He died in Leyden, March 12, 1681. FRANS VAN MIERIS, the younger, son of Willem Van Mieris, born in Leyden, Dec. 24, 1689. He painted genre pictures and portraits, and published works on numismatics and history. He died in Leyden, Oct. 22, 1763. JAN VAN MIERIS, son of Frans, the elder, born in Leyden, March 17, 1660. He painted portraits and historical pictures. His works are rare. Died in Rome, March 17, 1690. WILLEM VAN MIERIS, son and pupil of Frans, the elder, born in Leyden, in 1662. He painted genre and mythological pictures, his best work representing subjects taken from ordinary life. His "Poulterer's Shop" is in the National Gallery, London, and many of his more important works are preserved at Dresden and other continental galleries. He died in Leyden, Jan. 27, 1747.

Mieroslawski, Louis (myā-rō-slâv′skē), a Polish general; born in Nemours, France, Jan. 17, 1814. He joined the Secret Democratic Society of Poland, engaged in organizing an insurrection, and having betaken himself to the post indicated by it in 1846, was arrested at Posen, and after a dignified and vigorous defense, was condemned to death at Berlin. A rising having taken place at Berlin during the revolution of 1848, he was, with his companions, liberated. Invited by the provisional government of the grand-duchy of Baden to take the command of their army against the Prussians, he obeyed the call, and with a very inferior force for some time held the troops of Peucker and Hirschfeld in check. Having been deserted by his cavalry, he fell back on Rastadt, and after a few reverses, laid down his arms. From that period till the outbreak in Poland in 1863, he lived in retirement in Paris, occupying himself with the study of history, politics, and the art of war. At an early stage of the insurrection he was offered the dictatorship, with the personal command of a portion of the Polish army. But the appointment was not approved by the nobility, who were dissatisfied with his strong democratic bias, and he was therefore obliged to give way to Langiewicz. Some valuable works on Polish history were written by him. He died in Paris, Nov. 13, 1878.

Mignet, François Auguste Alexis (mē-nyā′), a French historian; born in Aix, Provence, France, May 8, 1796. He studied at Avignon, and then law at Aix with Thiers. Both were admitted to the bar at the same time (1818), but Mignet's true vocation was at once apparent in the no less solid than brilliant prize essay for the Academy of Inscriptions on the institutions of France in the time of St. Louis. In 1821 he went to Paris, and soon began to write for the "Courrier Français," and to lecture on modern history at the Athénée. In the spring of 1824 appeared his "History of the French Revolution," the first complete history by one other than an actor in the great drama. Mignet joined the staff of the "National," and with Thiers signed the famous protest of the journalists, July 25, 1830. After the revolution of 1830 he became keeper of the archives at the Foreign Office, but lost this in 1848. In 1833 he went on a confidential mission to Spain, and used the opportunity to explore the famous Simancas Archives. Elected to the Academy of Moral Sciences at its foundation in 1832, he succeeded Comte as its perpetual secretary in 1837, and was elected to fill Raynouard's chair in the French Academy in 1836. He died in Paris, March 24, 1884.

Mignonette (min-yon-et′), *Reseda odorata*, a well-known and highly fragrant flower, indigenous in Northern and Northeastern Africa. There is a variety called *B. frutescens*, tree mignonette, brought originally from Egypt, now cultivated in England.

Migration, in zoölogy, ornithology, etc., a term applied to the periodical or irregular movements of all animals, especially to those of birds and fishes, for though the movements of some mammals correspond in some degree to those of birds, they are rather incursions than true migrations. In all the temperate parts of the globe there are many genera and species of birds which reside only a part of the year, arriving and leaving at tolerably fixed epochs. Most of the birds that spend their spring and summer in the temperate parts of the United States pass the winter in the far S.; the winter visitants pass the summer in the extreme N., some of them breeding in Greenland, Lapland, or Iceland. It is probable that what may be called "the instinct of migration" in such birds has arisen from the habit of wandering in search of food, greatly exaggerated by the powers of flight, and by the necessity for procuring a large amount of soft insect food for their unfledged young. Many sea fishes migrate to a limited extent for the purpose of depositing their spawn in favorable situations.

In botany, many seeds have downy or feathery appendages which when the wind blows influence their motion through the air; others are floated down rivers to alluvial sands near their mouths; the ocean may cast them on distant shores, or regions, now disconnected, may at a former geological period have been united.

Migratory Thrush. See ROBIN, AMERICAN.

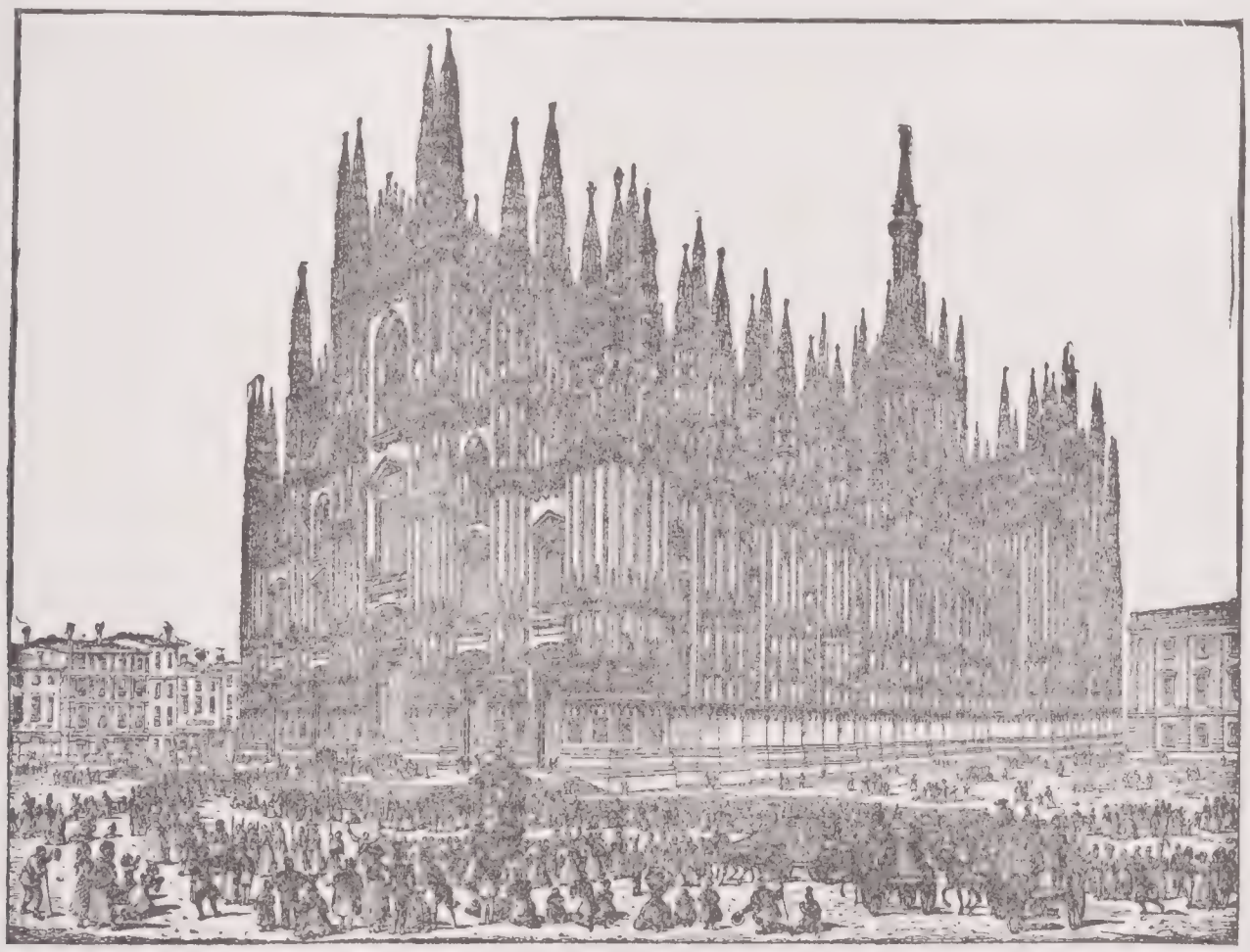
Miguel (mē-gel′), **Maria Evaristo, Dom,** Duke of Braganza, and so-called King of Portugal; born in Lisbon, Portugal, Oct. 26, 1802; son of John VI. At six years of age he emigrated with the royal family to Brazil, and when his father succeeded to the throne in 1821, Miguel rebelled three times against him, and was banished. On the death of John, in 1826, Miguel was made regent, and offered the hand of Maria da Gloria, the legitimate heir to the throne, then on her way to Portugal. Notwithstanding his oath to the constitution, he caused himself to be proclaimed king, and forbade the entrance of Maria into the country. After holding the throne for some time, and plunging the country into confusion and misery, a revolution ensued, and Dom Pedro came from Brazil to support the claims of his daughter Maria, in which he was aided by France. Dom Miguel was, after several defeats, compelled to sign, in 1834, a capitulation at Evora, and to depart from Portugal. He died in Bronnbach, near Wertheim, Baden, Nov. 14, 1866.

Mikado (mē-kä′dō) (Japanese = the Venerable), the Emperor of Japan, the spiritual as well as temporal head of the empire. From 1192 up to the revolution in 1868, the temporal power was in the hands of the tycoon or generalissimo of the army, the spiritual power only being vested in the Mikado, who lived in almost perfect seclusion. The government now is a constitutional one, and the Mikado appears among his subjects.

Miknas (mik′näs), or **Mequinez** (mek′-i-nez), a town of Morocco, 32 miles W. by S. of Fez and 70 miles from the coast, situated amid olive groves on the slope of a hill. It is surrounded by walls, and is perhaps the best built town in Morocco. The palace is the summer residence of the Sultan, and the mosque of Muley Ismail is the burial place of the royal house.

Milan (mi-lan′, or mil′an), a city of Northern Italy, capital of the province of Milan, and the former capital of Lombardy, 150 miles W. of Venice, and 79 miles E. N. E. of Turin. One of the finest and most pleasing cities of Europe, it is circular in form, and surrounded by a wall 10 miles in circuit, but, like most of old cities, it is

irregularly laid out. The most remarkable among its public buildings are the cathedral, an imposing Gothic structure, inferior only to that of St. Peter's at Rome, or St. Paul's of London, being 485 feet long, 252 feet broad, and height of dome 355 feet, adorned with over 4,500 statues; the church of St. Ambrose, in which the German emperors usually received the Lombard crown; the Palazzo del Corte, or royal palace, and the Teatro della Scala. It has, besides, numerous private palaces. The city is entered by 10 gates, of which the Porta Orientale is the richest and most remarkable, surpassed only by the Arcadella Pace, a triumphal arch on the road leading from Milan to Simplon. In the Piazza di Castello is an arena built by Napoleon I. in 1806, on the model of the amphitheater at Rome. Principal institutions are the Brera Palace, formerly a Jesuitical college, at present known as the Palace of Arts and Sciences, which has a library of over 140,000 volumes, besides several rare collections, and the Ambrosian College, containing a library of over 95,000 volumes, and 15,000 MSS. Attached to the latter is also a gallery of paintings, containing several fine works by Titian, Da Vinci, Luini, Albano, etc., and sketches by Raphael, Pietro de Cortona, and Caravaggio. Manufactures velvets, silks, ribbons, laces, carpets, glass, paper, etc. Milan is the center of the silk trade of Northern Italy; and, besides an extensive trade in rice and Parmesan cheese, is, next to Venice, the largest book mart in Italy. Milan (ancient Mediolanum), supposed to have been founded by the Gauls, was annexed to the Roman dominions by Scipio Nascica, 191 B. C. In the 4th century, it held the rank of the 6th city of the Roman empire, and is one of the few in Italy which have survived the devastations of the Middle Ages, and brought down its celebrity to modern times. Its history is identified with that of Lombardy. Pop. (1906) 520,600.



MILAN CATHEDRAL.

Milan I., King of Servia; born in Jassy, Moldavia, Aug. 10, 1854. He studied at Paris, at the Lycée Louis-le-Grand. The assassination of his cousin, Prince Michael, caused his recall to Servia, where he was proclaimed prince at the age of 14. A Council of Regency administered the government till the prince came of age. In 1875 he married Natalie, Princess of Stourdza, from whom he was afterward divorced, and by whom he had a son, who became King Alexander. Owing to the troubles arising out of disagreement with the queen, he abdicated in favor of his son, March 6, 1889. He was reconciled to Queen Natalie in 1893, and in 1894, despite his pledge to the contrary, he returned to Belgrade. After many subsequent vicissitudes he became bankrupt. He died in Vienna, Feb. 11, 1901.

Milan Decree, a decree issued by Napoleon I. from Milan, Feb. 18, 1801, for cut-

ting off Great Britain from all connection with the Continent.

Milan Edict, an edict issued by Constantine the Great from Milan, A. D. 313, granting toleration to Christianity and all other religions in the Roman empire.

Milanés, José Jacinto (mē-lä-nās′), a Cuban poet; born in Matanzas, in August, 1814. His drama "El Conde de Alarcos" at once gave its author fame, as it contains passages of very passionate poetry. The drama "A Poet at Court" also met great success. He published "A Cuban Looker-on," a series of social sketches (1842). Many of his poems have been translated into English, French, and Italian, and nearly all his works into German. He died in November, 1863.

Milazzo (mē-lät′sō) (ancient Mylæ), a fortified seaport of Sicily, on a promontory 21 miles W. of Messina. Off Mylæ in 260 B. C. the Romans won a great sea fight over the Carthaginians; and here July 20, 1860, Garibaldi, with 2,500 men, defeated 7,000 Neapolitans, and compelled the garrison to evacuate the fortress.

Milburn, William Henry, an American clergyman; born in Philadelphia, Pa., Sept. 26, 1823; became widely known as "the blind preacher," and was many times chaplain of the National House of Representatives, and in 1893 of the National Senate. He wrote: "Rifle, Axe, and Saddle-Bags" (1857); "Ten Years of Preacher Life" (1859); etc. He died April 10, 1903.

Mildew, a morbid appearance produced on plants by the ravages of parasitical fungi or other cause, or the parasitical fungus itself which produces the morbid appearance. Such fungi are always minute, and sometimes microscopic. Different genera and species attack different plants. Thus, wheat mildew is *Puccinia graminis; P. coronata* also attacks cereals. Another species injuring wheat is the bunt or pepperbrand, *Tilletia caries. Rœstelia coronata* attacks the ash, *R. lacerata* the hawthorn, and *R. cancellata* the pear. These three are sometimes placed in the genus *Æcidium. Oidium tuckeri* constitutes the true mildew. *O. fructigenum* forms little concentric tufts on pears, apples, etc. These may be only early stages of some other fungus. *Erineum*, a pseudo-genus of Fungals is now known to be only a diseased state of the plants on which it appears; *Erineum aureum* or *Taphria aurea* occurs on poplar leaves. All the foregoing are parasites which attack the plants internally, and then force their way to the surface. Other mildews are produced by fungi which grow on the surface of plants, as *Cylindrosporum concentricum* on the cabbage. *Erysiphe* (*Sphærotheca*) *pannosa* is the rose mildew; *E. pannosa* the hop mildew. These fungi, growing on the surface of leaves, fruits, etc., do not establish themselves till the plant on which they grow has become unhealthy from other causes.

Mile, a measure of length or distance in use in the United States and almost all European countries. The English statute mile, in use in the United States, contains 8 furlongs, or 320 poles, or 1,760 yards or 5,280 feet; in surveying it measures 80 chains. A geographical mile is 6,075 feet (nearly), or 1.15 statute miles. A square mile is 6,400 square chains, or 640 acres. The English statute mile = 1609.3149 French mètres. A league is 3 miles. The nautical mile is 2,028 yards, or 1,014 fathoms. The Roman mile was 1,000 paces of 5 feet each, and the Roman foot being 11.62 English inches, the Roman mile was therefore = 1,614 English yards, or (about) $\frac{11}{12}$ of an English statute mile. The old Scotch mile was = 1,984 yards, or 1.127 English mile. The Irish mile is = 2,240 yards, or 1.273 English mile. The German short mile is = 3.897 English miles. The German long mile = 5.753 English miles. See METRIC SYSTEM.

Mileage, in the United States, fees paid to certain officials, such as members of Congress, of State legislatures, etc., for their traveling expenses, at so much per mile. The system has in the past led to gross abuses, each senator and representative estimating for himself the distance he had traveled. Now, however, there is a fixed table of mileage, and the total annual cost, for both houses of Congress, is nearly $150,000. In all countries of Europe, except Great Britain, the same system prevails with regard to members of the popular chambers, at least, they being paid either their traveling expenses or a fixed annual sum.

Miles, George Henry, an American dramatist; born in Baltimore, Md., July 31, 1824. His short story "Loretto, or the Choice," won the $50 prize offered by the Baltimore "Catholic Mirror" for the best short story. In 1850 his "Mohammed" won the $1,000 prize offered by Edwin Forrest for the best play by an American author. He wrote many poems, plays, and sketches; among them "Christine, a Troubadour's Song; and Other Poems (1866); and "Abou Hassan the Wag, or the Sleeper Awakened" (1868). He died in Thornbrook, Md., July 23, 1871.

Miles, Nelson Appleton, an American military officer; born in Westminster, Mass., Aug. 8, 1839. At the breaking out of the Civil War, he was engaged in mercantile pursuits in Boston, Mass.; entered the service as 1st lieutenant of the 22d

Massachusetts Regiment in October, 1861; and distinguished himself at the battles of Fair Oaks, Charles City Cross Roads, and Malvern Hill. In September, 1862, he was commissioned colonel of the 61st New York Regiment, which he led at Fredericksburg and Chancellorsville, where he was severely wounded. He commanded the 1st Brigade, 1st Division, 2d Army Corps, in the Richmond campaign, and was promoted Brigadier-General, May 12, 1864; and brevetted Major-General for gallantry at Ream's Station in December, 1864 At the close of the war he was commissioned colonel of the 40th United States Infantry. He was promoted Brigadier-General in December, 1880; Major-General in April, 1890; and succeeded Lieut.-Gen. John M. Schofield as commander of the army in 1895. He took a prominent part in the wars with the Indians in 1874 and thereafter. On July 13, 1898, he went to the front and assumed personal command of the army around Santiago, Cuba; and after the surrender of the Spanish army commanded the expedition which left Guantanamo Bay, July 21, landed at Guanica, Porto Rico, July 25, and was marching on San Juan, the capital, when the armistice stopped hostile operations. On the reorganization of the army in 1901 the grade of Lieutenant-General was revived and he was promoted to it. In December, 1901, he publicly expressed satisfaction with Admiral Dewey's report on Rear-Admiral Schley and was reprimanded therefor.

Milesians, a name sometimes given to natives of Ireland, a portion of whose inhabitants, according to Irish tradition or legend, are descended from Milesius, a fabulous King of Spain, whose two sons conquered the island 1,300 years before Christ, establishing a new nobility.

Miles, O'Reilly. See HALPINE, CHARLES GRAHAM.

Miletus (mī-lē'tus), in ancient geography, a city of Asia Minor, on the confines of Caria, S. of the mouth of the river Meander. This city, supposed to have been peopled by Carians at an early period, passed through the hands of several tribes, and was seized by the Ionians, who massacred all the women. Gold coins are said to have been struck here, 800 B. C. The inhabitants carried on a war against the Lydians, 623–612 B. C. They rose against the Persians, 500 B. C., and after sustaining several defeats, their city was taken, 494 B. C., and the inhabitants were carried to Ampe, on the banks of the Tigris. Miletus regained its independence after the battle of Mycale, 479 B. C., and soon after joined the Athenians. Alexander III. (the Great) took the city by assault, 334 B. C. It was visited by the Apostle Paul (Acts xx: 17), who summoned the elders of the Church of Ephesus to meet him here in April, A. D. 56, and was an early see of the Christian Church. It was destroyed by the Turks.

Milfoil, or **Millefoil,** *Achillea millefolium,* so called because the leaves are thrice pinnatifid. They are linear oblong, and have linear axile segments. The flowers are white, pink, or purple. It possesses an ethereal oil, and a bitter, resinous matter in its leaves. It is considered to be highly astringent. The Scotch Highlanders make it into an ointment, used for healing wounds.

Milford, a town in Worcester co., Mass.; on the Charles river, and on the New England, Grafton, and Upton, and the Boston and Albany railroads. It has a waterworks system supplied from large wells, National and State banks, public library, Memorial building, electric light and street railroad plants, and daily and weekly newspapers. There are manufactories of shoes, shoe thread, boot and shoe trees, straw goods, shoe cement, cement, foundry products, machinery, bone cutters, etc., and granite quarries. The town has an assessed property valuation of over $5,500,000. Milford was incorporated April 11, 1780; includes the village of North Milford; and is the trade center for a large farming and manufacturing section. Pop. (1890) 8,780; (1900) 11,376; (1910) 13,055.

Milford, a town in Pike co., Pa.; on the Delaware river, and on the Port Jervis and Monticello, and the New York, Lake Erie and Western railroads; 8 miles S. W. of Port Jervis. It is built on a broad plateau, 400 feet above tidewater in that part of the Delaware valley most famous for its scenery. On the N. W. and S. of the town there rises a semicircular range of mountains, while in the vicinity are the Sawkill Falls and the Cliffs. Three miles S. are the Falls of the Raymondskill, and 13 miles S. are the cataracts of the Big and Little Bushkill creeks. Milford was founded in 1800. It contains several buildings which were erected prior to the Revolutionary War, and numerous hotels and boarding houses. For many years Milford has been a popular summer resort and the rendezvous for Pike county hunting parties. Its legends have been graphically set forth in "Pike County Ballads" by Ed. Mott. Pop. (1890) 793; (1900) 884; in summer 6,000-7,000.

Miliken's Bend, a village of Madison parish, La.; on the Mississippi river, 25 miles N. W. of Vicksburg; noted as the scene of a battle, June 7, 1863, between the Confederate and the Union troops, in which the former were defeated.

Militarism, a term principally used in reference to the policy of maintaining great

standing armies. See ARMIES OF THE WORLD.

Military Academy, United States, a technical educational institution, established at West Point, N. Y., by Act of Congress, in 1802.

Each United States Senator, Representative in Congress, and Territorial Delegate — also the District of Columbia — is entitled to have one cadet at the academy. There are also 30 appointments at large, especially conferred by the President of the United States. The number of students is thus limited to 481. In 1901 there were three extra cadets at the academy, who were authorized by Congress to enter it at their own expense from Venezuela, Costa Rica, and Ecuador.

Appointments are usually made one year in advance of date of admission, by the Secretary of War, upon the nomination of the senator, representative, or delegate. These nominations may either be made after competitive examination or given direct, at the option of the representative. The representative may nominate a legally qualified second candidate, to be designated the alternate. The alternate will receive from the War Department a letter of appointment, and will be examined with the regular appointee, and if duly qualified will be admitted to the academy in the event of the failure of the principal to pass the prescribed preliminary examinations. Appointees to the military academy must be between 17 and 22 years of age, free from any infirmity which may render them unfit for military service, and able to pass a careful examination in reading, writing, orthography, arithmetic, grammar, geography, and history of the United States.

The course of instruction requires four years, and is largely mathematical and professional. The principal subjects taught are mathematics, French, drawing, drill regulations of all arms of the service, natural and experimental philosophy, chemistry, chemical physics, mineralogy, geology, and electricity, history, international, constitutional, and military law, Spanish, and civil and military engineering, and art and science of war, and ordnance and gunnery. About one-fourth of those appointed usually fail to pass the preliminary examinations, and but little over one-half the remainder are finally graduated. The discipline is very strict — even more so than in the army — and the enforcement of penalties for offenses is inflexible rather than severe. Academic duties begin Sept. 1 and continue till June 1. Examinations are held in each January and June, and cadets found proficient in studies and correct in conduct are given the particular standing in their class to which their merits entitle them, while those cadets deficient in either conduct or studies are discharged.

From about the middle of June to the end of August cadets live in camp, engaged only in military duties and receiving practical military instruction. Cadets are allowed but one leave of absence during the four years' course, and this is granted at the expiration of the first two years. The pay of a cadet is $540 per year, and, with proper economy, is sufficient for his support. The number of students at the academy is usually about 425.

Upon graduating cadets are commissioned as second lieutenants in the United States army. The whole number of graduates from 1802 to 1900, inclusive, was 3,993. It is virtually absolutely necessary for a person seeking an appointment to apply to his senator or member of Congress. The appointments by the President are usually restricted to sons of officers of the army and navy, who, by reason of their shifting residence, due to the necessities of the service, find it next to impossible to obtain an appointment otherwise.

An annual Board of Visitors is appointed, seven being appointed by the President of the United States, two by the president of the Senate, and three by the speaker of the House of Representatives. They visit the academy in June, and are present at the concluding exercises of the graduating class of that year. The superintendent in 1910 was Gen. Thomas H. Barry, U. S. A. (retired), and the academic staff consisted of 110 persons.

Military Bicycle Corps, bodies of completely drilled and equipped troops trained to the use of the bicycle attached to the armies of several countries. The bicycle corps of the French army are provided with folding wheels, which can be placed on the back and carried with ease. In the German army bicyclists are attached to all the staffs as couriers, and, in small numbers, to almost every battalion, where they are used as scouts and patrols. Rapidity and silence of movement are important points in their favor.

Military Carrier Pigeons. See CARRIER PIGEON.

Military Masts, masts on a modern fighting ship, provided purely for military purposes, and not to carry sails. They are of steel, and hollow, and through them access is had to the various structures built on them, to the conning tower on the superstructure of the deck where are the wheel, the wires communicating to all parts of the ship, and where the captain generally takes his stand; to the fighting top with its rapid-fire guns; and to the look-out far above all of these. Recent American battleships have lattice-work masts.

Military Order of Foreign Wars, an American organization founded in New York, Dec. 27, 1894, by veterans and descendants of veterans of one or more of the four foreign wars which the United States had been engaged in, to-wit: The War of the Revolution, the War with Tripoli, the War of 1812, and the Mexican War, "to perpetuate the names and memory of brave and loyal men who took part in establishing and maintaining the principles of the government" in said wars, and to "preserve records and documents relating to said wars, and to celebrate the anniversaries of historic events connected therewith." Since the establishment of the order the United States has fought its fifth foreign war. By an amendment to the constitution all American officers who participated in the war with Spain in 1898 are rendered eligible to membership as veteran companions. Members are entitled "companions," and are either "veteran companions" or "hereditary companions." The former are commissioned officers of the army, navy, or marine corps of the United States who participated in any of the foreign wars of the United States. The latter are direct lineal descendants, in the male line only, of commissioned officers who served honorably in any of the said wars. Commanderies may be established in each of the States, and State commanderies now exist in the States of New York, Pennsylvania, Connecticut, Illinois, California, Massachusetts, and Florida, and are in course of formation in Ohio, Maryland, and the District of Columbia. The National Commandery was instituted March 11, 1896, by the officers of the New York, Pennsylvania, and Connecticut commanderies.

Military Orders, in Europe, religious associations whose members united in themselves the double characters of monk and knight. These orders arose about the period of the Crusades, the first to be formed being the HOSPITALLERS (*q. v*). Their primary duties were to tend sick pilgrims at Jerusalem, afterward to protect them also on their way to the Holy City. The order of the Templars soon followed; their purpose was to protect pilgrims, a duty to which was afterward added that of guarding the Temple at Jerusalem. The orders of Alcantara, of Calatrava, and of Santiago of the Sword, in Spain, had for their immediate object the defense of their country and creed against the Moors. These orders, as well as that of St. Bennet of Aviz in Portugal, which was instituted with a similar view, differed from the Templars and the Knights of St. John (Hospitallers) in that their members were permitted to marry. The same privilege was enjoyed in the Savoyard order of Knights of St. Maurice, and the Bavarian order of St. Hubert. On the contrary, the Teutonic Knights who had their origin in the Crusades, but afterward made the S. E. and E. shores of the Baltic the theater of their activity, were bound by an absolute vow of chastity. These religious associations have mostly been abolished or have fallen into disuse, though some still subsist as orders of knighthood.

Militia, the civilian military force of a nation consisting of citizens trained to arms, and subject to be called forth to enable the executive to execute the laws of that country, suppress insurrection, and repel invasion. They are not a standing army, in the sense of being continually under arms, but are subject to the call of the President in the event of war. The organization is generally spoken of in the United States as the National Guard.

Militia, Naval, a body organized in a number of the United States, under authority of an Act of Congress, and forming a part of the State militia. The duty of the naval militia in time of war is to man the coast and harbor defense vessels, thus leaving free the regular force to carry on offensive operations at sea. In 1901 this militia was organized in 19 States and in the District of Columbia, as follows: California, Capt. N. T. James; Connecticut, Com. Fred L. Averill; District of Columbia, Com. Robert P. Hains; Florida, Com. J. W. Fitzgerald; Georgia, Com. F. D. Aiken; Illinois, Capt. Albert A. Michelson; Louisiana, Com. J. W. Bostick; Maryland, Com. E. Emerson; Maine, Lieut. H. M. Bigelow; Massachusetts, Capt. W. E. McKay; Michigan, Com. G. Wilkes; New Jersey, Battalion of the East, Com. W. Irving, Battalion of the West, Com. J. B. Potter; New York, Capt. J. W. Miller; North Carolina, Com. F. M. Morse; Ohio, Lieut.-Com. W. G. Welbon, commanding 1st Battalion, Lieut.-Com. W. E. Wirt, commanding 2d Battalion; Oregon, Lieut.-Com. R. E. Davis; Pennsylvania, Capt. J. S. Muckle; Rhode Island, Com. W. M. Little; South Carolina, Com. R. H. Pinckney; Virginia, Com. H. L. Cannon.

All matters relating to the naval militia come under the cognizance of the Assistant Secretary of the Navy. The total enlisted force of petty officers and men on Jan. 1, 1910, was 5,639. The Navy Department transacts all its business with the naval militia through the governors and adjutants-general of the States. Congress makes an annual appropriation for a partial support of the service.

Militia, State. The following table shows the strength of the regularly-organized militia, or National Guard, in the several States and Territories, on Dec. 1, 1900:

States and Territories.	Official Designation.	Generals and Gen'l Staff.	Cavalry.	Artillery.	Infantry.	Total Number Authorized.	Total Liable to Military Service.
Alabama	Alabama State Troops	24	191	158	1,949	7,788	170,000
Alaska	No organized militia	6	...	...	163	*	12,000
Arizona	National Guard of Arizona	17	...	...	382	898	17,200
Arkansas	Arkansas State Guard	63	99	140	1,630	*	262,000
California	National Guard of California	55	258	...	2,991	6,471	250,000
Colorado	National Guard of Colorado	18	181	46	897	*	100,000
Connecticut	National Guard of Connecticut	16	73	37	2,168	4,108	107,000
Delaware	National Guard of Delaware	17	...	...	449	750	29,000
Dis't of Columbia	Nat'l Guard Dis't of Columbia	14	...	43	1,213	3,320	50,000
Florida	Florida State Troops	91	...	...	1,167	1,458	85,000
Georgia	Georgia Volunteers	15	390	142	3,416	12,344	290,000
Guam	Guam Volunteers	..	...	...	42	....	1,200
Hawaii	Hawaiian National Guard	7	93	...	790	2,000	4,000
Idaho	Idaho National Guard	6	...	...	566	21,000	27,000
Illinois	Illinois National Guard	103	365	200	6,535	10,626	800,000
Indiana	Indiana Legion	13	...	121	739	4,601	550,000
Indian Territory	Indian Territory Militia‡	..	...	...	....	*	5,000
Iowa	Iowa National Guard	26	41	...	1,806	3,694	350,000
Kansas	Kansas National Guard	6	...	93	1,090	2,131	110,000
Kentucky	Kentucky National Guard	7	...	...	1,762	3,500	415,000
Louisiana	Louisiana State National Guard	16	39	678	780	*	140,000
Maine	National Guard State of Maine.	6	...	...	1,252	2,051	110,000
Maryland	Maryland National Guard	15	71	...	1,806	2,700	210,000
Massachusetts	Massachusetts Volunteer Militia	38	246	1,027	3,874	6,592	460,000
Michigan	Michigan National Guard	8	...	...	2,800	3,429	280,000
Minnesota	National Guard of Minnesota	20	...	138	2,322	3,729	200,000
Mississippi	Mississippi National Guard	28	95	279	928	1,800	235,000
Missouri	National Guard of Missouri	4	...	...	2,444	3,000	415,000
Montana	National Guard of Montana	9	...	60	....	1,124	34,000
Nebraska	Nebraska National Guard	1	63	63	950	2,113	100,000
Nevada	Nevada National Guard	1	...	...	154	*	5,500
New Hampshire	New Hampshire National Guard	15	66	73	1,267	1,699	35,000
New Jersey	National Guard of New Jersey	43	130	140	3,397	5,127	390,000
New Mexico	National Guard of New Mexico.	3	115	11	274	1,128	40,000
New York	Nat'l Guard State of New York	69	343	370	13,448	18,000	950,000
North Carolina	North Carolina National Guard	17	...	23	1,618	5,000	250,000
North Dakota	North Dakota National Guard	9	51	56	557	933	37,000
Ohio	Ohio National Guard	21	49	200	4,171	9,486	650,000
Oklahoma	Oklahoma National Guard	5	...	...	498	2,164	62,000
Oregon	Oregon National Guard	7	47	74	925	1,585	62,000
Pennsylvania	National Guard Pennsylvania	178	240	284	9,334	11,103	900,000
Porto Rico	Porto Rico Battalion	..	...	...	600	1,000	170,000
Rhode Island	Brigade of Rhode Island Militia	19	111	98	786	1,030	69,000
Samoa	Samoan Volunteers	..	...	...	68	....	400
South Carolina	S. Carolina Vol. State Troops	9	865	96	2,058	5,000	110,000
South Dakota	South Dakota National Guard	3	46	...	52	1,000	53,000
Tennessee	Nat'l Guard State of Tennessee	2	...	...	1,480	3,000	165,000
Texas	Texas Volunteer Guard	50	191	210	2,793	*	350,000
Utah	National Guard of Utah	15	21	...	286	1,000	40,000
Vermont	National Guard of Vermont	18	...	76	617	*	45,000
Virginia	Virginia Volunteers	2	50	196	805	5,176	300,000
Washington	National Guard of Washington	11	73	54	669	1,877	96,000
West Virginia	West Virginia National Guard.	20	20	...	945	8,359	130,000
Wisconsin	Wisconsin National Guard	8	67	69	2,692	3,122	400,000
Wyoming	Wyoming National Guard	..	...	...	348	1,078	180,000
Grand aggregates		911	4,576	5,459	96,899	199,694	11,448,200

The total organized force was 105,845 men. *No limit. ‡None organized.
In 1910 the total organized force was 118,926; unorganized, 14,969,448.

Milk, the fluid secreted by all female mammals for the nourishment of their young. As an alimentary substance, it may be regarded as a perfect food. It consists essentially of a solution of sugar, albuminous and saline matter, and holds in suspension a certain proportion of fat in the form of very minute globules. The same constituents are found in the milk of all the mammals, but they differ considerably in the proportion in which they are present in each kind. Mare's milk contains a larger proportion of sugar, while that of the ewe is very much rich in albuminous and fatty constituents, the milk of the cow having its composition more evenly adjusted. The non-fatty solids of cow's milk, which consist of casein, albumin, sugar, and mineral salts, vary from about 8 to 11 per cent., and the fat from 2 to 7 per cent.; 9 parts of the non-fatty solids consist on the average of 3 parts of casein, 1 of albumin, 4.2 of milk sugar, and .8 of mineral salts. The mineral matter consists chiefly of phosphates of lime and potash, with a little chloride of sodium. Milk spontaneously ferments, the sugar being converted into lactic acid, alcohol, and carbonic acid gas. When an

artificial ferment has been used, a larger proportion of alcohol is generated, and the milk is converted into a product to which the name of koumiss has been given. The chief adulterant added to milk is water; but sugar, carbonate of soda, salt, salicylic acid, and borax are also occasionally used. These latter are obviously added, not to increase the quantity of the milk, but to cover the addition of water or in order to prevent the milk turning sour. Condensed milk consists of cow's or goat's milk which has been evaporated by the aid of steam pipes or a vacuum pan to one-fourth of its volume, refined sugar being added during the boiling in the proportion of 1¼ pounds in the quart of condensed milk produced. It is also prepared without sugar, but its keeping properties are much less than the sweetened article. Both kinds form a wholesome article of food.

In human physiology, milk is the secretion of the mammary glands, whose activity begins at delivery, and continues for a period of nine months as a rule, but, if encouraged, may persist for a longer time. The fluid secreted contains all that is requisite for the nourishment and development of the child. It contains 90 per cent. of water and 10 per cent. of solids (casein, fat, sugar, and a trace of salts). The first milk secreted is colostrum; it acts as a natural purgative to the child. That the mind exerts an influence both on the quantity and quality of secretion is certain. Violent emotions, as fear, rage, etc., render it unwholesome.

Milk Fever, a fever which sometimes arises in females when first milk is secreted after child-birth.

Milk Snake, a harmless snake of a grayish ash color, with three rows of dark spots along the back and sides. It is found in the Northern and Middle United States.

Milky Way. See GALAXY.

Mill, a money of account in the United States, being the thousandth part of a dollar, or tenth part of a cent. The mill, however, is not coined.

Mill, a machine for grinding grain, fruit, or other substances, and reducing them to a fine powder. Also a lapidary's grinding wheel, known as roughing mill, cloth mill, etc. Also a machine, or complication of engines or machinery, for working up raw material, and preparing it for immediate use or for employment in a further stage of manufacture; as, a cotton mill, a spinning mill, a saw mill, an oil mill, etc. In die-sinking, the hardened steel roller having the design in cameo, and used for impressing in intaglio a plate, as in the bank-note system of engraving; or a copper cylinder, as in the process of engraving cylinders for calico printing.

Mill, James, an English political economist; born in Forfarshire, Scotland, April 6, 1773. He first came to London as tutor in the family of Sir John Stuart, but gave up that post, and devoted himself entirely to literary purusits. In 1818 he published his admirable "History of British India"; a work of great research and powerful reasoning. He also produced several valuable works on legislation and morals, viz., his "Elements of Political Economy"; an "Analysis of the Human Mind"; and "Prison and Prison Discipline"; "Colonies"; "Laws of Nations"; and "Education." He was also a contributor of many excellent articles to the "Encyclopædia Britannica," and "Edinburgh," "Westminster," and "London" Reviews. In morals and legislation he was the powerful auxiliary of Jeremy Bentham; in political economy the ally of Adam Smith and Ricardo; and in philosophy he was a follower of Bacon and Locke. He held the office of chief examiner of accounts to the East India Company. He died in Kensington, June 23, 1836.

Mill, John Stuart, an English philosopher and political economist; born in London, England, May 20, 1806. All his studies, in which he showed remarkable precocity, were conducted under the superintendence of his father, and under the paternal roof. In 1820 he visited Paris, where he resided with the economist J. B. Say, and before returning to England he spent some months in the S. of France. In 1823 he entered the East India Company's service as clerk in the examiner's office, and for 33 years he continued in the political department of the office, that connected with the transactions of the company with native States. He formed at the commencement of this period an intimate acquaintance with the banker and historian George Grote. He also acquired the confidence of Bentham, his father's friend, whose opinions he adopted, and was selected by him to superintend the publication of his work on the "Rationale of Evidence," which appeared in 1827 with notes and several supplementary chapters by J. S. Mill. From this time he became a regular and assiduous contributor to the "Westminster Review." From 1835 to 1840 he was editor and part proprietor of the "London and Westminster Review," in which many of his own articles appeared. His "System of Logic, Ratiocinative and Inductive," appeared in 1843; "Essays on Some Unsettled Questions of Political Economy" (1844); "Principles of Political Economy" (1848); "Liberty" (1859); "Considerations on Representative Government" (1861); "Utilitarianism" (1862); "An Examination of Sir William Hamil-

ton's Philosophy," and "Auguste Comte and Positivism" (1865); "Dissertations and Discussions, Political, Philosophical, and Historical" (1867); the "Subjection of Woman" (1869); "Program of the Land Tenure Association" (1871). His "Autobiography" was published after his death, which occurred in Avignon, France, May 8, 1873. A posthumous work containing three essays on "Nature," the "Utility of Religion," and "Theism," was published in October, 1874.

In the service of the East India Company he rose from grade to grade till he succeeded in 1856 to the position held by his father as chief examiner. He drew up in 1858 the petition of the company against the transference of the government of India from the company to the crown. He declined a seat in the new India council, and retired with a compensating pension. In 1865 he was elected member of Parliament for Westminster, but he proved too philosophical and independent in his political views to be a serviceable dependent of the Liberal party, and despite his incisive logic, he lacked both the popular eloquence and the personal qualities to make himself a leader. He opposed the ballot, supported Hare's scheme for the representation of minorities, and advocated the representation of women. By these and similar courses he acquired, independently of the soundness or unsoundness of his opinions, a reputation for somewhat crotchety independence. Hence in 1868 he lost his election. After this he lived in private, spending a considerable part of his time in Avignon. In 1851 he married Harriet Taylor, a widow with whom he had lived on terms of intimate friendship during her husband's life. He had no children. Aside from politics, Mill lived a somewhat secluded life. He delighted in natural scenery and was fond of walking. Only three days before his death he walked 15 miles on a botanical excursion. His powers of work were remarkable and in addition to spending six hours daily at his office he did a vast amount of intellectual work. He was generous in his recognition of an opponent's merits and prompt to encourage obscure talent.

John Stuart Mill was a positivist in his philosophy, inasmuch as he adopted some of the leading principles of Auguste Comte, but in his historical relations as well as in its fundamental principles, his philosophy does not belong to positivism but to the school of speculative empiricism, successively and variously developed by Locke, Berkeley, Hume, Hartley, and James Mill, the aim of which is to establish a psychology on the basis of experience and in alliance with the natural sciences. In his "Examination of Sir William Hamilton's Philosophy" he adopts the view of Berkeley and Hume that the absolute distinction popularly conceived to exist between mind and matter, and maintained by the Scotch realistic school from Reid to Hamilton, has no existence; and he defines matter as a permanent possibility of sensations, and mind as a series of actual, and the base of possible states of consciousness. His differences from Auguste Comte, shown in "Auguste Comte and Positivism," are too recondite, and demand a knowledge of the details of their respective systems too intimate to admit of their being satisfactorily summarized. One point, however, is worthy of being noted. Mill refuses to admit that positivism excludes the supernatural. He holds that the positive mode of thinking is not necessarily a negation of the supernatural. It merely refers back that question to the origin of all things. If the universe has had a commencement it must by the conditions of the case be supernatural, for the laws of nature cannot render an account of their own origin. Positive philosophy is free to form its opinions on this subject according to the weight which it attaches to the analogies which are called evidences of design, and to the general traditions of the human race. The value of these proofs is not a subject on which positive philosophers need necessarily agree. The positive mode of thinking, according to him, consists in believing in the constancy of the succession of antecedents and consequents in the existing order of the universe, and in the exclusion of supernatural or providential interference with this order, and a positivist may consistently conceive this order to have been originated by an intelligent being. Mill's views on morals are developed in his work on utilitarianism. He is a follower of Bentham, whose principles he develops with some original views. He introduces a distinction, like Epicurus, between superior and inferior pleasures; founds justice on the natural principle of vengeance whose function it is to protect certain utilities more absolute and imperative than others; he makes the moral sense rise through the association of ideas into a seeming independence of its utilitarian root, in a manner analogous to the creation of conscience by Mackintosh.

As a politician he belonged to the sect of philosophical radicals, a body whose somewhat undefined creed admits of a combination of democratic and conservative notions in any proportions. He was a great admirer of the constitution of the East India Company, and in his "Representative Government" he represents the councils of the governor-general and lieutenant-governors of India as one of the few instances of the happy adaptation of means to end which political history affords. In this work he insists on the necessity of various checks to modify the license of extreme democracy, a

council of the usual size of a cabinet council to take the initiative in the formation of laws, and a representative body to pass them, in electing which minorities are to be represented, and a double vote given to those whose functions indicate superior intelligence. In his "Liberty" he asserts the rights of individual liberty against the tyranny of social opinion. In this work he takes as his unit the individual man arrived at the age of full intelligence, leaving out of view the effects on individual liberty of the previous control and discipline of family life, and omitting to consider the important bearing upon social liberty of the organization of the true unit of society, the family.

As an economist Mill occupied a double and somewhat conflicting position. In his "Principles of Political Economy" he assumes the position of a logical exponent of the principles of the utilitarian school of Adam Smith, Ricardo, and James Mill, founded on the orthodox doctrine of proprietary rights, but he was by no means an unquestioning adherent of this doctrine. In regard to proprietary rights, he drew a distinction between landed and movable property. The soil he held to be the property of the community, and individual property in it to be a right held contingently on the consent of the State. The socialistic principle of the right of labor he did not consider it reasonable absolutely to repel. He held that it was possible for the State to guarantee employment provided it took the multiplication of the people under its control, and he believed that public opinion might be so educated that the restriction against undue multiplication might be made a legal one. See his "Autobiography" (1873), and "John Stuart Mill," by Professor Bain (1882).

Millais, Sir John Everett (mil-lā'), an English painter; born in Southampton, England, June 8, 1829. He gained his first medal for drawing when nine years old; became a student at the Royal Academy; exhibited his first picture "Pizarro seizing the Inca of Peru" (1846); and received the gold medal for an historical painting, "The Tribe of Benjamin seizing the Daughters of Shiloh" (1848). In his earlier days he was a leader of the pre-Raphaelite School, but on attaining maturity in art he abandoned the peculiarities for which that school is noted. As the result of this new departure Millais painted such pictures as "Ferdinand Lured by Ariel," "Mariana in the Moated Grange," "The Huguenot Lovers," "The Black Brunswicker," and "Ophelia," while its influence was also apparent in his landscapes of "Chill October," "The Fringe of the Moor," etc. Among his later works are, "The North-West Passage," "The Princes in the Tower," "Effie Deans," "Cinderella," and "Mercy — St. Bartholomew's Day, 1572." In portraiture he held the foremost rank, and painted a number of the most distinguished men of his day. Many of the works of Millais are well known by engravings. He was chosen president of the Royal Academy in 1896. He died in London, Aug. 13, 1896.

Millbank Prison, or **The Penitentiary,** an English house of detention, demolished in 1891. It was situated in the parish of St. John's, Westminster, facing the Thames. It was erected at an enormous cost to carry out the plans of the philanthropists Howard and Bentham; the latter's contract with the Treasury was signed in 1794, but the building was not actually commenced till 1812, and not completed till 1821. It had accommodation for 1,100 prisoners, and was so constructed that, from a room in the center, the governor was able to view every one of the cells, in which solitary confinement was rigidly enforced. Convicts condemned to penal servitude used to undergo first a term of solitary confinement in Millbank; but the prison ceased to be a convict establishment in May, 1886, and was finally closed in November, 1890.

Millboard, a stout pasteboard made of strong materials, such as refuse flax, cotton, and hemp, rope, or bagging; and used for the stiff portion of book covers, and for other purposes. It is also used for packing between the flanges of pipes, being previously soaked in oil. Millboard cutter; a machine for cutting heavy board, for book covers and pasteboard boxes.

Millenary Petition, a petition named from the number of signatures appended to it (though they actually fell short of 1,000) presented by the Puritans to James I., in 1603. The petitioners desired to be relieved from the use of the sign of the cross in baptism, the ring in the marriage service, confirmation, and bowing at the name of Jesus. The petition also treated of (1) objections to the Church service; (2) pluralities, non-residence, and clergy who did not preach, though they were resident; (3) the better maintenance of the parochial clergy; and (4) redress of Church discipline. The HAMPTON COURT CONFERENCE (*q. v.*) was the outcome of this petition.

Millennium, in Scripture, a period of 1,000 years, during which Satan shall be confined to the bottomless pit, having first been bound, by an angel, with a great chain (Rev. xx: 1–3), while the souls of those who have been "beheaded for the witness of Jesus," and have not worshiped the beast or his image, or received his mark on their foreheads or their hands, shall live and reign with Christ for 1,000 years (Rev. xx: 1–6).

During the first three centuries, when Christians were at intervals in danger of martyrdom, and many actually suffered death, the millennium loomed largely before their minds; the second advent of Christ, interpreted literally, was considered to be pre-millennial, and the millennium to be a literal reign of Him and the martyrs. The Christian fathers, Papias, Justin Martyr, and Irenæus, with the heretical Cerinthians, Marcionites, Montanists, and Melitians, held these views, as did Papias and Irenæus with rather extravagant accompaniments. Toward the end of the 2d century, Caius, a presbyter of Rome, led the way in opposing their millennial conceptions, and, in the 3d, Origen considered the millennium as consisting of spiritual delights to be enjoyed by souls raised to perfection in the world to come. Jerome also gave a spiritual interpretation to the passage in Revelation. On the triumph of Christianity over paganism, in the 4th century, the view gradually arose that millennial glory had already begun. The persecuted Christians had risen, and were spiritually reigning with Jesus unseen. His reappearance would not be till the consummation of all things, when He would come to judge the world. From about the year 950 yet another opinion arose and gained extensive credence.

The millennium, to be heralded by the coming of Jesus, began with His first advent, and was now about closing. Many landed proprietors, therefore, believed they should no longer require their estates, and might atone for their sins by giving them over to the Church, the deed of bequest commencing with the words *Appropinquante mundi termino* (As the end of the world is approaching), and the estates were not returned when it was found that the world outlasted the year 1000. Two opinions are now held: one, that the advent of Christ will be pre-millennial, and that a literal reign of martyrs and saints shall take place with Him on earth; the other is, that the millennium will be brought on by the blessing of the Holy Spirit on the means employed for the conversion of the world. and that during the continuance of the promised years Jesus shall reign in the hearts of nearly all mankind, and shall not return visibly till He comes as Judge. Many interpreters, holding that in prophecy a day stands for a year, consider that the 1,260 days mentioned in Rev. xii: 6, etc., mean 1,260 years; yet they deem the 1,000 years to be literal years. The reason probably is that they are influenced by the Jewish tradition that the seventh 1,000 years from the creation of man shall be a Sabbatic 1,000. Hugh Miller, who accepted the view that a prophetic day means a year, and, being a geologist, was not startled by very large numbers, considered the millennium to be 360,000 years.

Millepede (mil'le-pēd), a popular name for the members of one of the orders of Myriapods, of which *Julus* is a good type.

Millepora (-lep'-), in zoölogy, the typical genus of the family *Milleporidæ*. It consists of a calcareous skeleton with a foliaceous or laminar expansion, studded with minute apertures of two sizes. The colony consists of two kinds of zoöds, the one with four to six knobbed tentacles, inhabiting the larger, and the second with five to 25 tentacles, the smaller ones.

Miller, Cincinnatus Heine, better known as JOAQUIN MILLER, an American poet; born in Wabash district, Ind., Nov. 10, 1841. His checkered life included the extremes of being a California gold-miner, editor of an Oregon newspaper, an Oregon lawyer and judge, a social lion in London, journalist at Washington, D. C., etc. The name of "Joaquin" he took from Joaquin Murietta, a Mexican brigand, whom he had once legally defended. His "Collected Poems" appeared in 1882. After that he published "Songs of Mexican Seas; and "Songs of the Soul." He wrote also in prose "The Baroness of New York" (1877); "'49, or The Gold Seekers of the Sierras" (1884); "Life of Christ," in verse; "Chants for the Boer" (1900); etc. His novel "The Danites" was successfully staged; other plays were "The Silent Man"; "Tally-Ho"; etc.

Miller, Emily Huntington, an American educator; born in Brooklyn, Conn., Oct. 22, 1833. She was president of the Woman's College of the Northwestern University, Ill. Among her works are: "From Avalon and Other Poems"; "The Royal Road to Fortune"; the "Kirkwood" series; etc.

Miller, Harriet (Mann), pseudonym OLIVE THORNE MILLER, an American writer of children's stories; born in Auburn, N. Y., June 25, 1831; particularly distinguished for her descriptive books of birds and their habits. Included in her publications are: "A Bird-Lover in the West"; "In Nesting Time"; "Little Folks in Feathers and Fur"; "Our Home Pets"; and "Little People of Asia."

Miller, Hugh, a Scottish geologist, whose writings first made geology popularly known; born in Cromarty, Scotland, Oct. 10, 1802. Beginning life as a stone-mason (1819–1836), he became bank accountant at Cromarty (1834), and editor of an Edinburgh newspaper (1840). His chief works were: "The Old Red Sandstone" (1841); "Footprints of the Creator" (1847); "My Schools and Schoolmasters" (1852); "Testimony of the Rocks" (1857). He

published besides "Poems" (1829); "Scenes and Legends of the North of Scotland" (1835); etc. He died near Edinburgh, Dec. 2, 1856.

Miller, Johann Martin, a German author; born in Ulm, Würtemberg, Dec. 3, 1750. He was professor at Ulm (1781); dean and clerical councilor (1810). He was best known by "Siegwart, a Convent Tale" (1776). He wrote also in prose: "Contribution to the History of the Tender Passion" (1776); "Corespondence between Three College Friends" (1776); "Story of Charles of Burgheim and Emilia of Rosenau" (1778); etc.: while several of his "Poems" (1783) became popular songs. He died in Ulm, June 21, 1814.

Miller, Joseph, better known as JOE MILLER; an English favorite low comedian; born in 1684. The jests which have immortalized his name were collected in 1738, by John Mottley, author of the "Life of Peter the Great," and other works. Miller died in London, in 1738.

Miller, Joseph Nelson, an American naval officer; born in Ohio, Nov. 22, 1836; joined the navy in 1851; was promoted lieutenant in 1860; served with distinction through the Civil War; was executive officer of the iron-clad "Passaic" in the assault on Forts McAllister and Sumter and of the "Monadnock" in the two engagements with Fort Fisher; commanded the "Tuscarora," which had charge of the deep sea soundings between the Hawaiian and Fiji Islands in 1875; was promoted captain in 1881; commodore in 1894; and rear-admiral March 21, 1897. He represented the United States navy at Queen Victoria's jubilee in 1897, having the "Brooklyn" as his flagship. As Commander-in-Chief of the Pacific Station he raised the American flag at Honolulu in August, 1898, indicating the change of sovereignty of the island. He also organized the Naval Reserves on the Pacific coast during the American-Spanish War; retired 1898. He died April 26, 1909.

Miller, Olive Thorne. See MILLER, HARRIET.

Miller, Thomas, an English writer; born in Gainsborough, England, in 1807. He supported himself as a basket maker, till Rogers the poet enabled him to open a book store in London. He wrote: "Royston Gower" (1838), a novel; "Rural Sketches" (1839), in verse; "Gideon Giles, the Roper" (1840) and "Godfrey Malvern" (1843), novels; "History of the Anglo-Saxons" (1848; four editions since); etc. With G. W. M. Reynolds, he wrote Vol. v. of the "Mysteries of London." He died in London, Oct. 24, 1874.

Miller, Warner, an American legislator; born in Oswego co., N. Y., Aug. 12, 1838; was graduated at Union College in 1860; and for a time was a teacher in the Fort Edward Collegiate Institute. When the Civil War broke out he enlisted in the 5th New York Cavalry, and was afterward promoted to 1st lieutenant. He was a delegate to the National Republican Conventions of 1872 and 1888; member of the New York Assembly in 1874–1875; and of Congress 1878–1880. On the resignation of Thomas C. Platt, in 1881, he was elected to fill that unexpired term in the United States Senate; in 1888 was the Republican nominee for governor of New York, but was defeated.

Miller, William, a Scotch engraver; born in Edinburgh, Scotland, May 28, 1796. He studied engraving at Edinburgh and also under George Cook in London, after which he settled down at Edinburgh. His work was much appreciated by Turner, and he engraved many plates after that master. He died in Sheffield, England, Jan. 22, 1882.

Miller, William, an American religious leader; born in Pittsfield, Mass., Feb 15, 1782. In 1815 he took up his residence at Low Hampton, N. Y. He became deeply interested in the prophecies of the Bible and in 1831 predicted the second coming of Christ and fixed the year 1843 as the time at which the world would be destroyed. Hundreds of people became converts to his belief and before the appointed time had arrived had given up their business and devoted themselves to preparation for the event. The believers in the peculiar doctrines of this sect are now called Millerites or Second Adventists and have their headquarters at Battle Creek, Mich. Miller died in Low Hampton, N. Y., Dec. 29, 1849. See ADVENTISTS.

Miller, William, a Scotch poet; born in Bridgegate, Glasgow, in August, 1810. One of his most popular single poems was "Wee Willie Winkie." He died in Glasgow, Aug. 20, 1872.

Miller, William Hallows, an English scientist; born in Wales, in 1801. He was Professor of Mineralogy at Cambridge, and especially distinguished for his system of crystallography. He died May 20, 1880.

Miller, William Henry Harrison, an American jurist; born in Augusta, Oneida co., N. Y., Sept. 6, 1840. He was graduated at Hamilton College, studied law in the office of the late Chief-Justice Waite, and subsequently settled in Fort Wayne, Ind. In 1874 he went to Indianapolis, and entered into partnership with Benjamin Harrison. When the latter was elected to the presidency, he chose Miller to be Attorney-General in his cabinet.

Miller, Fort, a Revolutionary defensive work on the site of the present village of Fort Miller, in Fort Edward township,

Washington co., N. Y.; on the Hudson river, 40 miles N. of Albany.

Millet, the common name for a great number of cereal plants, the grains of which are used as food, and for making a kind of beer, in various countries. *Holcus Sorghum* is the Turkish millet; *Panicum miliaceum*, the Indian; *Paspalum exile*, the Sierra Leone; *Setaria Germanica* and *Italica* the German and Italian millet respectively, probably varieties of the same species.

Millet, Francis Davis, an American artist and author; born in Mattapoisett, Mass., Nov. 3, 1846; was graduated at Harvard College in 1869. His art work was largely in connection with expositions. He was very successful as correspondent of the London "Daily News" in the Turco-Russian war; was special correspondent of the London "Times" and "Harper's Weekly" at Manila (1898); and a frequent contributor to periodicals. He published in book form "A Capillary Crime, and Other Stories"; and "The Danube from the Black Forest to the Black Sea."

Millet (mi-lā′), **Jean François,** a French painter; born in Gruchy, near Cherbourg, France, Oct. 4, 1814. He worked with his peasant father in the fields; studied drawing at the academy of Cherbourg; from thence passed with an allowance from this town to the atelier of Delaroche in Paris, and exhibited at the Salon in 1840. As a student and till the death of his first wife in 1844 he was frequently in the greatest poverty, and his life subsequently was by no means free from difficulty. In 1849 he left Paris and settled among the peasants of Barbizon, on the edge of Fontainebleau Forest, and devoted himself to transferring their simple everyday life to his canvases, which he did with great truth of sentiment and subdued poetic charm. Of his paintings may be mentioned "The Sheep-Shearers," "The Gleaners," "The Sower," "The Shepherdess with her Flock," and "The Angelus." The last was sold by auction in Paris, in 1889, for about $115,000. He died in Barbizon, France, Jan. 28, 1874.

Milliard, the French collective name for a thousand millions; familiar in connection with the five milliards of francs (5,000 millions of francs, or $1,000,000,000) paid by France as indemnity to Germany in 1871-1873, as a result of the Franco-Prussian War.

Milligan College, a coeducational institution in Milligan, Tenn.; founded in 1882 under the auspices of the Christian Church; has grounds and buildings valued at over $14,000; scientific apparatus, etc., $2,000; volumes in the library, about 6,000; ordinary annual income, $16,000; average number of faculty, 15; average student attendance, 215.

Mills, Abraham, an American writer; born in Dutchess co., N. Y., in 1796. He published "Literature and Literary Men of Great Britain and Ireland" (2 vols., 1851); "Outlines of Rhetoric and Belles-Lettres" (1854); "Poets and Poetry of the Ancient Greeks" (1854); "Compendium of the History of the Ancient Hebrews" (1856). He died in New York city, July 8, 1867.

Mills, Albert Leopold, an American military officer; born in New York city, May 7, 1854; was graduated at the United States Military Academy in 1879 and commissioned 2d lieutenant of the 1st United States Cavalry; promoted 1st lieutenant in 1889; served at the United States Infantry and Cavalry School, Fort Leavenworth, Kans., in 1894-98; appointed captain of volunteers May 12, 1898, and served in the war with Spain, being conspicuous for bravery at Las Guasimas and Santiago. He received the brevets of major and lieutenant-colonel for gallantry, and in 1898 was appointed superintendent of the United States Military Academy, a post he relinquished in 1906. In 1904 he was promoted brigadier-general.

Mills, Robert, an American architect; born in Charleston, S. C., Aug. 12, 1781; studied with Benjamin H. Latrobe; became architect for the United States government in 1830; and drew the plans for the United States post office and treasury buildings. He was the architect of the Washington Monument, on which work was started in 1848, on the site chosen by General Washington for a memorial of the Revolutionary War. His publications include "Statistics of South Carolina"; "The American Pharos, or Lighthouse Guide"; and "Guide to the National Executive Offices." He died in Washington, D. C., March 3, 1855.

Mills, Roger Quarles, an American soldier and statesman; born in Todd co., Ky., in 1832. He removed to Palestine, Tex., in 1849, was admitted to the bar when only 21 years of age, served as member of the Texas house of representatives in 1859, but entered the army of the Confederacy at the outbreak of the Civil War. At the battle of Chickamauga he commanded a brigade. He was elected to Congress in 1873 and continued a member of the House until 1892, when he was chosen to fill an unexpired term in the Senate. In the following year he was re-elected for the full term. In 1884-88 he was chairman of the House committee on ways and means, in which capacity he drafted the Mills bill for the regulation of the tariff. This measure was defeated in the Senate.

Millsaps College, an educational institution in Jackson, Miss.; founded in 1892 under the auspices of the Methodist Episcopal Church, South; has endowment, $250,000; grounds and buildings valued at over $175,000; scientific apparatus, etc., $45,000; volumes in the library, about 6,500; ordinary income, $18,000; average number of faculty, 16; average students, including summer school, 300.

Mills Bill, a tariff bill, named from the chairman of the Ways and Means committee (R. Q. Mills) of the National House of Representatives, passed by the Democratic House in 1888 and rejected by the Republican Senate. It placed wool, lumber, hemp and flax on the free list and reduced duties on pig-iron, woolen goods, etc.

Mills College, an educational non-sectarian institution for women at Mills College Station, Cal.; founded in 1871; has endowment of $423,000; grounds and buildings valued at over $420,000; volumes in the library, about 10,000; average number of faculty, 35; average students, 135.

Mills Springs, a village in Wayne co., Ky., on the Cumberland river, 89 miles S. of Frankfort. A battle was fought here Jan. 19, 1862, in which the Confederates under Generals Crittenden and Zollicoffer were defeated by the Federals under General Thomas.

Millville, a city in Cumberland co., N. J.; on the Maurice river, and on the West Jersey railroad; 40 miles S. E. of Philadelphia. It has a high school, public library, electric railroad to Bridgeton, waterworks, electric lights, a National bank, and daily and weekly newspapers; extensive manufactories of glass bottles, other glassware, cotton goods, water pipes, iron castings, etc.; and an assessed property valuation of over $4,000,000. Pop. (1890) 10,002; (1900) 10,583; (1910) 12,451.

Milman, Henry Hart, an English historian; born in London, England, Feb. 10, 1791. He was Professor of Poetry at Oxford, 1821–1831; Bampton lecturer 1827; canon of Westminster 1835; dean of St. Paul's 1849. His "History of the Jews" (1830) excited intense antagonism, being the first attempt to apply secular historical methods to the sacred history, though not irreverently. In 1838 he edited Gibbon's "Decline and Fall of the Roman Empire," and in 1839 published a "Life of Gibbon." He wrote "History of Christianity under the Empire" (1840), and published in 1855 his most important work, "The History of Latin Christianity down to the Death of Pope Nicholas V." In verse he produced "Samor" (1818), an epic; "Fall of Jerusalem" (1820); etc. The drama "Fazio" (1815), written while he was at Oxford, was performed in 1818 by Charles Kemble and Miss O'Neill, and by Madame Ristori in 1856. He also wrote a history of St. Paul's Cathedral. His "Essays and Memoirs" were collected by his son in 1870. He died near Ascot, Sept. 24, 1868.

Milne=Edwards, Henri (mēl-nā-dwär′), a French naturalist; born in Bruges, Belgium, Oct. 23, 1800. He was Professor of Entomology at the Jardin des Plantes, and of Zoölogy and Physiology at the Faculté des Sciences. His principal works are "Monograph of the Crustacea" (1837–1841); "Elements of Zoölogy," (2d ed. 1840–1850); and "Comparative Anatomy of Men and Animals" (1855–1857). He died in Paris, July 28, 1885.

Milnes, Richard Monckton. See HOUGHTON, BARON.

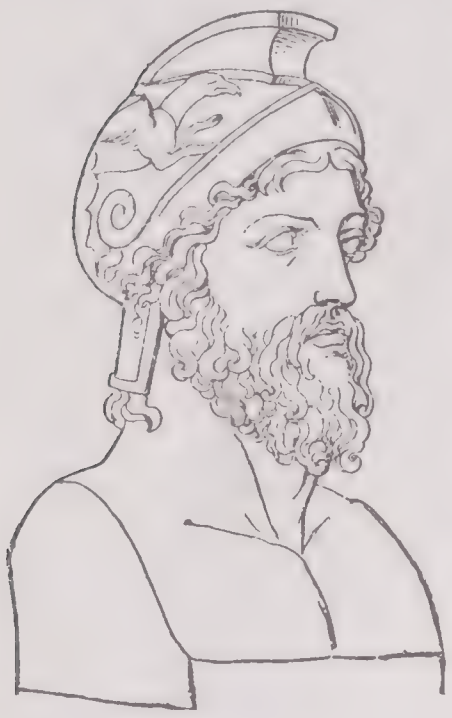
Milo (mī′lō), wrestler and athlete of Crotona in Italy, of extraordinary strength and endurance. Some of his feats of strength are fables; such as the story told of his carrying a live bullock on his shoulders, killing it with one blow of his fist, and concluding the performance by eating the entire carcass for his dinner. He obtained seven prizes at the Olympic games. His death was characteristic of his life and habits; attempting to tear open a split tree, to reach the honey within, the tough oak rebounded, and grasping both hands, as in a vice, held him a helpless prisoner, where some wild beasts devoured him, about 500 B. C.

Milo, Titus Annius, a Roman tribune, who formed several parties for the purpose of obtaining the consulate. He was opposed by Claudius, and supported by some of the first members of the senate. In a quarrel between Claudius and Milo, on the Appian Way, the former was slain by some of the domestics of the latter. Cicero undertook to plead the cause of Milo; but the rostrum being surrounded by soldiers and a crowd of people, who expressed their disapprobation, he was so dismayed as to be unable to proceed. Milo was exiled to Marseilles, whither the orator sent him his discourse; on which he said, "How fortunate it is that this oration was not delivered, for then I should have been acquitted, and have never known the delicious flavor of these Marseillian mullets." He was killed 48 B. C.

Milo. See MELOS.

Milouna Pass, a high point in the Olympian Mountains in Thessaly, not far from Tyrnavos. It was the scene of a fierce conflict between the Turks and Greeks during the Greco-Turkish war in 1897. In this battle about 50,000 men were engaged on both sides and the Greeks were defeated with heavy loss.

Miltiades (-ti'a-dēz), an Athenian general, hero of Marathon. He was the youngest son of Cimon, and succeeded his brother Stesagoras about 515 B. C., as tyrant of the Chersonese. He took part in the invasion of Scythia by Darius, held his government of the Chersonese at least 22 years, and retired to Athens in 493. On occasion of the second Persian invasion of Greece, under Datis and Artaphernes, 490, Miltiades was chosen one of the 10 generals and signalized himself by a great victory over the Persians, on the field of Marathon. Having persuaded the Athenians to give him the command of a fleet, he used it for private ends in an attack on Paros. The attack failed, Miltiades was severely wounded, and on his return to Athens was prosecuted and imprisoned for deceiving the people. His death took place in prison soon after, about 489 B. C.



MILTIADES.

Milton, a borough in Northumberland co., Pa., on the West Branch of the Susquehanna river, and on the Philadelphia and Erie, and the Catawissa and Williamsport railroads; 15 miles W. N. W. of Danville. There are several churches, National bank, and weekly newspapers. It has rolling mills, car shops, knitting factory, saw and planning mills, and manufactories of nails, tools, and machinery. Pop. (1890) 5,317; (1900) 6,175; (1910) 7,460.

Milton, John, an English poet; born in London, England, Dec. 9, 1608. His father, a notary, was a man of cultivated mind, and gave him a careful education, which was continued at St. Paul's School and the University of Cambridge. He entered the latter in 1624, and quitted it in 1631, without taking his degree of M. A. In 1637 he set out for Italy, and visiting Paris on his way, made acquaintance with Grotius. At Florence he visited the aged Galileo in his prison, and at Rome Cardinal Barberini received him kindly. After three years' absence, news reached him of the political troubles which were beginning in England, and, passionate lover of liberty as he was, he hastened home, to take part in the struggle. He almost immediately began that career as a controversialist, which, while it has exposed him to much obloquy from those who dissent from his opinions, has enrolled his name among the noblest and most eloquent of the writers of Old English prose. His first polemical work was a treatise "Of Reformation" (1641). In 1643 he married Miss Powell, daughter of an Oxfordshire gentleman attached to the royal cause. She very soon returned to her father's house, and for her desertion was repudiated by Milton, who soon after published successively his several treatises on divorce. About the same time he passed to the side of the Independents, and wrote the "Areopagitica," an appeal in benalf of the freedom of the press, and the most magnificent of his prose works. A reconciliation with his wife was brought about by friendly intervention, and she returned to him. In 1649, he was appointed Latin Secretary to the Council of State; and among the duties assigned to him were those of writing a refutation of the "Eikon Basilike," (Kingly Image), then attributed to Charles I., and a reply to the work of Salmasius in defense of the king and the monarchy. Hence the "Eikonoklastes" (Image-Breaker), and the "Defense of the People of England." On the establishment of the Protectorate Milton became secretary to Cromwell, and remained so till the death of the latter in 1658. Several years before that time he had become totally blind, deliberately and heroically preferring, as he says, the loss of his sight to the desertion of his duty. The last short intervals of sight allotted him were devoted to the composition of the "Defense."

JOHN MILTON.

The Restoration of 1660 consigned Milton to obscurity. At first he thought it necessary to conceal himself; his friends are said to have made a mock funeral for him; and a proclamation was actually issued for his apprehension, and that of Goodwin the theologian. But, though the most offensive of his books were burned by

the hangman, he was included in the Act of Indemnity; and it is even asserted that his former office was offered to him, but of course refused. He had in the end inherited but little from his father, had failed in getting payment of the portion of his first wife, had lost money lent, and had had his house accidentally burned. Accordingly, his circumstances were now indifferent, yet not very low for a man so moderate in his habits. He published, in 1661, a Latin grammar in English. In 1664 he married his third wife, Elizabeth Minshull, of a good Cheshire family. In 1665, being in his 57th year, he completed "Paradise Lost," and it was published in 1667. It was sold for $25 to a bookseller, who engaged to pay a like sum for each 1,500 copies that should be sold from each of the three editions of 2,000 each. In two years the first of these additional payments was due and made; a second edition was published in 1674, and a third in 1678. This was a large sale in that age, even for the greatest epic in the English language. The poet next published his "History of England down to the Norman Conquest," and in 1671 appeared the "Paradise Regained," to which was subjoined "Samson Agonistes." His second epic was written with great quickness, perhaps altogether during a retirement of several months which he made to Chalfont in Buckinghamshire, on the breaking out of the plague in London in 1665. His literary labors closed with a treatise on logic, very ably written, in Latin; a new treatise in controversial theology, "Of True Religion," directed against Popery; and a Latin collection, published in 1674, of his private letters and academical exercises. To the latest years of his life may have belonged the completion of his Latin treatise, "Of Christian Doctrine," which, left unpublished till it was disinterred from the State Paper Office in 1823, showed him to have become decidedly an Arian. The current account which represents his daughters as having been trained to read and write for him, appears to be true only as to Deborah, the youngest; and all of them had lived uncomfortably with him and his third wife, and had left his house some years before his death. He died so easily that the moment was not perceived, in London, on Sunday, Nov. 8, 1675.

Milwaukee, a city of Wisconsin, county-seat of Milwaukee co.; the chief city in population and importance in the State. It is a port of entry, situated on the W. shore of Lake Michigan, at the mouth of the Milwaukee river, 85 miles N. of Chicago and 82 miles E. of Madison, the State capital. It has an area of 22½ square miles. Its commanding situation on high bluffs overlooks one of the finest bays of Lake Michigan, and Milwaukee is noted for its many beautiful features. Into the capacious harbor extend numerous piers, utilized in the lake commerce that forms a large part of the city's business enterprise.

Topography, Streets, Parks, etc.—The Milwaukee river flows through the principal part of the city and with the connecting Menomonee and Kinnickinnic rivers divides it into three sections, known respectively as the East, West, and South sides. All of these rivers are navigable for the largest lake vessels. On the W. side of the Milwaukee river the surface has an elevation of 125 feet, and between the lake and the river the elevation is 80 feet. The East Side is the principal residence section, and in the S. part of this district are large wholesale and retail houses. The West Side, W. of the Milwaukee river and N. of the Menomonee, is the largest district of the city. In the Menomonee valley are hundreds of manufactories. The South Side is also the home of many great industries. Milwaukee has many wide and beautiful streets. The principal retail thoroughfare is Wisconsin street, E. of the Milwaukee river, and Grand avenue, W. of the river. All streets crossing the rivers are given separate and distinct names on opposite sides and are numbered from the rivers. The streets on the West Side paralleling the Milwaukee river and running N. and S., commencing with Second street, are numbered in order from Second to Fifty-eighth street. On the South Side the streets so numbered are called avenues. The residence streets are particularly attractive, and are of superior character in all sections of the city. Upper Grand avenue, on the West Side, is lined with handsome residences, and the cross streets are distinguished for their generally pleasing appearance. Prospect avenue is the most beautiful promenade street of the East Side. Stately elm trees overarch many of the avenues. East Water street, West Water street, and Third street, among others, are also deserving of particular mention. The streets on opposite sides of the rivers are connected by numerous bridges.

In the number and beauty of its parks Milwaukee also enjoys distinction among American cities. There are 9 parks under control of a park board, and many smaller parks and public squares under a board of public works. Juneau park, containing statues of Laurent Solomon Juneau and Leif Ericson, lies along the lake shore N. from Wisconsin street, and commands a magnificent view of the bay. Lake park, perhaps the most beautiful, extends along the lake for more than a mile in the N. E. part of the city. It is naturally wooded, and in it are deep ravines through which

Milwaukee

streams course down to the lake. The other principal parks include Riverside, overlooking the upper Milwaukee river; Washington, on the W. limits of the city, and its largest park, with a zoölogical garden; Humboldt and Mitchell, on the South Side; and McKinley park, commonly known as Flushing Tunnel park, midway between Juneau and Lake parks. In Grand Avenue park are the Washington and the Soldiers' monuments and a column commemorating the semi-centennial of the city's incorporation. One of the most beautiful spots on the lake is Whitefish bay, 4 miles N. of the city, a favorite resort, approached by a handsome drive along the shore.

The water works, which receive their supply from the lake, were built at a cost of $5,000,000. The reservoirs have a storage capacity of 46,000,000 gallons, and the water is distributed through 345 miles of mains. The consumption averages 24,000,000 gallons a day. The sewerage system has a total length of 318 miles. In 1888 a tunnel 12 feet in diameter and about half a mile in length was constructed from the lake to the river N. of the city. Enough lake water is forced through this tunnel, by means of the largest single pump in the world, to give an entire new supply of water to the river every 24 hours, thus purging it of all the refuse matter discharged into it by the sewers. In 1907 another such tunnel was completed in the S. part of the city to flush the Kinnickinnic river in the same manner. In the same year bonds for $150,000 for a municipal light plant had been sold and the site purchased.

Buildings and Institutions.—Among the chief public buildings are the county court house, erected at a cost of $4,100,000, with a dome from which an excellent view of the city is obtained; the city hall, finished in 1896, at a cost of $1,200,000; the National Soldiers' Home, just W. of the city, accommodating 2,000 disabled veterans, and occupying a fine tract of over 200 acres, a large part of which is under cultivation, the remainder being a park; the Federal building, containing the post office and custom house, erected at a cost of $1,500,000; the Public Library and Museum; and the Layton Art Gallery. Milwaukee is the seat of a Protestant Episcopal bishop and of a Roman Catholic archbishop. Among the noteworthy church edifices are St. Paul's and St. James' (P. E.), Immanuel (Presb.), Plymouth (Congl.), the Cathedral of St. John, the Church of Gesu, and St. Josaphat's (all R. C.), and Trinity (Luth.). The numerous charitable institutions include the Johnston Emergency Hospital, the Milwaukee General Hospital, the United States Marine Hospital, and other hospitals, the State Industrial Home for Girls, Home for the Friendless, etc. To the sum of $250,000 raised by private subscription was added an equal sum raised by sale of city bonds for the erection of the public auditorium, to be completed in 1909. The Union passenger station, the Pabst building, the Wells, Mitchell, Germania, and many other business buildings are prominent features in the architectural character of the city.

Education.—In 1908 Milwaukee had 4 high schools, 54 district schools, and 28 classes taught in "barracks," or portable schoolhouses. At the close of the school year the population of school age numbered 109,658; population subject to the compulsory attendance law (7 to 14 years), 48,168; enrollment in all public schools, 41,130; average daily attendance, 35,951. There were 1,142 teachers. The public school property was valued at $3,864,155. Kindergartens, manual training centers, evening schools, and schools for the deaf and blind are important parts of the public school system. The institutions of higher education include a State normal school, Milwaukee Downer College for women, Marquette College (R. C.), Concordia College (Luth.), and several seminaries. Milwaukee has 8 daily newspapers—5 English, 2 German, and 1 Polish.

Industries and Commerce.—Milwaukee has rapidly developed as an industrial and commercial center. Here are great flour mills, some of them having a daily output of 10,000 barrels, and grain elevators with a capacity of 5,500,000 bushels. Milwaukee beer, well known throughout the country, has an output of about 2,000,000 barrels annually. The iron and steel industries have grown to vast proportions. The city has one of the largest manufactories of machinery in the world, and heavy sawmill machinery is one of the greatest products. Meat-packing is also extensively carried on. Clothing, leather boots and shoes, lumber products, agricultural implements, etc., increase the volume of manufactures.

According to the United States Census of Manufactures of 1905, Milwaukee employed 28.8 per cent. of the total number of wage-earners and reported 33.8 per cent. of the total value of products for the State. The growth of the industrial activities of the city since 1880 is shown in the following table, taken from the Abstract of the Twelfth Census:

Year	Number of Establishments	Capital	Wage-Earners	Wages	Cost of Materials Used	Value of Products
1880	844	$18,766,914	20,886	$6,946,105	$28,975,872	$43,473,812
1890	2,879	69,145,814	38,850	16,737,261	55,815,485	97,503,951
1900	3,342	110,363,854	48,328	20,240,656	65,118,719	123,786,449

The special United States Census of Manufactures of 1905 was confined to industries carried on under the factory system, to the exclusion of neighborhood industries and hand trades. Compared with the corresponding figures for 1900, the results, according to that census, are shown in the following table:

Year	Number of Establishments	Capital	Wage-Earners	Wages	Cost of Materials Used	Value of Products
1900	1,419	$105,503,870	41,220	$17,102,265	$59,693,700	$110,854,102
1905	1,532	162,129,641	43,540	20,910,000	71,705,220	138,881,515
Per cent. increase	8.0	53.7	5.6	22.3	20.1	25.3

According to the more inclusive local census of 1906, the city had 3,350 manufactories, employing $194,485,440 capital and 88,362 wage-earners; paying $51,100,912 for wages; and having a combined output valued at $285,435,941.

The trade of the city in grain and produce, lumber, and other commodities gives it an increasing commercial importance. In 1906 the domestic and foreign exports at the port of Milwaukee were valued at $281,666; imports, $3,144,937. There is a large jobbing trade. In 1906 there were 5 National banks in operation, having a combined capital of $3,250,000, and a surplus fund of $737,500. The clearing-house exchanges in the year ending Dec. 31, 1906, aggregated $426,029,808. Milwaukee has the advantage of three railroad systems. The Chicago, Milwaukee, and St. Paul and the Chicago and Northwestern roads make direct connections with all the great trunk lines, and their numerous branches reach out in every direction to the productive localities of the Northwest. The Wisconsin Central railroad also supplies service of great importance to the city. The Père Marquette and Grand Trunk lines have here their W. termini, reached by means of car ferries. Besides the railroads, the several lines of lake steamers furnish excellent means of transportation. The street railway system, owned and operated by the Milwaukee Electric Railway and Light Co., gives complete and unusually efficient service throughout the city.

Administration and Public Interests.—Milwaukee is governed by a mayor and a common council that consists of two aldermen from each ward, other elective officers being the treasurer, comptroller, and attorney. All except the attorney, whose term is four years, are elected biennially. The administrative departments include boards of public works, school directors, civil service commissioners, etc., appointed by the mayor with the approval of the aldermen. The assessed valuations in 1906 were: Real estate, $157,611,560; personal property and real estate, $201,585,127. Tax rate, $24.00 per $1,000; net debt, Jan. 1, 1906, $8,013,250. The city owned property valued at $21,092,031, including its water works, from which it receives a larger sum annually than the total interest on its debt. The expenditures of the city government for the year 1906 amounted to $5,452,641.

History and Population.—Though other settlers on the site of Malwaukee had preceded him, the real settlement of the place is usually dated from the arrival of Laurent Solomon Juneau, an Indian trader, from Canada, in 1818. Juneau found here a Pottawattamie village, and he established a trading station on the E. side of the Milwaukee river. The settlement here was afterward called Juneautown, while another, on the W. side, was named Kilbourntown, after Byron Kilbourn (1834). The district S. of the Menomonee river received from George H. Walker (1834) the name of Walker's Point. In 1835 a town was laid out. After a considerable growth in the following year a period of slow development ensued. In 1837 Juneautown was organized as the village of Milwaukee. Kilbourntown was annexed in 1839, and Walker's Point in 1845. The city was incorporated in 1846, and Juneau was its first mayor. Population, 1850, 20,061; 1870, 71,440; 1880, 115,587; 1890, 204,468; 1900, 285,315; 1910, 373,857. Of the present population about one-half represents the German element.

Revised by SHERBURN M. BECKER.

Mimicry, in zoölogy, a term introduced by H. W. Bates to denote that "close external likeness which causes things really quite unlike to be mistaken for each other," which exists in the animal kingdom; but it should be borne in mind that there is no evidence that such mimicry is in the slightest degree voluntary. It may be regarded as the highest form of protective imitation or resemblance, or as that imitation or resemblance carried to its extreme limits. A. R. Wallace, who has brought together probably the largest collection of facts on this subject in the language ("Westminster Review," July, 1867, pp. 1-43), says, that the phenomena of mimicry "have been shown to follow certain definite laws, which again indicate their dependence on the more general law of the survival of the fittest." These laws are:

(1) That in an overwhelming majority of cases of mimicry, the animals (or the groups) which resemble each other inhabit the same country, the same districts, and in most cases are to be found together on the same spot.

(2) That these resemblances are not indiscriminate, but are limited to certain groups, which in every case are abundant in species and individuals, and can be often ascertained to have some special protection.

(3) That the species which resemble or mimic these dominant groups are comparatively less abundant in individuals, and are often very rare.

In botany, the term is sometimes used of plants belonging to one order when in their general features they resemble species belonging to another order; as, for instance, certain foreign *Euphorbiaceæ* which bear a close superficial resemblance, though no affinity, to *Cactaceæ*. Prof. Thiselton Dyer considers that there is no genuine mimicry in the vegetable kingdom, and terms the phenomenon now described homoplasmy.

Mimir, (mē′mir), the Scandinavian god of wisdom, and most celebrated of the giants. The Vaner, with whom he was left as a hostage, cut off his head. Odin embalmed it by his magic art, pronounced over it mystic runes, and even after consulted it on critical occasions.

Mimosa, a genus of leguminous trees, shrubs, and herbs. Of the numerous species, most are tropical, but some occur in the southern and southwestern United States. Several are cultivated, but the only one that is thus familiar is the *Mimosa pudica*, or sensitive plant (*q. v.*).

Mimusops (-mū′-), a genus of *Sapotaceæ*, calyx, six to eight-parted; corolla with an outer row of 6 to 16 and the inner of six to eight petals; ovary, six to eight-celled. *M. kaki* has an astringent bark, yields a gum, and bears a sweet fruit eaten by the natives of India. *M. elengi* is a large evergreen tree largely cultivated in India. During the hot season it produces many small, fragrant flowers, which fall plentifully. The small, oval berries are eaten by the poorer Hindus. The sap-wood is large, whitish, and very hard, the heart-wood red. It is used for house building, carts, and cabinet-work. That of *M. indica*, which grows only above sandstone, is used for sugar mill beams, oil presses, house posts, and turnery. *M. littoralis*, which grows in the Andaman Islands, is used for bridges and house posts. The berries of *M. hexandra* are eaten in India. Most species of the genus yield gums and their seeds oils. *M. elengi* yields the Pagoda gum of India. *M. globosa* the American gum Batata. The bark of *M. elengi* is used in India for tanning; boiled, it yields a brown dye used with myrabolans; that of *M. littoralis*, a red dye used in the Andamans. The barks of *M. elengi* and of *M. hexandra* are astringent tonics; the decoction of the former is a gargle which produces salivation. Water distilled from the flowers is a stimulant medicine and a perfume. The powdered seeds of *M. kaki* are used in ophthalmia, the milk in inflammation of the ear and conjunctivitis.

Mina, an ancient denomination of money among the Greeks. The Attic mina which is the most frequently mentioned, contained 100 drachmæ, and was itself contained 60 times in an Attic talent, and was worth about $16.

Minas Geraes (zhe-rīs′), the most populous State of Brazil, inland from Espirito Santo and S. of Bahia; area 221,951 square miles; pop. (1900 census) 3,594,471. Lying wholly in the table-land, its surface is occupied with grass and bush-covered campos, rising, however, in the Serra do Espinhaço to 5,900 feet; the principal rivers include the navigable Sao Francisco, and the Rio Grande which unites with the Paranahyba to form the Paraná. Agriculture and stock raising are the chief industries; some gold is still obtained, and diamonds, iron, and lead are mined. The inhabitants include very few whites; among the Indians the Botocudos are met.

Mincio (min′cho), a river of N. Italy, having its source in the Lago di Garda, and after a S. course of 38 miles uniting with the Po 12 miles S. E. of Mantua. The French under Napoleon Bonaparte defeated the Austrians on the banks of this river May 29, 1796. General Brum crossed it Dec. 25, 1800. Eugène Beauharnais gained a victory over the Austrians Feb. 8, 1814. In 1848, on the outbreak of the revolution in Italy, the Austrian general Radetzky retreated to the Mincio, April 2. He was followed by Charles Albert, who forced the passage of the river April 8.

Mind, Human, the central point around which the controversies of philosophy range. For the form assumed by these controversies see the articles METAPHYSICS and PSYCHOLOGY. The human mind may be considered either as a whole or as comprehending various powers, active or passive, faculties or capacities, which may be specially observed and described. This susceptibility of division indicates the greatness of the subject. A preliminary difficulty also attends the inquirer at its threshold. It cannot be defined or illustrated by reference to other subjects. Mind is unlike anything else. If we are to know anything about it it must be by direct observation. This indicates the method of inquiry suitable to the subject; and it is to the neglect of this method that most of the confusion and contradiction, as well as some of the obscurity which surrounds it, is to be ascribed. This method is that properly called the psychological; for its establishment or restoration modern philosophy is indebted to Descartes. According to this method the proper starting point of philosophy is the mind itself in the present exercise of its powers. It is opposed to the historical method which begins by attempting to trace the history of

Mind

mind, to discover its genesis and to ascertain its relations to other things. According to the Cartesian theory this investigation, highly important and useful in its own place, is impracticable until we have first determined something in relation to the mind, the investigating agent itself, and according to the result of this preliminary determination will be the whole value of the subsequent investigation.

The mind, to begin with, is something, or there would be no investigation; and the first question is, What is it? and not, How did it originate? It is not indeed necessary that we should ascertain exhaustively what the mind is before we can proceed by a historical inquiry to ascertain whence and how it came to be such, for then all further inquiry would be hopeless; but some things must be ascertained, as, How does the mind receive and judge of evidence? What is the value of its powers of observation and of its appreciation of what it observes? In short, Have we in the mind the conditions of historical investigation? Our first excursions in philosophy must be to try and test the powers or resources of the mind itself; to ascertain, as far as may be, their extent and relations; and to discriminate them, if possible, from other things with which they come in contact, mind from not mind. To some extent this inquiry must precede history, and it is only in as far as this inquiry has given us distinct views that we can draw anything certain from our historical investigations. If we are incapable of discriminating what we already know we can have little hope of bestowing a better judgment on new facts. This investigation is properly the work of psychology, and its method is to begin with the investigation of the mind in the concrete, with its present powers in their actual development. It is violated by Locke when he appeals in disputed points in psychology to the supposed genesis of our powers in infancy; and it is violated by modern evolutionists when they import into psychology a supposed genesis of our race and a cyclical history of the development of our mental powers. It must also be added that while Descartes has rendered an inestimable service to philosophy in giving it this method, it is very badly exemplified in his own practice.

The Cartesian method, beginning with the investigation of the powers and relations of the mind, leads directly to the questions involved in the mental phenomena called moral. Is the mind active or passive? Are its actions necessarily determined by antecedents; or has it an inherent power of determining, as an original cause, its own actions? These questions lie at the root of moral philosophy; for if the mind has no inherent power of determining; if choice is only a necessary inclination toward the stronger motive, moral philosophy can amount to nothing more than a descriptive science. If, on the other hand, there is in a given state of the mind a power of self-determining choice between varying antecedents, according as these antecedents or the actions they prompt to are better or worse, the mind which chooses them will be better or worse. But what we have to observe is that this question can be determined only psychologically; that is to say, it is a question of fact and can only be determined by observation. If we cannot decide it by observing what passes in our own minds there is no other way in which for us it can be decided. The attempt, indeed, is often made to reach the decision by a shorter road. It is supposed that any power of origination in the mind can be shut out by an exhaustive syllogism; but as this syllogism must include not only the state of consciousness of the mind but its passions, it necesarily includes the psychological difficulty. Are these passions necessarily raised in proportion to the objects presented to them; or are they to any extent under the control of the mind itself? The power of attention also demands consideration. There are always present in the mind numerous objects of consciousness; but there is in the state of consciousness a synthesis produced by the mind's directing its attention specially to some one object or to certain portions or attributes of the objects before it. Is this attention necessarily determined or not? For if we assumed that the mind could not control its passions when it suffered itself to dwell on their appropriate objects, yet if it had the power of concentrating its attention on or withdrawing it from these objects, an indefinite power of originating and controlling action would still belong to it.

The questions connected with the relations of mind to not mind, of subject and object, of the surroundings and relations of mind to other similar or different forms or manifestations of being, are likewise psychological questions. These questions, by the extraordinary number and divergency of the answers they have received, are the despair of philosophy. These answers range from the assumption that all external or objective phenomena are but subjective manifestations or modes of mind, to the opposite one, that mind itself is but the product of a preëxisting external organism. It may, perhaps, be safely affirmed that neither of the extremes in these conclusions can be reached without a violation of the psychological method. According to Descartes the fundamental and essential attribute of mind is thinking. This will generally be accepted by psychologists as a sound generalization or true deduction from observation. It is to be observed, however, that thinking is not mind itself,

but a product of mind. We cannot conceive of thought as existing of itself, but only as existing in a being who thinks. But if we accept thinking as the essential attribute of mind, we have an elementary definition of mind, and are able to distinguish it from other things which have not this attribute. Whatever thinks is mind; whatever does not think is not mind. We are conscious from observation, of many things which do not manifest the attribute of thinking, and to these things we give the distinctive name of matter. But material things have also their attributes which are capable of being observed and recorded. We have thus as distinguishable forms of being, mind and its attributes and matter and its attributes. If it is alleged by the idealist that the whole of this distinction is purely subjective, the answer is that the objection is simply a question of the truth of consciousness, without reliance upon which neither he nor we can proceed one step in philosophical investigation.

The subjective condition of our knowledge, which seems to the idealist to invalidate our belief in the existence of external things, is not a condition of our knowledge merely, but of all possible knowledge; for now can any intelligence know but through his own consciousness? If the intrusion of our consciousness therefore invalidates our knowledge of external things, all possible knowledge of anything outside himself is for ever excluded from any intelligence. Ferrier, who calls himself a real idealist, makes the curious mistake of confounding what is inseparable in knowledge from what is inseparable in existence. When I look at a tree the object of my knowledge, according to him, is myself-seeing-a-tree. This is the absolute, and exists; but I am the relative and do not exist, and the tree is the relative and does not exist except in synthesis with its correlative. The mind, the thinking person, besides the consciousness of himself and of his own thoughts, is conscious of things without him which are neither himself nor his thoughts, but only the instruments or occasions of them. Is this denied? Then the whole of consciousness is but a wild confusion of conflicting elements, and no subjective philosopher has ever yet succeeded in reducing his thoughts into obedience to his own theory. Ferrier makes a remarkable confession to this effect in the introduction to his "Institutes of Metaphysics." After telling us that the object of his science is to correct the inadvertence of ordinary thinking, he proceeds in section 64 to answer the objection that its conclusions cannot during 99 parts (out of 100) of a man's existence be present to his conviction with the force and vivacity which he might think desirable if they were true. "But this," he says, "is neither desirable nor necessary. Their perpetual presence would convert him from an agreeable human being into a nuisance both to himself and others. It is the worst species of pedantry to entertain and parade the conclusions of science, either to ourselves or others, when engaged in the common business and intercourse of life; just as it is the worst species of prudence to embrace the plausibilities of common opinion, the maxims of the salons and thoroughfares, when ministering at the altars of science. The two things should be kept everlastingly apart. All that is necessary is that the reader should know that what is laid before him is the truth; it is not necessary that he should feel it to be so."

Contrast this with Milton:

> "How charming is divine philosophy!
> Not harsh and crabbed, as dull fools suppose;
> But musical as is Apollo's lute,
> And a perpetual feast of nectared sweets,
> Where no crude surfeit reigns."

So far psychology is justified in going, but the Cartesians have gone much further and by their ultroneous conclusions have landed themselves in inextricable difficulties. They have, for example, drawn an absolute line of distinction between mind and matter, and asserted a complete independence in the former of the latter. In virtue of this view the Cartesians in France have styled themselves spiritualists. But this is pushing the distinction between mind and matter beyond what psychology warrants. We know certainly an attribute of mind which does not exist, or at least which is not manifested to us in matter; but we know of the existence of mind only in relation to matter, and before we can assert its possible existence out of relation to it we must know at least one of them exhaustively. If we knew mind exhaustively we might be able to say that it was independent of matter, or if we knew matter exhaustively we might be able to say it was unnecessary to mind; but the proof that we do not know either exhaustively is that we do not know their relation to one another. The facts of that relation actually known have, indeed, a great weight, and enable us to assign the superiority to mind and the position of instrumentality to matter; but they do not enable us to conceive, otherwise than as an abstracted conception, of a state of intelligent existence out of relation to instrumentality, nor to determine whether such a mode of existence is possible for us. Whatever views we may have on such subjects as matters of speculation or of faith, we do not seem at present capable of knowing anything on them from psychology. Psychology, however, leads us to the consideration of another relation of mind than that to matter, a relation suggested by its manifested superiority to matter on the one hand, by its own attributes

Mind

and its finite and dependent condition on the other; and which, by suggesting a first cause, who as the author of intelligent beings must necessarily be intelligent, excludes the possibility of regarding mind as a mere product of organization.

Descartes distinguishes matter by the essential attribute of extension. Whether this is really the distinguishing quality of matter may perhaps be held doubtful; but the distinction has been carried out by otbers in a way about which there can be no doubt. The distinction between mind and not mind has been represented, by calling it a distinction between the extended and the unextended. Whatever may be the case with matter it is certain that mind is not distinguished by the epithet, unextended. In any sense in which the term is applicable to mind it is applicable also not only to the attributes of mind but to the attributes of matter. Motion is not extended any more than thought. Another distinction made between mind and not mind is to call the former the universal, the latter the particular, in cognition.

The theory of the relations of mind and matter have given occasion, especially among the Cartesians, to many curious speculations. Three leading explanations have been given of it. The theory of occasional causes advocated by Malebranche and other Cartesians affirms that there is no real causal connection between the reciprocal actions of mind and body, but only modifications produced in the one, on the occasion of what happens in the other; the theory of preëstablished harmony adopted by Leibnitz supposes that the two natures have been so coördinated at their creation that the action produced by the evolution of their internal forces must always correspond; the theory of the plastic medium upheld by Cudworth represents the existence of a medium partaking of the nature both of mind and body, through which the communication between them is maintained. Pascal takes a juster view of this subject. "Man," he says, "is to himself the great est prodigy of nature. He cannot conceive what a body is, still less what a spirit is, and least of all how a body can be united to a spirit; and yet that is his own nature." From the attention bestowed on the question both by physiologists and philosophers, as well, perhaps, as from the nature of the case, it may probably be concluded that to discover the true nature of the connection between body and soul, mind and matter, lies beyond our capacity; but the element of contradiction, which in philosophical reasoning has so frequently been associated with this connection, would seem to be entirely due to the readiness of philosophers, both spiritualist and materialist, to assume more than they actually know as to the properties of one or the other. That there can be no real contradiction is evident from the fact that the connection exists; but while the spiritualists have defined matter and mind respectively as destitute of all common or communicable properties, the materialists, by deriving mind from matter, the conscious from the unconscious, have degraded the necessary laws of consciousness into a mere product of a particular organism. If, however, we suppose, as there seems good reason to do, that matter is neither a self-subsistent product of some remote effort of creative power, nor the primeval form of being, but a present creation, the constant emanation of divine power, the instrument of communication between the Creator and his sentient and intelligent creatures, and the means by which he assigns them their place in the scale of being and imposes on them a portion at least of the laws by which they are governed, the secret of the connection between mind and matter may indeed remain unrevealed, but the very fact of its impenetrability will remove the possibility of imagining any reasonable ground for suspecting it of any element of contradiction.

Another much agitated question is as to the origin of the soul in connection with the human body. Various answers have been given to this question by spiritualists. Pythagoras, Plato, and others believed in the preëxistence of the soul. Tertullian, Luther, and Leibnitz held that all human souls existed in germ in our first parent, and have been transmitted by generation. The most common opinion is that each soul is created by God at the moment of its junction with the body. Another question much agitated relates to the extent of the functions of the soul. The great majority of philosophers attribute to its origination all the vital functions of the body. Another class, however, among whom is Maine de Biran, limit it to the voluntary and intelligent actions; and some of this class give man both an animal soul, like the beasts, and a mind, spirit, or intelligent soul. Another question which has caused great perplexity is the extent of the resemblance between human and brute intelligence. It is clear that observation supplies no absolute distinction between human and brute intelligence except one of degree. We have at least not been able to discover any faculty or attribute of human intelligence of which some germ may not be discovered at least among the higher animals. But the consequences of this analogy appeared so formidable to Descartes that he abandoned the method of observation and took to that of hypothesis in order to demolish it. According to him the lower animals were pure automata, or organized machines. This hypothesis, which is actually introduced in his "Discourse on Method," though not directly connected with psychol-

ogy, is as great a deviation from his own method, of receiving nothing as truth but what is clearly demonstrated to be such, as could well be practised.

The question of the immortality of the soul is usually associated with the question of its origin, material or immaterial, but it is more properly associated with theism or atheism. He who believes that the Author of our being is an infinite intelligence, may reasonably assume the permanence of his work; but he who attributes it to a blind chance has no criterion to guide him in estimating future possibilities. The division of the powers of the mind into particular faculties may be considered as partly natural and partly arbitrary. Every philosopher adopts, to some extent, a classification of his own, but the distinction of such powers as memory, imagination, and reason cannot be held as merely artificial. The faculties are frequently grouped in a threefold division, as those of emotion, intellect, and will.

Mindanao (mēn-dä-nä′ō), one of the Philippine Islands, next to Luzon in point of size; length about 300 miles, breadth 105 miles; area 34,250 square miles; pop. (1903) 499,634. All the country, except on the sea-coast, is mountainous, the volcano of Apo being 8,819 feet high. Some coffee, cocoa, and cotton are exported. The chief town is Zamboanga or Samboangan, a port and naval station at its W. extremity. This island was ceded by Spain to the United States, Dec. 10, 1898. See PHILIPPINE ISLANDS.

Minden, a Prussian town in Westphalia, on the Weser, 40 miles W. of Hanover; it has a fine new bridge (1874), a Gothic town hall a Catholic church (till 1811 cathedral), built between the 11th century and 1379, and restored in 1864–1885, manufactures of tobacco, beer, brandy, glass, etc., and a considerable river trade. Till 1873 a fortress of the second class, it was already a town in Charlemagne's day, and suffered much in the Thirty Years' War and again in the Seven Years' War, when, on Aug. 1, 1759, the French were defeated here by an Anglo-Hanoverian army under Ferdinand of Brunswick and Lord George Sackville. Pop. (1900) 24,315.

Mindoro (mēn-dō′rō), one of the larger of the Philippine Islands, situated S. of Luzon, from which it is separated by the Strait of Manila; length about 110 miles, breadth about 53 miles; area, 3,934 square miles; pop. (1903) 28,361. It is evidently volcanic, the climate is hot and the rain almost incessant. Rice, cacao, and wild cinnamon are among the products.

Mine. See MINING.

Mineralogy, the natural history of the mineral kingdom, considered as a pure science. The observations made at first related simply to the usefulness of minerals to the purposes of society, and it was not before the lapse of many ages that they came to be investigated on account of their great variety and the beautiful arrangements of which they are susceptible. The *orukta* and *metalleuta* of Aristotle evince no valuable observations on the part of that philosopher concerning minerals, and are chiefly mentioned by him because he believed the former to be derived from the earth and the latter from water. The allusions to mineral substances found in the writings of Theophrastus, Pliny, Dioscorides, and Galen, are of more interest to the antiquarian and philologist than to the natural historian. No attempt to classify these bodies was made previous to the introduction of alchemy into Europe by the Arabians; and to Avicenna belongs the merit of the first arrangement. He divided minerals into stones, metals, sulphureous fossils, and salts — a division which was generally adopted by the chemists of those times, though opposed by the naturalists who confined their investigations to the characters derived from the external forms of minerals and their supposed medicinal virtues, but without deriving from them any just grounds of classification.

Agricola (who was born in 1494, and died in 1555) directed his views to the uniting of these two classes, though he inclined more strongly to the side of the scholiasts than to that of the chemists. All minerals (*corpora subterranea*) are divided by him into simple, or such as consist of homogeneous particles; and compounded, or such as are formed of heterogeneous parts, taken in a mineralogical acceptation of the terms. The minerals belonging to the former of these divisions are found in four different forms, viz.: (1) *terra;* (2) *succus concretus;* (3) *lapis;* (4) *metallum.* Terra he defines as "*corpus fossile quod potest manu subigi, cum fuerit aspersum humore, aut ex quo cum fuerit madefactum, fit lutum.*" These earths he divides partly according to some external characters, partly after their localities, in cases where their names are derived from the countries or places in which they are found: "*Succus concretus est corpus fossile siccum et subdurum, quod aquis aspersum aut non mollitur, sed liquescit, aut, si mollitur, multum vel pinguitudine differt a terra, vel materia ex qua constat.*" The fossils of this class Agricola divided into *macra* and *pinguia.* The former consist of a juice, partly mixed with earth (*sal nitrum*), partly with metal (*chrysocolla, ærugo, ferrugo, cæruleum*), partly mixed both with earth and metal (*atramentum, sutorium, alumen,* etc.); to the latter he refers sulphur, bitumen, sandarach, and auripigmentum. The stones are the third class of Agricola's system. "*Lapis est corpus fossile siccum et*

Mineralogy

durum, quod vel aqua longinquo tempore vix mollit, ignis vehemens redigit in pulverem; vel non mollit aqua, sed maximo ignis liquescit calore." The stones are subdivided into *lapis*, *gemma*, *marmor*, and *saxum*. His definition of metals, being his fourth class, is "*corpus fossile natura vel liquidum vel durum quidem, sed quod ignis liquescit calore.*" He enumerates 10 metals. The last class of Agricola's system comprehends mixed and compound fossils: (1) Mixtures of stones and juices (*succi*); (2) of earth and metal; (3) of stone and metal; (4) of juice, stone, and metal. To the second and third divisions he refers the various ores. A translation of Agricola's system into German was published, with considerable additions, by Lehmann at Freyberg in 1809.

Most of the writers on mineralogy who succeeded Agricola, till the middle of the following century, adopting his system, occasionally making some trifling alterations in conformity with the slow progress of chemistry. Becher (whose "Physica Subterranea" was published in 1667) made the first important innovation on the classification of Agricola. He considered water and earth as the remote, and vitreous, inflammable, and mineral earths (*sal, sulphur, mercurius*) as the proximate constituent parts of all minerals which he accordingly arranged under three classes; the first comprehending those stones in which the vitreous earth constitutes the principal ingredient; the second and third classes containing the substances in which the two remaining earths predominate. Bromelius, who published a book entitled "Catalogus Rerum Curiosarum" (Gothenburg, 1698), referred sulphur and the bituminous substances to the same class, which he called *sulphurea* and *pinguia*. Magnus von Bromel, a Swede, who was the pupil of Boerhaave, published a system of mineralogy, "Inledning til Kundskap om Mineralier," etc. (Stockholm, 1730), in which he not only availed himself of all the improvements made by his predecessors, but also proposed a new chemical division of stony substances into such as are refractory (*apyri*), or calcinable, or vitrescible in the fire, to which were added the figured stones (*figurati*).

After Von Bromel, the great Swedish reformer in natural history appeared, whose admirable views respecting the philosophy of the natural sciences have contributed more to the perfection of our science than the labors of all who preceded him, and yet Linnæus appears to have possessed but very little knowledge of minerals; but the success with which he applied the method of natural history to the vegetable kingdom rendered it easy for subsequent naturalists to apply his principles to the mineral kingdom. Linnæus, too, has the merit of calling the attention of naturalists to the important characters derived from diversity of crystallization. Mineralogy, however, remained from the time of Linnæus to that of Werner almost exclusively in the hands of chemists, who appear to have regarded the science in no other light than as an appendage of chemistry, and who, while they paid little regard to the natural properties of minerals, believed that chemical knowledge was alone capable of affording the basis of the classification, nomenclature, and diagnosis of the mineral kingdom. To this class of the cultivators of mineralogy belonged Henkel, Pott, Wallerius, and Cronstedt.

In 1774 Werner published his work "On the External Properties of Minerals" ("Von den äussern Kennzeichen der Fossilien")—a work of great merit and value at that juncture, as it served to call the attention of naturalists to a much neglected method of arriving at a knowledge of this department of nature. The external characters of minerals had before been almost wholly overlooked; in this work they were described with uncommon minuteness, though they were employed by him in his system without a just regard to their relative importance. The greatest defect, however, in the views of Werner arose from his reluctance to ascertain the properties of minerals through the aid of instruments. He scarcely availed himself of any other means than such as were derived directly through the eye, the hand, and the tongue. Hence those characters depending on the value of angles and different degrees of hardness and specific gravity, which are now acknowledged to be of the highest value in mineralogy, were turned to comparatively little account. For a knowledge of Werner's system of mineralogy we are indebted to his translation of Cronstedt's mineralogy (to which he subjoined notes), to his catalogue of the mineral collection of M. Pabst von Ohain, and to several memoirs in the "Bergmannische Journal." In addition to these sources several expositions of his system have been made by his pupils, the best of which is that published by Professor Jameson.

The fundamental principle laid down by Werner in the classification of minerals is their natural affinity which he allows to be founded on the chemical nature of their component parts. These he distinguishes into essential and accidental component parts, of the former of which only does he take notice in his arrangement. The essential component parts are subdivided into predominant and characteristic ones, and generally the characteristic happen to be, at the same time, the predominant constituents. His classes are four—which are founded on what he calls the "fundamental constituent parts," viz., the earthy, saline, inflammable, and metallic, each class being

named after that fundamental constituent part which predominates in and characterizes it. Thus he derives his classes of earths, salts, inflammables, and metals. These classes are subdivided into genera which are founded upon the variety in the component parts of the minerals comprehended in each class, there being as many genera as there are predominating, or at least characteristic constituent parts discovered in their mixture.

Mineralogy is under immense obligations to the Abbé Haüy for his researches respecting the geometrical character of minerals, which were presented to the mineralogical world at the commencement of the 19th century. His labors connected with crystallography gave an entirely new aspect to the science, and communicated to its results a degree of that precision and certainty which belong to geometry. He defines a species in mineralogy to be "an assemblage of bodies, the integrant molecules of which are similar to each other and have the same composition." The following outline of Haüy's system is taken from his "Traité de Minéralogie" (Paris, 1822): Class I. Free acids. Class II. Metallic substances, but destitute of a metallic appearance. This class contains eight genera, namely, lime, barytes, strontites, magnesia, alumine, potash, soda, and ammonia; and to it is subjoined an appendix, consisting of one order characterized by the presence of silex in all its compounds, and which embraces a larger number of species than the whole class to which it is appended. Class III. True metallic substances. This class contains 18 genera, characterized by the different metals. Class IV. Unmetallic, combustible substances.

In proceeding to notice the labors of Professor Mohs, we come to an era in the history of mineralogical science. This naturalist, no less distinguished as a cultivator of the mathematics than of mineralogy, published at Dresden in 1822 his "Grundriss der Mineralogie." His first object is to attempt to fix the exact limits of mineralogy. He then proceeds to develop the science under the following heads: (1) terminology; (2) theory of the system; (3) nomenclature; (4) characteristic; (5) physiography. Under the first of these he explains those properties of minerals which manifest no change, either in the properties themselves, or in the substances which possess them during their observation or examination. They had before been treated of under the denomination of external or physical characters, though, from the stress which had been laid upon chemical characters, the greater part of them had been but very imperfectly determined; and this part of the subject is called terminology, because, besides the general investigation of those properties, it embraces also the

Mineralogy

explanations of the expressions which, for the sake of precision, are used in a determinate and peculiar sense. Decomposed and imperfectly formed minerals, or those which are destitute of several of the properties peculiar to these bodies, are not regarded as suitable objects for the consideration of the science; in which respect they are treated like mutilated, defective, or monstrous plants or animals in botany and zoölogy. And in order to study the productions of the mineral kingdom in their purest state, Mohs takes notice of those properties which belong to minerals occurring in single individuals, separately from those which belong to several individuals of the same quality, formed in a common space, one being the support of, or at least contiguous to the other — of the former of which only does he make use in the determination of the species, while he pays no attention to the properties of minerals composed of individuals belonging to different species (mixed minerals), these last falling within the province of geology.

According to this system, the individual of the mineral kingdom, or the simple mineral, is the sole object of mineralogy, and the natural properties of the simple mineral are the only ones to which, in this science, we ought to direct our attention. Mohs has particularly distinguished himself in treating of that part of terminology which relates to the regular forms of minerals. The fundamental forms, from which he derives all the occurring forms among minerals, are but four in number, namely, the scalene four-sided pyramid, the isosceles four-sided pyramid, the rhombohedron, and the hexahedron; and the geometrical constructions by which he illustrates the simple forms capable of appearing in the individuals of one and the same species, or which may produce combinations with one another, entitle him to the first rank as a crystallographer. But one of the greatest improvements was the establishment of an accurate scale for the degrees of hardness. This was effected by choosing a certain number of suitable minerals, of which every preceding one is scratched by that which follows it, while the former does not scratch the latter; and the degrees of hardnesses are expressed by means of numbers prefixed to the different individuals of the scale. Thus

1	expresses	the	hardness	of	talc;	
2	"	"	"	"	"	gypsum;
3	"	"	"	"	"	calcareous spar;
4	"	"	"	"	"	fluorspar;
5	"	"	"	"	"	apatite;
6	"	"	"	"	"	feldspar;
7	"	"	"	"	"	quartz;
8	"	"	"	"	"	topaz;
9	"	"	"	"	"	corundum;
10	"	"	"	"	"	diamond.

The second general head under which

Mineralogy

mineralogy is developed, according to Mohs, is the theory of the system which contains the reasoning or philosophical part of the science. It determines the idea of the species; fixes the principle of classification; and on the idea of the species it founds, according to this principle, the ideas of the genus, the order, and the class; and lastly, by applying all these ideas to nature, the outline of the system thus constructed is furnished with its contents, in conformity to our knowledge of the productions of nature, as obtained from immediate inspection. The principle of classification consists in the resemblance of natural properties, since in every science the classifiation must rest on such relations as are objects of the science. On the different degrees of resemblance are founded the higher ideas of the theory of the system. An assemblage of species connected by the highest degree of natural historical resemblance is termed a genus; an assemblage of similar genera, an order; of similar orders, a class; and the collection of these ideas conformably to the degree of their generality and applied to the productions of the mineral kingdom constitutes the mineral system. The mineral system is therefore the systematic exhibition of the natural resemblance as observable in the mineral kingdom, or of the connection established by nature among its products by means of this resemblance. For this reason it is called the natural system, because, in fact, it expresses nature in this very remarkable relation.

The third idea of the science as developed by Mohs, is its nomenclature which relates to the connection of its unities with certain words, through which the ideas and representations may be so expressed as to be conveniently applied in writing and speaking. The order is the highest idea expressed in the nomenclature of Mohs, and in the selection of the names of the orders he has invented but two which are entirely new, having employed as many designations from ancient mineralogy as would answer the purpose. The names receive their signification in agreement with the ideas of the orders; thus pyrites embraces the minerals hitherto called by that name. A mineral which may with propriety bear the name of a metal must really be a metal or it must present the properties peculiar to metals. Mica signifies a mineral which may be cleaved with facility into thin, shining laminæ; the order mica therefore contains only such species as present cleavage in a high degree. Thus we have lead glance, augite spar, iron pyrites. The generic name also refers to the properties of the genus, and expresses, as much as possible, some striking feature of its resemblance with other bodies. Such is the name garnet blende. The genus designated by this name belongs to the order blende; the individuals which it contains very often look like garnet. The denomination of the species is produced by the nearer restriction of the generic name by an adjective. The adjective with which the species is designated within its genus is taken from its natural properties, and in general refers to one of those properties of the species which is most useful in distinguishing it from other species of the same genus; hence the systems of crystallization and the relation of the cleavage are the most frequently employed — examples of which are hexahedral, prismatic, rhombohedral, iron pyrites; rhombohedral, octahedral, dodecahedral, prismatic, iron ore, etc.

The terminology, the theory of the system, and the nomenclature form the constituents of theoretical mineralogy according to Mohs' system. Practice, or the application of it to nature, requires the characteristic, the object of which is to furnish us with the peculiar terms or marks by which we are able to distinguish objects from each other, so far as they are comprehended in the ideas established by the theory of the system. In order to find the name of a mineral when its properties are ascertained, we make use of the characteristic, which consists of an assemblage of general ideas corresponding to the system, and expressed by single distinctive marks. With these ideas are connected the names and denominations as far as the nomenclature extends and requires, not above the order nor below the species; and they are by degrees transferred to the individual, in proportion as it enters within the compass of those general ideas. The characteristic is only useful when we have the mineral in our hands, and is not to be studied to obtain a knowledge of the contents of the mineral kingdom, since the characters of its classes, orders, genera, and species, consisting of single marks or properties, are not calculated to produce representations or images of the objects to which they refer. Physiography, the last head of scientific mineralogy, consists of the assemblage of the general descriptions, and is intended to produce a distinct image of minerals. We cannot, by its assistance, find the place of a given mineral in the system, or, in other words, recognize it; for it is independent of that connection among minerals upon which the system is founded. Mohs was the first writer who drew the line between the determinative and the descriptive parts of mineralogy.

This system of Mohs claimed to be a natural system, which rendered mineralogy a science complete in itself; it certainly classified minerals from its own point of view, but how limited was this! Mohs' system was based upon far too narrow a foundation, which was exactly the fault of

those purely chemical systems which preceded it. Mohs' so-called natural groupings were the results of one single idea, whereas, to gain a just view of the mineral world, we must take into account all the points of contact between mineralogy strictly so-called and the allied sciences. The basis of the modern systems of mineralogical classification is to be found in the relations of the elements which constitute the minerals. In order to study these relationships a knowledge of chemistry is clearly essential. But the formation of mineralogical classes is dependent not only on a study of the elements and of their chemical arrangement, but also on a study of the outward form assumed by the minerals, that is, upon their crystallographic shapes. But further, minerals are acted on by, or they themselves exert, an action on light; their densities vary; they are of different degrees of hardness; they are affected by electricity; their fracture is not invariable; their odor, taste, and state of aggregation all vary. To arrive at a just classification of minerals all these points must be taken into account. And this it is that makes mineralogical classification so varied, different observers being led to give differing degrees of importance to the same characteristic; thus in one system the crystallographic form is made the one essential for determining the place of a mineral in the general scheme, in another the chemical composition is all in all, in a third the physical state, and so on; but as we have seen, modern mineralogy more and more tends to regard all these points as important and to form its scheme of classification only after a careful study of them all. To understand aright the science of mineralogy a knowledge of chemicals on which the general divisions of mineral substances are based; of crystallography, by means of which many curious relationships between minerals become apparent; of optics, the laws of which science regulate the color and luster of all minerals; of physics in general, influencing especially the hardness, specific gravity, and fracture of minerals; and lastly, of geology, as a guide to the localities in which minerals occur, is absolutely necessary; and the more we know of these cognate sciences the more able shall we be to understand the teachings of mineralogy.

The general subdivisions in the classification of minerals adopted by Dana in the last edition of his work on "Mineralogy" are as follows:

I.— Native Elements.

Series 1.
1. Gold group. 2. Iron group.
3. Tin group.

Series 2.
1. Arsenic group.
2. Sulphur group.
3. Carbon-silicon group.

Series 3.
1. Chlorine, bromine, iodine group.
2. Fluorine group.
3. Oxygen group.

II.— Compounds.

The more negative element an element of series 2 (above).

1. Binary. *Sulphides, etc., of metals of sulphur and arsenic groups.*
2. Binary. *Sulphides, etc., of metals of gold, iron, and tin groups.*
3. Ternary. *Sulpharsenites. Sulphantimonites. Sulphobismuthites.*

III.— Compounds.

The more negative element an element of series 3, group 1 (above).

Chlorides. Bromides. Iodides.

IV.— Compounds.

The more negative element an element of series 3, group 2 (above).

Fluorides.

V.— Compounds.

The more negative element an element of series 3, group 3 (above).

1. *Oxides.* 2. *Silicates, Phosphates, Nitrates, Borates, etc., etc.*

VI.— Hydro-Carbon Compounds. Minerals of Organic Origin.

Mineral Products, United States. The following is a detailed report on the mineral productions of the United States in the calendar year 1900, compiled by David T. Day, chief of the Division of Mining and Mineral Resources, United States Geological Survey:

PRODUCTS.		1900.	
		Quantity.	Value.
Metallic.			
Pig iron (spot value *a*)	long tons (*b*)	(*c*)13,789,242	$ 259,944,000
Silver, coining value (*d*)	troy ounces	59,610,543	(*d*)77,070,471
Gold, coining value (*c*)	do.	3,837,215	79,322,281
Copper (*f*), value at New York city	pounds	606,117,166	98,494,039

Mineral Products

PRODUCTS.		1900. Quantity.	1900. Value.
METALLIC.			
Lead, value at New York city	short tons (g)	270,824	23,561,688
Zinc, value at New York city	do.	123,886	10,654,196
Quicksilver, value at San Francisco	flasks (h)	28,317	1,302,586
Aluminum, value at Pittsburg	pounds	5,200,000	1,716,000
Antimony, value at San Francisco	short tons	(j)1,750	346,980
Nickel (k), value at Philadelphia	pounds	9,715	3,886
Tin	do.	(*none*)	.....
Platinum, value (crude) at San Francisco	troy ounces	400	2,500
Total value of metallic products			$ 552,418,627
NONMETALLIC (SPOT VALUES a).			
Fuels:			
Bituminous coal (m)	short tons	212,513,912	$ 221,133,513
Pennsylvania anthracite	long tons	51,221,353	85,757,851
Natural gas		.....	23,606,463
Petroleum	barrels (n)	63,362,704	75,752,691
Structural Materials:			
Brick clay		.....	12,000,000
Cement	barrels (p)	17,225,131	13,279,167
Stone (q)		.....	47,958,539
Abrasive Materials:			
Corundum and Emery	short tons	4,305	102,715
Garnet for abrasive purposes	do.	3,185	123,475
Grindstones		.....	701,121
Infusorial earth and Tripoli	short tons	3,615	24,207
Millstones		.....	32,858
Oilstones, etc.	pounds	.....	181,011
Chemical Materials:			
Borax	Refined tons	1,602	170,036
	Crude tons	24,235	848,215
Bromine	do.	521,444	140,790
Fluorspar	short tons	18,450	94,500
Gypsum	do.	594,462	1,627,203
Marls	do.	60,000	30,000
Phosphate rock	long tons	1,491,216	5,359,248
Pyrite	do.	204,615	749,991
Salt	barrels (r)	20,869,342	6,944,603
Sulphur	short tons	3,525	88,100
Pigments:			
Barytes (crude)	short tons	67,680	188,089
Cobalt oxide	pounds	6,471	11,648
Mineral paints	short tons (s)	72,222	881,363
Zinc white	do.	48,840	3,667,210
Miscellaneous:			
Asbestos	short tons	1,054	16,310
Asphaltum	do.	68,429	491,598
Bauxite	long tons	23,184	89,676
Chromic iron ore	do.	140	1,400
Clay (all other than brick)	do.	.....	1,840,377
Feldspar	short tons	21,353	173,659
Fibrous talc	do	63,500	499,500
Flint	do.	32,495	179,351
Fuller's earth	do.	9,698	67,535
Graphite	Crystalline, lbs.	5,507,855	197,579
	Amorphous, tons	611	
Limestone for iron flux	long tons	7,495,435	4,500,000
Magnesite	short tons	2,252	19,333
Manganese ore	long tons	11,771	100,289
Mica	Sheet, lbs.	456,393	92,758
	Scrap, tons	5,453	54,302
Mineral waters	gallons sold	47,558,784	6,245,172
Monazite	pounds	908,000	48,805
Ozocerite, refined	do.	(*none*)	(*none*)
Precious stones		.....	233,170
Pumice stone	short tons	(*none*)	(*none*)
Rutile	pounds	300	1,300
Soapstone	short tons	27,943	383,541
Total value of nonmetallic mineral products		.....	$ 516,690,262
Total value of metallic products		.....	552,418,627
Estimated value of mineral products unspecified (v)		.....	1,000,000
Grand total		.....	$1,070,108,889

a. By "spot" value is meant value at the point of production.
b. Long tons are tons of 2,240 avoirdupois pounds; short tons are tons of 2,000 avoirdupois pounds.
c. Iron ore, 1892: 16,296,666 long tons; value at mines: $33,204,896. 1893: 11,587,629 long tons; value at mines: $19,265,973. 1894: 11,879,679 long tons; value at mines: $13,577,325. 1895: 15,957,614 long tons; value at mines: $18,219,684. 1896: 16,005,449 long tons; value at mines: $22,788,069. 1897: 17,518,046 long tons; value at mines: $18,953,221. 1898: 19,433,716 long tons; value at mines: $22,060,887. 1899: 24,683,173 long tons; value at mines: $34,999,077. 1900: 27,553,161 long tons; value at mines: $66,590,504.

d. Figures of production furnished by the Bureau of the Mint, Treasury Department. Coining value, $1.2929 per troy ounce. Commercial value, 1895: $36,445,000. 1896: $39,665,000. 1897: $32,316,000. 1898: $32,118,420. 1899: $32,858,700. 1900: $36,958,537.
e. Figures of production furnished by the Bureau of the Mint, Treasury Department. Coining value, $20.6718 per troy ounce.
f. Including copper made from imported pyrites.
g. The product from domestic ores only.
h. Of 76½ avoirdupois pounds net.
i. Including aluminum alloys.
j. Includes antimony smelted from imported ores, in 1899, 83 per cent.
k. Including nickel in copper-nickel alloy, and in exported ore and matte.
l. Not reported.
m. Including brown coal and lignite, and anthracite mined elsewhere than in Pennsylvania.
n. Of 42 gallons.
o. Estimated from census returns. Value of clay products in 1894: $64,575,385; 1895: $65,409,806. 1896: $63,110,408. 1897: $62,359,991. 1898: $73,892,884. 1899: Census returns: $95,212,345.
p. Of 300 pounds for natural cement, and 400 pounds for artificial Portland.
q. Not including limestone or iron flux, or grindstones.
r. Of 280 pounds net. The reduced price in 1893 is due to omitting cost of packages.
s. Including metallic paints, ocher, umber, venetian red, sienna, ground soapstone, ground slate, and mineral black.
t. Value of the crude product.
u. Included in asphaltum.
v. Including building sand, glass sand, iron ore used as flux in lead smelting, tin ore, nitrate of soda, carbonate of soda, sulphate of soda, and alum clays used by paper manufacturers.

The remarkable development of the various mining interests is shown in the following values of productions in the calendar years specified:

	1890.	1900.	1908.
Metallic products	$305,735,670	$552,418,627	$549,923,116
Nonmetallic products	312,776,503	516,690,262	1,045,497,070
Unspecified	1,000,000	1,000,000	250,000
Total	$619,512,173	$1,070,108,889	$1,595,670,186

Mineral Tallow, or **Hatchettine,** a remarkable substance found in several places in Great Britan, Germany, Siberia, etc., soft and flexible, yellowish white, yellow, or greenish yellow, resembling wax or tallow, often flaky like spermaceti, inodorous, melting at 115° to 170° F., and composed of about 86 per cent. carbon and 14 per cent. hydrogen. The mineral is closely related to, if it be not identical with, ozokerite or native paraffin. Like other hydrocarbons, such as naphtha, petroleum, asphalt, etc., hatchettine appears to have resulted from the chemical alteration of organic matter.

Mineral Waters, waters so far impregnated with mineral matter as to give them a peculiar taste or smell, and specific medicinal properties. They are usually divided into four classes — carbonetted, or those containing free carbonic acid gas; chalybeate, or those impregnated with iron; saline, containing considerable quantities of neutral salts, as sulphate of magnesia, chloride of sodium, etc.; and sulphurous, or waters containing sulphuretted hydrogen. The sulphurous waters are readily recognized by their disagreeable smell, and their property of tarnishing silver. Artificial mineral waters are frequently prepared in the laboratory in imitation of the natural waters. The term mineral waters is also applied to artificial aërated waters, containing minute quantities of the salts of soda, potash, or lithia. Natural mineral waters are generally connected with recent or extinct volcanoes, and they are most common in volcanic regions. Some are thermal.

The production of mineral waters in the United States during the calendar year 1900 was reported at 47,558,784 gallons, from 561 springs, valued at $6,245,172, Wisconsin, Texas, Massachusetts, New York, Michigan, California, and Minnesota being the largest producing States in the order given.

Minerva (mi-nur'vä), in Roman mythology, the goddess of wisdom and war, the liberal arts, science, and learning. She is reputed to have been the offspring of Jupiter's brain, without a mother. The fable told of Minerva's birth is as amusing as it is unquestionably original. Jupiter having married Metis, became conscious that her progeny, if allowed to come into existence, would have so much intelligence and wisdom that Jupiter himself would be unable to cope with his children. To guard against such an event as the possibility of being eclipsed by his offspring, he devoured Metis before her confinement; when, feeling a violent pain in his head, he sent for the celestial surgeon, Vulcan, whom he ordered to cleave it open, to relieve the anguish he suffered. This surgical operation for the relief of a congested brain the blacksmith accordingly performed; when, to the amazement of the heavenly conclave and the operator also, out of the Thunderer's head flew Minerva, full-grown and ready armed, and by universal acclaim was immediately admitted into the synod of the gods. She is

also called Athena, Pallas, Parthenos, Tritonia, Glaucopsis (Blue-Eyes), Agoræa, Hippia, Stratea, Area, Sais, etc., according to the arts she taught or the functions over which she presided. The serpent, the owl, and the cock were sacred to her; and among the plants, the olive. She was worshiped over all parts of Greece; but her great temple was the Parthenon at Athens, where she was the presiding goddess, and in which fane there was a colossal statue of her, by Phidias, overlaid with ivory.

Minerva Press, the name of a former English printing press; also the name given to a series of ultra-sentimental novels issued at the close of the 18th and the beginning of the 19th century; the name has since been adopted by an American publisher.

Mines, John Flavel, pseudonym FELIX OLDBOY, an American journalist; born in Paris, France, Jan. 27, 1835. Originally a student of theology, he entered the army as chaplain in 1861; but afterward abandoned the ministry, received a commission, and was mustered out as lieutenant-colonel in 1865. He published: "Heroes of the Last Lustre" (1858), verse; "Tour around New York, by Mr. Felix Oldboy" (1888); etc. He died in New York city, Nov. 5, 1891.

Minghetti, Marco (min-get'tē), an Italian statesman; born in Bologna, Italy, Nov. 8, 1818. A conspicuous political figure in his day, he occupied for a number of years the highest positions, and was very influential in the government. He wrote: "Relation of Public Economy to Morality and Right" (2d ed. 1868), his most remarkable work; "Literary and Economic Pamphlets" (1872); "Italian Ladies in the Fine Arts" (1877); "Church and State" (1878); "Raphael" (1885), a biography; "My Recollections" (1888–1891); etc. He died in Rome, Dec. 10, 1886.

Minho. See ENTRE MINHO E DOURO.

Minho (mēn'yō), a river of Spain and Portugal, rising in the N. E. of Galicia, flowing S. W. through the Spanish provinces of Lugo and Orense, and, after forming the boundary between Portugal and Spain, falling into the Atlantic Ocean; total length, 174 miles; it is navigable for small craft 25 miles above its mouth; a bar at the entrance prevents the passage of large vessels. Area of basin, 157,000 square miles. Its chief tributary is the Sil, which joins it from the left.

Miniature Lake George, term sometimes applied to Greenwood Lake, in New York and New Jersey, 40 miles N. N. W. of New York city. It is a favorite resort of health-seekers, sportsmen, and summer tourists.

Miniature Painting, the painting of portraits on a small scale. It originated in the practice of embellishing manuscript books (see ILLUMINATION OF MANUSCRIPTS). As the initial letters were written with red lead (Latin *minium*), the art of illumination was expressed by the Low Latin verb *miniare*, and the term *miniatura* was applied to the small pictures introduced. After the invention of printing and engraving this delicate art entered on a new phase; copies in small dimensions of celebrated pictures came to be in considerable request, and, in particular, there arose such a demand for miniature portraits that a miniature in popular language came to signify "a very small portrait." Soon after their introduction miniature portraits were executed with very great skill in England. Holbein (1495–1543) painted exquisite miniatures, and having settled in London, his works had great influence in calling forth native talent. Isaac Oliver (1556–1617) was employed by Queen Elizabeth and most of the distinguished characters of the time; his works are remarkable for careful and elaborate execution. Samuel Cooper (born in London 1609, died 1672), who was with his brother, Alexander, a pupil of his uncle, John Hoskins, an artist of reputation (died 1664), carried miniature painting to high excellence. Cromwell and Milton sat for him; he was employed by Charles II., and obtained the highest patronage at the courts of France and in Holland. Jean Petitot (1607–1691) was the first to bring to perfection the art of enameling as applied to portraiture. Richard Cosway (1740–1821) was one of the most famous miniaturists of the 18th century. The last famous miniature painter was Sir William Ross (1794–1860), who lived to see his art superseded by photography. The number of his miniatures in existence is said to number over 2,200. Photography may be said to have killed the art, though miniatures have continued to be painted; but enthusiasts hope from the interest now taken in historical specimens that the art may yet be revived. As to technical details, the early artists painted on vellum and used body colors — *i. e.*, colors mixed with white or other opaque pigments; and this practice was continued till a comparatively late period, when thin leaves of ivory fixed on cardboard with gum were substituted. Many of the old miniature painters worked with oil colors on small plates of copper or silver. After ivory was substituted for vellum, transparent colors were employed on faces, hands, and other delicate portions of the picture, the opaque colors being only used in draperies and the like; but during the 19th century, in which the art was brought to the highest excellence, the practice was to execute the entire work with the exception of the high lights in white drapery with transparent colors.

Mineral Wax. See OZOKERITE.

Minié, Claud Etienne (mē-nyā′), a French military officer, inventor of the Minié rifle; born in Paris, France, in 1814. He enlisted in the army as a private soldier and quitted it as colonel in 1858. He devoted his principal thought to the perfecting of firearms, and in 1849 invented the Minié rifle (see RIFLES). In 1858 the Khedive of Egypt appointed him director of a small arms factory and musketry school in Cairo. He died in 1879.

Minim, the popular name of the Minim-Hermits founded by St. Francis of Paola (1416–1507). The rule and dress closely resemble those of the Franciscans, but the life led by the members is in great measure contemplative. They were called Minims by their founder to humble them below the Franciscans, who call themselves Friars Minor. The order consists of monks, nuns, and tertiaries. In medicine, the smallest liquid measure, generally regarded as equal to one drop; 60 minims make one fluid drachm. In music, a time character of the value of two crotchets. In modern music it is second in value to the semibreve now held to be the time standard, but in ancient music it was, as its name implies, of the shortest duration. Morley (" Introduction to Practicall Musicke," 1601) ascribes the first use, if not the invention, of the minim to Philippo de Vitriaco, a musician of the 14th century, who is also credited with the invention of the crotchet. In printing, a small kind of type; minion (obsolete). See MINNOW.

Minimum Thermometer, a thermometer constructed to register the lowest point reached between observations. See THERMOMETER.

Mining, the processes whereby minerals are obtained from their natural localties beneath the surface of the earth, and the subsequent operations by which many of them must be prepared for the purposes of the metallurgist. The art has been practised from the remotest times. The coal mines of England are mentioned as early as 853 and the discovery of the Zwickau coal mines was made in the 10th century. In the 12th century the coal mines at Lüttich began to be exploited and in the 13th century the coal deposits at Newcastle, Wales, and Scotland were discovered. In the course of the 19th century, after the invention of the steam engine and the smelting of iron by means of coal and coke, mining was marvellously developed. Coal has been discovered in Australia, New Zealand, Borneo, China, and Japan. Great Britain has larger deposits than any other country in Europe. Next to these in amount of output are the coal mines of Belgium and France. In Germany those along the Rhine and in Westphalia, and in Saxony, Bohemia, and Schleswig, are of great importance.

The coal fields of the United States cover an area of upward of 200,000 square miles and produce about one-third of the world's supply of coal; Great Britain furnishes another third, while the remainder is produced by the mines of all other countries.

Mineral deposits are found in more or less horizontal or inclined beds or seams, in which the extension is parallel to the stratification of the inclosing rock, as in coal, salt and many iron ore deposits, and in veins or lodes, in which the extension intersects the stratification of the inclosing rock, as in deposits of the metals. In the case of horizontal beds lying parallel to the stratification of the surrounding rocks and below water level a shaft is sunk till the mineral is reached. Machinery is then used to extract the whole of the mineral, due precautions being taken to avoid danger from falls of roof and from noxious gases. In the case of veins or lodes and inclined beds the inclination and change of direction have to be studied. The miner looks unfavorably on vertical veins; for he considers that the chance of their being productive is much less than in inclined ones. In some cases a vertical shaft is sunk, and passages, known as cross-cuts are driven from this to the vein at different levels. A vertical shaft presents the advantages of greater ease in sinking, hauling, and pumping. At the Comstock lode, in Nevada, thousands of dollars were wasted in sinking a perpendicular shaft, the advantages of which were urged with considerable plausibility. A deep shaft may cost from $50,000 to $250,000. In the case of an inclined shaft the ore obtained from the shaft itself enables some of the charges to be recouped. In a well-known Cornish copper mine, Tresevean, after an inclined shaft had been used for many years, a new shaft, 1,800 feet in depth, was sunk at a cost of $100,000; but success had already been assured before this great outlay was contemplated. The best arrangement for an extensive mine is to have a main vertical shaft and several secondary inclined ones. With inclined shafts it is often out of the question to put in the highly-perfected engines used at collieries, the object being not the removal as quickly as possible of large quantities of material, but the exploration of the vein by slow and careful degrees at many points and with a moderate number of men. In the anthracite coal mines of Pennsylvania, however, a large majority of the mines are opened by inclined shafts or " slopes."

In searching or prospecting for mineral deposits large sums of money are spent, sometimes in vain. The surface of the rock is frequently covered by deposits of sand

Mining

and gravel, vegetable matter, vegetation, and in some cases, peat bogs. Many notable mines have been discovered by accident. Thus, the observation of the pellets picked up by birds led to the discovery of veins of gold in Lower Hungary. The famous silver mines of Potosi are said to have been discovered by an Indian, who, taking hold of a bush to prevent his falling, pulled it up the roots and thereby disclosed glittering masses of native silver. Gold was discovered in California by James W. Marshall, in 1848, while cutting a small millrace. In ancient times the search for mineral deposits was based on the indications given by the divining-rod; and there still exist intelligent miners who believe in this curious myth. Prospecting for ores of the heavy metals is carried on generally by surface examination. The "float" or loose ore being discovered in stream beds or in gullies, is traced to its source in the hillsides or places where the bare rock is exposed. As the veins are usually highly inclined, they intersect the surface, and often make prominent ridges. The further exploration, after the finding of the vein, consists in tracing its course on the surface, and in excavations in the vein itself, which often produce sufficient ore to repay the cost of exploration. In the search for horizontal deposits, the best evidence is obtained by putting down bore holes. These are made by various methods, and are put down to a depth of a few feet when required for testing the character of the foundation subsoil, or, in the other cases, to thousands of feet when required in seeking for or estimating the value of deposits of coal, salt, and iron ore. Ages ago bore holes were put down by the Chinese to a depth of 3,000 feet. Recently, in Europe and America, greater depths have not infrequently been attained. A bore hole at Pittsburg, Pa., was sunk to a depth of 4,625 feet. At Schladebach, near Merseburg, the deepest bore hole in the world was put down by the Prussian government in search of coal. The sinking occupied several years (1880–1886) and the depth attained amounted to 5,834 feet.

In order to open up a mine, tunnels or adit levels are driven on the lode or to cut it whenever the contour of the country allows. In the ordinary method of sinking shafts the workmen blast out the rock, and send the excavated material to the surface by means of an engine, rope, and bucket. The sides of the shaft are supported by timbering or walling. An ingenious process of sinking through quicksand was devised by H. Poetsch. This consists in freezing into a solid mass of ice the water contained in that portion of the water-bearing ground which occupies the position of the intended shaft, and then perforating it by hand. This method has proved successful at several Continental collieries and at the Chapin mine in Michigan.

Coal Mines.— The average depth of coal mines before the introduction of the steam engine did not exceed 100 yards; at the present time it must be more than 400 yards. The deepest shaft in Great Britain is that of the Ashton Moss Colliery, near Manchester, which attained a depth of 2,850 feet. The seams dip at the rate of 9 inches a yard so that parts of the workings are 3,000 feet deep. The deepest shaft in the world was till recently that of a silver lead mine in Bohemia, at Przibram, where the Adalbert shaft is 3,432 feet in depth. This depth has, however been exceeded in the Lake Superior copper-mining district, where a number of shafts have reached a depth of 4,000 feet, and one, the Red Jacket of the Calumet & Hecla Co., was in 1897 sunk to a depth of 4,880 feet.

The cutting of a path through the harder rocks, as carried on by the ancient miners, was particularly laborious and unhealthy. The work was executed in confined spaces and a large amount of dust was produced. Miners became subject to disorders of the lungs to which they fell victims at an early age. Previous to the introduction of blasting the implements used were of the nature of wedges and hammers. Bit by bit pieces of rock were broken away, the operation being assisted by natural fissures in the rock and by the brittleness of the hard material. In this way the ancient miners cut coffin-shaped galleries 5 feet in height. At the present time the galleries or levels in ore mines are usually 7½ feet high and 5 feet wide, thus affording facilities for traveling and ventilation. The invention of gunpowder is of much greater antiquity than its application to mining purposes. Curiously enough, it was not applied to mining purposes till the beginning of the 17th century, and even then made its way so slowly that it was not largely employed till the 18th century. Of late years mechanical rock drills driven by steam or by compressed air have come largely into use. The bore hole when finished is then charged. For blasting in soft materials as coal, gunpowder is used enclosed in a little bag of cloth or paper dipped in pitch or other water-proofing material, and provided with a fuse. The fullest benefit of modern explosives such as dynamite, gun-cotton, and tonite, which are used for blasting hard materials, as metallic ores, can be obtained only by the use of strong detonators fired by electricity, by which it is possible to place a number of bore holes in such a manner that when fired simultaneously they shall help one another. While blasting powder continues to be used for removing coal (millions of tons being still obtained by its aid), in order to obviate the danger of explosions in fiery col-

Mining

lieries, many ingenious substitutes for blasting have been proposed. For example, a hole is bored and wedges inserted to force down the coal which has previously been under-cut with the pick. Another plan of great promise is that devised by Smith and Moore, in which cartridges of caustic lime are employed, water being forced into them by a force pump. The pressure of steam generated by the usual charge of seven cartridges is 2,850 pounds, the cartridges themselves expanding to about five times their original size. The efficiency of these cartridges varies with the nature of the coal, the best results having been obtained in the Derbyshire collieries.

Various machines have been invented with a view to lessen the labor and expense of under-cutting coal seams. They work with compressed air or electricity, some on the principle of the reciprocating rock drill, while others have the cutters arranged on the periphery of a rotating disk, or on a traveling pitch-chain. The coal, when broken down, is placed in wagons and drawn by horses, mules, traction rope, locomotive, or trolley, to the bottom of the shaft and raised to the surface.

The actual mode of working the coal, varies greatly in very district. By the post-and-stall, or bord-and-pillar, or room-and-pillar, or (in Scotland) stoop-and-room, method the first stage of excavation is accomplished with the roof sustained by coal; in the long wall method the whole of the coal is allowed to settle behind the miners, no sustaining pillars of coal being left. This when well planned is the safer both as regards facility of ventilation and liability to accidents from falls. At a Durham colliery, working the Harvey seam which is 3½ feet in thickness, 5,185 tons of coal per acre were obtained when working by the longwall system and 5,052 tons when working by the post-and-stall system the total coal in the seam per acre being about 5,345 tons. In thick and highly-inclined beds it is usual to remove the coal by horizontal slices, and to fill the excavation with waste material. In some instances blast-furnace slag has been used for the purpose, but generally enough waste material, such as slate, may be obtained from the coal bed itself. In the Pennsylvania anthracite beds, which are mostly highly inclined, the workmen often work on the coal broken down in driving the "breast" upward; this broken-down coal being drawn off from below at intervals to give the workmen room to work. When the breast has been extended upward to its full length the broken-down coal is all removed. Later when the breasts in one section of the mine are all worked out the sustaining pillars between them are "robbed" or removed, allowing the roof to fall.

In working metalliferous veins horizontal galleries termed "levels" are driven on the lode usually 50 to 100 feet apart. They are rarely perpendicularly above one another, as they follow the inclination of the vein. The levels are connected by means of small shafts, termed "winzes." Represented on a vertical plane, the vein will thus be seen to be cut up into pillars which are worked by the method of "stoping." In underhand stoping, the ore is gradually worked away downward from the floor of one level, the ore and worthless mineral being taken out through the level next below. This method is especially adapted for working any valuable ores, as the loss is small. The overhand method, in which the miners stand on timber platforms and break down the mineral above them, is more economical, so far as cost of excavation is concerned; but the loss of ore is greater than by underhand stoping, and hence it is best adapted for the working of low-grade ores.

The great depth and size of modern collieries necessitate the raising of vast quantities of coal through a single shaft and the winding-engines of modern erection are of extraordinary power. At Harris's Navigation Colliery the engines have cylinders with a diameter of 54 inches and are capable of raising 6 tons of coal, or, with ropes and the cages containing the coal trucks, a total load of 15½ tons at a speed of 32 feet a second; 900 to 1,400 tons are often raised from one pit in a day.

In collieries both coal and men are raised in the cages, but in the metalliferous mines the man-engine is largely used. This consists of a reciprocating rod or pair of rods fitted with steps, by which the miner is raised 8 to 14 feet at a stroke. Though this method obviates the tax on the energies of the men entailed by the climbing of ladders it is not free from danger. Prussian statistics show that where man-engines are employed there are four times as many accidents as where cages and ropes or where ladders are used. At the Épinac collieries in France a costly pneumatic system of raising coal and men is employed. An air-tight wrought iron tube 5 feet 3 inches in diameter, is placed in the shaft and fitted with a piston-cage carrying nine coal wagons. The air being exhausted above the piston, a load of 3 tons of coal is raised at a rate of 95 feet a minute.

In almost all mines the surrounding rock contains water which rapidly accumulates in the workings. Where the contour of the district is suitable the mine is drained by means of an "adit level" or tunnel driven into the hillside. The great Gwennap adit in Cornwall is with its branches 40 miles in length and drains 30 square miles. The Ernst-August adit in the Harz Mountains has a total length of 14 miles and cost £85,-

(2 and 3 by courtesy of "Mining Magazine.")

COAL-MINING SCENES.

1. From Mine to Railway (showing Incline and Breaker). 2. Undercutting by Hand. 3. Undercutting by Electric Chain-Machine.

Mining

500; the Rothschönberger adit at Freiberg in Saxony is 25 miles long. Where adits are unavailable, pumps either of the lifting or forcing type are used. The Cornish pumping engine is a single-acting condensing beam engine working expansively, the cylinders in some cases being as much as 100 inches in diameter. Cheaper direct-acting engines placed underground force columns of water to vertical heights of as much as 1,000 feet. At a silver mine at Klausthal, in the Harz Mountains, a pair of direct-acting rotary engines have been erected, driven by hydraulic power, with a head of 1,959 feet. At 12 revolutions a minute these pumps force 330 gallons of water up 750 feet.

Placer Gold-Mining.— Many deposits of gold ores, as those first worked in California and those of the Klondike, are in the gravel or sand in the present or ancient stream beds. Such deposits are called "placers." In working these deposits in the beds of existing streams, the course of the stream may be deflected by a dam and sluice, and the water of the stream utilized for separating the gold from the gravel which may be dug from the stream bed. In the case of larger streams, mechanical dredges remove the material from the bottom, which after separation of the gold is returned to the stream bed. In the old placers which are abandoned stream courses, generally above water level, hydraulic mining is resorted to. A stream of water from 6 to 12 inches in diameter and under the pressure caused by a head of several hundred feet is directed on the hillside where the old placer outcrops and rapidly washes it away. The material thus removed is sorted by the same water and the gold separated.

Ventilation.— The ventilation of subterranean workings is a problem of the greatest importance. The air is contaminated by the respiration of men and horses, by the combustion of lights, by the smoke of explosives, and by deleterious dust. In collieries, the insidious fire-damp or carburetted hydrogen exudes from the coal and mingled with the air forms the explosive mixture to which so many miners owe their death. The ventilating current must be sufficient to dilute this mixture below the firing point and to sweep it away. The general mode of ventilating a colliery is to have two shafts — a "downcast" and an "upcast." The pure air entering by the downcast shaft traverses the roadways of the colliery. By means of doors and stoppings, the current is caused to travel in the required direction so as to reach the innermost workings of the mine. It then passes to the upcast shaft and returns to the surface. The motion of the air current is caused by furnaces at the bottom of the upcast shaft, the air in which it heats and causes to expand, or by mechanical ventilators or fans, so that as much as 120,000 to 250,000 cubic feet of air may pass through the shafts in a minute. Thus the vitiated air is withdrawn from the colliery by the exhausting action of centrifugal fans, which may be made either of large diameter to run at low velocity or of small diameter to run at high velocity. At several important collieries these fans attain enormous dimensions, in some cases as much as 45 feet in diameter and 14 feet in width. In many metal mines the compressed air supplied to run the rock drills serves also to ventilate the mine.

Almost as important as ventilation in relation to the safety of human life is the accurate construction and the preservation of mine plans. In many cases the plans were laid down without any reference to the phenomenon of the variation of the magnetic needle. Trusting to old plans constructed in this way, the miner may drive straight into old workings filled with water, the tapping of which would be death to all employed in the colliery. Hence surveying by means of the transit instrument is now usually resorted to, and the surveying very accurately performed.

The progressive legislation in connection with mines has proved beneficial in diminishing the proportion borne by the accidents to the number of miners employed. Great improvements have recently been made in sinking shafts, safety lamps, underground haulage, coal-cutting machinery, worked by compressed air and electricity, and pumping apparatus. Better methods of sorting, picking, and washing coal have been adopted. Good progress has also been made in the application of steel girders as props and bars, and in reducing the cost of coal consumed at collieries. By means of forced draught and better mechanical stoking much coal practically unsaleable has been utilized to great advantage. But by far the most appreciable good that has been done in connection with mining in recent years has been the scientific investigations respecting the causation and prevention of explosions in coal mines, and improved means recommended and adopted to diminish, if not minimize, these disasters, where many lives have been lost and much valuable property has been destroyed.

In England and Ireland the crown has the right to all mines of gold and silver; but where these metals are found in mines of tin, copper, iron, or other baser metal, then the crown has only the right to take the ore at a price fixed by statute. In Scotland gold mines belong to the crown without limitation, and silver mines when three-halfpence of silver can be extracted from the pound of lead. As a general rule,

in the United States as well as in Great Britain, whoever is the owner of freehold land has a right to all the mines underneath the surface, for his absolute ownership extends to the center of the earth; but under special grants and contracts it is not uncommon for one person to be owner of the surface of the land and another to be owner of the mines beneath; or several persons may be owners of different kinds of mines lying one above the other in different strata. On the public lands of the United States, a title or license may be obtained by any citizen from the general land office at Washington, at the rate of $5 per acre of surface preëmpted; no royalty is paid, but the claim must be worked in accordance with both local regulations and with the general mining laws, which prescribe as one condition the performance of a certain amount of work annually. If this condition is not fulfilled, the mine may be "denounced" and any other person may secure the claim.

AMOS P. BROWN.

Minister, in politics, one to whom a sovereign intrusts the direction of affairs of state. In France, Italy, Belgium, etc., the heads of departments in the State are so called, and the collective name ministry is applied to all of them. In England, the individual members are not so designated, but the collective name is retained. A British ministry is, in fact, a committee of the leading members of the two Houses. It is nominated by the crown, but consists exclusively of statesment whose opinions on the pressing questions of the time agree in the main with those of the majority of the House of Commons. Some eminent party leader, who has the confidence of the House of Commons, is authorized by the sovereign to form a ministry, the members of which he selects from his party, or from those favorable to his policy, he himself being the prime minister, and taking commonly the office of First Lord of the Treasury. Those of the ministers who are peers sit in the House of Lords, the others sit in the House of Commons, in virtue of being elected members, which is indispensable. When the House of Commons, by a decisive vote on a test question, shows that it no longer approves of the policy of the cabinet, the ministers are expected to resign and make way for a new cabinet. A foreign minister is a person sent from one government to another, and accredited to the latter, in order to transact public business in the name of his government. In ecclesiology, in most of the Reformed Churches, a pastor of a church, chapel, or meeting house.

Minium, the red oxide of lead, often designated red lead and commonly used as a pigment for ordinary purposes.

Miniver, the Siberian squirrel, which has fine white fur; also the fur itself.

Mink, a popular name for several species of the genus *Putorius,* which are found in the N. parts of both hemispheres, and are valuable as fur-producing animals. *P. lutreola* is the European, and *P. vison* the American mink. The body is stouter than that of a stoat or weasel, and from 15 to 18 inches long. The color varies from dull yellowish-brown to dark chocolate brown; the upper lip is usually white in the European, dark in the American species. The scent glands are well-developed, and their secretion is only second in offensiveness to that of the skunk. It is aquatic in its habits, and feeds chiefly on fish and amphibious animals, preying largely also on smaller mammals. In the United States the mink is domesticated and trained as a rat-catcher.

Minneapolis, a city of Minnesota, the largest in the State, and county-seat of Hennepin co., of which it is the only municipality of importance. It is situated on both banks of the Mississippi river, at the falls of St. Anthony, its eastern limits meeting those of St. Paul. Fort Snelling, a United States military post, situated on a high bluff overlooking the gorge of the Mississippi and the valley of the Minnesota, is equidistant by way of the Mississippi river from the two cities. Minneapolis is 1,332 miles by rail from New York, 2,224 miles from San Francisco, and 1,335 miles from New Orleans. The Mississippi divides it into two unequal parts, the larger one being on the W. side, and the smaller one on the E. side of the river. Included in the city are several islands lying in the river, of which the two largest are Nicollet and Hennepin islands, opposite the center of the city and near the famed St. Anthony falls. The length of the city is about 10 miles from north to south, its width about 6 miles, and its area 53.3 square miles. Its population by census of 1910 was 301,408.

Approaches and Bridges.—The city is entered by ten great railways, among them being the Great Northern; the Burlington Route; the Northern Pacific; the Chicago, Milwaukee, and St. Paul; the "Soo" line (Minneapolis, St. Paul, and Sault Ste. Marie) with its Canadian Pacific connection; the St. Paul, Minneapolis, and Omaha (the Northwestern), and the Chicago Great Western, besides their numerous branches and divisions. The larger part of the passenger traffic is handled at the union passenger station, a substantial brick structure at the foot of Hennepin and Nicollet avenues.

The two halves of the city are united by eighteen bridges thrown across the Mississippi and its various channels. Of these, ten are highway bridges owned and con-

Minneapolis

trolled by the city, with an aggregate length of over two miles, and eight are used by the railroads. The Steel Arch bridge spans the western channel of the Mississippi from Bridge square, at the foot of Hennepin and Nicollet avenues, to Bridge street, on Nicollet island. It is 530 feet long, and consists of two spans of 258 feet each. Its width is 80 feet, consisting of a roadway 56 feet wide, and two sidewalks, each 12 feet wide. It is the main thoroughfare between the east and west sides of the city, and over 4,000 teams cross it daily. The two most notable railway bridges are High bridge, which crosses the deep gorge of the Mississippi at a height of 100 feet or more above water, and the Stone Arch bridge, which spans the river immediately below the falls of St. Anthony across Hennepin island, forming a graceful curve in front of the flour mills. Besides the Mississippi river bridges, there are about 50 smaller bridges at railroad crossings and over various creeks which flow into the Mississippi.

Natural Features.—Minneapolis is singularly rich in rivers, creeks, waterfalls, and lakes. The Mississippi river intersecting it is about 1,200 feet wide. Above the falls, its placid surface is covered with log booms that serve to prevent the floating logs of the drive from being carried past the city; below the falls, the river dashes off in furious rapids for half a mile, and then courses for miles between high and exceedingly picturesque cliffs. Fine views of this gorge may be had from half a dozen bridges. The best view of the St. Anthony falls may be obtained from incoming trains from St. Paul as they pass over the Stone Arch bridge; but the stranger, who has pictured them in his mind as a seething torrent plunging over a wild precipice, will be disappointed, for they have been tamed and subdued to the purposes of man, and their destruction has served as the foundation for the building of a great city. The water power which they furnish, amounting in the upper and lower dams to 40,000 horsepower, is to this day the nucleus of the greatest manufacturing industry in the Northwest. The vertical descent of the falls is about 50 feet; with the rapids below, the total height is 85 feet; and the available fall of water is 68 feet. Minnehaha creek flows in an easterly course just above the southern boundary of the city. It is an outlet of Lake Minnetonka, which lies some ten miles to the southwest of the city, and whose shores are dotted with the summer homes of the city's residents. After draining several lakes in a devious course of 25 miles, and just before it empties into the Mississippi, the Minnehaha creek plunges over a cliff 50 feet high, forming the Minnehaha falls, immortalized by Longfellow. Bridal Veil falls is a beautiful little cascade, formed by a small stream which leaps over the Mississippi cliffs on the E. side of the city, just above the Franklin avenue bridge. Of the numerous lakes within the city limits, the largest are the following: Sandy Lake, on the extreme N. of the E. side; lakes Cedar, Isles, Calhoun (or Mendoza), and Harriet in the S. W. part of the city; lakes Rice and Amelia in the S., and Powder Horn Lake in the south central part.

Parks.—Closely connected with its watercourses and lakes is the park system of Minneapolis, one of the finest in the world. Besides a number of small neighborhood parks, ranging in size from a fraction of an acre to several acres, there are large parks in the outskirts of the city, connected with one another and with the more centrally located larger parks by an elaborate system of driveways and boulevards, which partly skirt the lakes and the gorge of the Mississippi. The total area of the parks is about 1,800 acres, and the length of the driveways aggregates 35 miles.

The center of the park system is Loring park (36.3 acres) and the Parade (87 acres), recently acquired and improved as a recreation field. W. and S. W. from Loring park extends Kenwood parkway, a broad avenue with walks and double rows of trees on either side, beautiful with here and there a flower-bed or ornamental shrubbery. At its southern end it connects with the boulevard that completely encircles the charming little Lake of the Isles, and continues in a southerly direction to Lake Calhoun, which is half encircled by it along its northern, eastern, and southern shores. S. E. of Lake Calhoun is Lakewood cemetery, which contains several hundred acres of land, and S. of this lake is Interlachen park (25.5 acres). A short distance farther S. is Lake Harriet, N. and E. of which is Lyndale park (61.3 acres), and around which extends the most beautiful part of the park system. From Lake Harriet the parkway follows first a southeasterly and then an easterly course, winding a great part of the way along the shores of the Minnehaha creek, crossing it now and then, and approaching it or diverging from it according to the formation of the ground. At Minnehaha falls the parkway reaches the Minnehaha State park (139 acres), which contains a small zoölogical collection, and adjoining which is the Minnesota soldiers' home, embracing a tract of 51 acres that is being converted into a park. From this point the boulevard extends along the summit of the Mississippi river cliffs to Riverside park (19.8 acres), about a mile below the St. Anthony falls. Crossing the river by the Franklin Avenue bridge, connection is made with the parkway on the eastern bank, which extends from that point to the University Campus. The whole area embraced

Minneapolis

in the river bank parks and parkways is over 700 acres and is designated the Mississippi park. There are a number of outlying parks and boulevards that do not yet form a part of the main system. Of these the most important are Farview park (20.8 acres), in the northern part; Glenwood park (57.1 acres), N. of Cedar Lake, near the western limit; Powder Horn park, in the south central part; and Columbia, Windom, Logan, and Van Cleve parks on the E. side of the river.

Streets.—The streets of the two halves of the city are entirely distinct. Excepting the thoroughfares in the vicinity of the river, the streets generally run E. and W., and are known by number, while the avenues have a general N. and S. direction, and are known by name. Washington avenue, on the W. side, runs parallel with the river from the northern limits of the city to 21st avenue S., and is 100 feet wide through the greater part of its course. At its intersection with Nicollet and Hennepin avenues is the business center. Both of these avenues begin at Bridge square, the former taking first a southwesterly course to Grant street, and thence a due southerly direction to the city limits, while Hennepin avenue extends from N. E. to S. W. as far as Lakewood cemetery. Nicollet avenue is, in its upper part, crowded with the fashionable retail stores, and Hennepin avenue contains some of the largest office buildings. The latter is the dividing line between the "north" and "south" thoroughfares. One of the longest streets in the city is Lyndale avenue, which extends all the way from the northern to the southern limits. University avenue, on the E. side, forms part of a direct drive to St. Paul, and is 120 feet wide in its southern section. Among the more fashionable residential streets are Oak Grove (west 17th street); Clifton avenue, Groveland terrace, Mount Curve avenue, Vine place, and Park avenue.

Buildings.—Many of the public buildings are Romanesque in their leading features, but pure types of any period or style are wanting. The court-house and city-hall is the most notable public building. It occupies an entire block, surrounds a large open court, and is surmounted by a tower which offers a fine view of the city from a height of 345 feet. Within its front entrance is an heroic figure, the "River God," by Larkin G. Mead, said to have been carved from the largest piece of marble ever taken from the Carrara quarries. The building has cost $3,000,000. The public library building is a handsome Romanesque structure, with large arched windows, elaborately carved casements, magnificent stairways, and ornate façade. The Pillsbury library, which is the east side branch of the public library, is also housed in a fine building. The Auditorium, completed in 1904, has a frontage of 110 feet, a depth of 220 feet, and a seating capacity of 2,500. It contains a magnificent organ, the fourth largest in the country, with about 4,000 pipes and 140 stops. The Masonic temple is said to be the handsomest structure of its kind in the N. W. Among church edifices, the Westminster (Presb.), the Church of the Redeemer (Univ.), Wesley (Meth.), and the First Baptist are notable. There are a large number of handsome modern buildings devoted to industry, commerce, and finance, as well as to hotel and club purposes. Among private residences, the home of Senator Washburn ("Fair Oaks") is the most conspicuous. There are hardly any tenement houses, the poorer classes generally living in small detached houses. The poorest quarter of the city is the W. side flats, a narrow strip of lowland at the base of the cliffs along the river. It is occupied by poor foreigners, who crowd its shanties. Some 20 years ago a limit was established about the business district beyond which saloons are excluded. The sale of liquor in residence districts is thus prevented.

Churches, Charities, Newspapers, etc.—There are about 200 churches of all denominations, with a membership of about 73,000. There are numerous benevolent societies, including orphan asylums, homes for children, women, and the aged, one city and several other hospitals, etc. Four general daily newspapers (including one Norwegian) are published, and there are a considerable number of weekly and semi-monthly publications, besides the trade and market reporters, some of which are published daily. The leading theaters are the Metropolitan opera-house, the Lyceum, the Bijou, the Orpheum, and the Unique. There are a number of musical societies, including a symphony orchestra. The Minneapolis and the Commercial clubs are the leading men's clubs. The latter has a membership of 1,200, and besides maintaining club quarters for social purposes, is the leading public organization of the city.

Education.—At the head of the educational institutions stands the University of Minnesota, a State institution founded in 1868, and one of the largest universities in the country. Its grounds comprise about 60 acres lying between University avenue, on the lower east side, and the Mississippi river from 11th to 18th avenues, and command a fine view of the city. On the campus are a statue of ex-Governor Pillsbury and a bronze statue in memory of the university students who died in the Philippines. The largest buildings are Pillsbury hall, 245 feet long, containing museums and laboratories for geology, mineralogy, botany, and zoology, the chemistry and physics buildings, and the library and administra-

tion building. The university consists of a college and schools of engineering, mines, agriculture, law, and medicine, besides a graduate department. The school of medicine also includes homeopathic, dental, and pharmaceutical departments. The total number of students is over 4,000. The library has about 95,000 volumes. The value of the land and buildings is about $3,000,000, the permanent fund is $1,369,000, and the annual expenditure is about $460,000.

Other institutions of higher or special education are the Norwegian-Lutheran Augsburg Seminary; the denominational colleges at Hamline and Macalester, which are largely supported from Minneapolis, though situated in St. Paul suburbs; the school of fine arts, which has about 250 students and is conducted, under the auspices of the Minneapolis society of fine arts, in the public library building; and two privately conducted conservatories of music with several hundred students—namely, the Northwestern Conservatory of Music and the Johnson School of Music, Oratory, and Dramatic Art.

The public school system consists of 4 high schools, with about 4,200 pupils, and 56 elementary schools, with over 900 teachers and 40,000 pupils. Manual training constitutes an essential element of instruction in both the high and the elementary schools, and text-books are free. The total expenditure is about $1,200,000 annually. The Roman Catholic parochial schools, which include some high schools, are attended by about 4,000 pupils, and there are also some private schools, as well as six commercial schools of high standing. There are numerous kindergartens, some being supported by church organizations, others by secular societies, and four by the municipality.

The largest library in the city is the public library, with about 160,000 volumes and several branches and reading-rooms. There are a number of special libraries maintained by the county medical society, the Academy of Natural Science, which also maintains a natural history museum, the Augsburg Seminary, the teachers' association, etc.

Industries.—Minneapolis is the foremost manufacturing city of Minnesota and the entire N. W. Over one-third (36.1 per cent.) of the entire manufacturing capital of the State is invested in Minneapolis establishments, and nearly two-fifths (39.5 per cent.) of the entire industrial output of the State are produced in the city. The water-power supplied by the St. Anthony falls and its favorable geographical situation have combined to make Minneapolis the foremost flour-milling and lumber-producing city in the world. The flour output has grown from 6,989,000 barrels in 1890 to 10,582,000 barrels in 1895, 15,083,000 barrels in 1900, 13,635,000 in 1904, and about 16,000,000 at the present time. There are 22 flour mills with a total daily capacity of 84,325 barrels, the largest of these mills being known as the Pillsbury A and B, with a daily capacity of 15,650 and 6,965 barrels respectively, and the Washburn A and C, with a daily capacity of 10,337 and 8,560 barrels respectively. The tendency to consolidation has resulted in the control of 18 of the largest mills by three more or less affiliated companies, the remaining four mills being owned by four independent companies. According to the census of 1905 the flour mills employed in that year $19,489,000 of capital and 2,227 wage-earners, who received $1,404,000 in wages, the cost of materials having been $56,083,000, and the value of the product $62,754,000. With the extension of the tributary wheat area, the flour-milling industry of the city is constantly extending. On the other hand, the lumber industry is shrinking, owing to the reduction of the forest area of the north. The first little sawmill near the falls was erected in 1822 for the use of Fort Snelling. In 1848 the first private mill was put in operation. Nowadays the sawmills occupy the river bank for a distance of between two and three miles above the falls, and with the extension of the industry water-power has been largely displaced by steam. The output of the mills has been 343,600,000 feet of lumber in 1890, 479,100,000 feet in 1895, 501,500,000 feet in 1900, and 386,900,000 feet in 1904. In 1905 there were 33 lumber and planing mills with a capital of $9,541,000, employing 4,419 wage-earners, who received $2,235,000 in wages, using materials valued at $5,124,000, and turning out a product valued at $9,961,000. The other leading industries are: Railroad-car and repair shops, flour barrels, furniture, furs, malt liquors, drugs and medicines, printing and publishing, and structural ironwork. The flour-barrel industry is of especial interest, owing to the fact that most of it is carried on in half a dozen coöperative shops employing about 400 men, with an aggregate capital of about $150,000. The first of these shops was organized in 1874. The general principle of organization is equal shareholding in the capital stock and apportionment of profits in proportion to work done. The industrial growth of Minneapolis since 1880 is shown in the following table:

Year	Number of Establishments	Capital	Wage-Earners	Wages	Cost of Materials Used	Value of Products
1880	401	$9,003,000	5,344	$2,582,000	$24,275,000	$29,973,000
1890	2,723	42,644,000	23,703	11,675,000	54,592,000	82,923,000
1900	2,368	57,708,000	26,608	12,709,000	78,176,000	110,943,000

Minneapolis

The special United States Census of Manufactures for 1905 was confined to factories proper, thus excluding neighborhood industries and hand trades. Compared with the corresponding figures for 1900, the results are shown in the following table:

Year	Number of Establishments	Capital	Wage-Earners	Wages	Cost of Materials Used	Value of Products
1900	789	$50,177,000	19,620	$9,383,000	$68,910,000	$94,408,000
1905	877	66,700,000	21,752	11,460,000	89,086,000	121,593,000
Per cent. increase	11.2	32.9	10.9	22.1	29.3	28.8

Commerce.—Minneapolis is one of the greatest wheat and produce markets in the world. The annual receipts of wheat approximate 100,000,000 bushels, and of other grains about half as much. The total grain receipts for 1906 amounted to over 120,194,000 bushels. All grain arriving in the city is inspected by deputies of the State grain inspector. Some two score terminal elevators within the city have a storage capacity for 40,000,000 bushels, the largest of these being the St. Anthony No. 2, with a capacity of 2,500,000 bushels. Built of wood and faced on the outside with iron, these vast structures have a somber aspect. As a fruit market, Minneapolis is second in the West only to Chicago, the receipts being far in excess of 115,000,000 pounds annually. Live-stock, oil-cake, and linseed oil are other important shipments. The wholesale trade in agricultural implements, hardware, dry goods, groceries, etc., exceeds $200,000,000 annually. There are 16 National and State banks, four savings banks, and three trust companies. The banks have, in capital and surplus, $12,000,000. The deposits of the commercial companies aggregate $52,000,000, and those of the savings banks and trust companies $22,000,000. The bank clearings have grown from $125,477,000 in 1885 to $372,895,000 in 1895, $912,442,000 in 1905, and $990,890,000 in 1906.

The street railways are directly connected with those of St. Paul, being operated as one system by the company in control. Their aggregate length is over 300 miles, electricity being the exclusive motor power.

Administration and Public Interests.—The administration of the city is carried on by the mayor and other officers, a council, and several boards and committees. The mayor, comptroller, treasurer, and members of the council are elected directly. The mayor has little direct appointive power. He is the virtual head of the police. The council is composed of two aldermen from each ward. It may override the mayor's veto of any ordinance by a two-thirds vote. The various boards for the administration of libraries, schools, parks, charities, etc., are mainly elective. The municipal court tries cases of misdemeanor and civil suits involving sums under $500. The annual expenditure is about $4,000,000, and the bonded debt was $9,384,000 in 1906. The water works are owned by the city, the supply being obtained from the Mississippi. The daily consumption of about 20,000,000 gallons is only about one-third the capacity of the works. The health of the city is exceptionally good owing to the dry climate, this being in fact a health resort for consumptives; and notwithstanding the necessarily high mortality of these invalids, its general death-rate is one of the lowest among large cities, having been 7.38 per 1,000 in 1905 and 8.47 in 1906.

History and Population.—In 1680 the falls of St. Anthony were visited and named by Father Hennepin. In 1805 Lieut. Z. M. Pike obtained from the Sioux Indians a grant of land about the falls for the United States Government. This became a military reservation, and Fort Snelling was erected in 1819. In 1838 the territory on the E. bank of the Mississippi was thrown open for settlement, and in 1849 also the territory on the W. bank. The older settlement, incorporated in 1855, was named St. Anthony, and the younger settlement was incorporated in the following year and named Minneapolis (from the Sioux *minne*, water, and the Greek *polis*, city). After 1855, when Congress first granted the right of preëmption, Minneapolis rapidly increased in population and wealth, and soon outgrew the older settlement. The two cities were consolidated in 1872, and in 1881 the legislature passed an act consolidating all previous enactments into what was practically a new charter. The prosperity of the city was marred by no untoward accident, excepting an explosion that occurred in 1878 in the Washburn A mill, in which fourteen men lost their lives.

The population of St. Anthony was 538 in 1850. The combined population of the two towns was 5,849 in 1860, and 18,079 in 1870. Since consolidation the population has grown as follows: 1880, 46,887; 1890, 164,738; 1900, 202,718; 1905 (State census), 261,974; 1906 (Fed. estimate), 273,825. In 1900 the population consisted of 103,122 males and 99,596 females. Negroes numbered 1,548, and the foreign-born 61,021, or 30.1 per cent. of the total population. The latter included 33,040 Scandinavians, 7,343 Canadians, 7,335 Germans, 3,334 English and Scotch, 3,213 Irish, 2,099 Austrians and Hungarians, 1,929 Russians, and the rest were Poles, Italians, and of various other nationalities. The death-rate averages about 9 per 1,000.

Revised by CHARLES H. HAMBLIN.

Minnehaha, Falls of, a beautiful cascade in the Minnehaha river near Minneapolis, Minn. The word Minnehaha is said to mean in the Indian language "laughing water." The cascade falls 60 feet into a most picturesque glen which opens on the Mississippi river. Longfellow has immortalized the name in his Indian maiden, the principal character in the poem "Hiawatha."

Minnequa Springs (min'-), chalybeate sulphur waters in Bradford co., Pa., containing carbonates of soda, magnesia, and lime, chlorides of sodium, potassium, sulphate of lime, oxide of iron, and alumina, sulphur, organic matter, carbonic acid, etc.

Minnesingers, a class of German lyric poets of the twelfth and thirteenth centuries, so called because love was the principal theme of their verse. The cradle of German lyric poetry was Austria, and more especially upper Austria. The earliest German poetry was chiefly narrative, whether celebrating past events or present occurrences; but gradually it passed into the lyric pure and simple. Early examples of this transition are seen in the oldest extant poems of Dietmar von Eist (1143-70) and others. But the development of German poetry was greatly hastened by the influence of the French poetry of the same class, which at that time flourished in Champagne and Flanders. The immediate effects of this French influence were greater strictness and variety in the versification, a greater preponderance of the subject of love, and a more purely lyrical treatment. Chivalry was a source of inspiration to the minnesinger, as it also was to the troubadour (*q. v.*). The significance of the word *minne* (love) was realized in the ordinary sense by the common people; but the poets who sang it gave to love higher meanings than the popular mind had grasped.

The poet afterwards regarded by the minnesingers as the true father of their art was Heinrich von Veldeke of Westphalia. The other chief minnesingers of the second half of the twelfth century were Heinrich von Morungen, the Saxon; Friedrich von Hausen, a Franconian from the Rhine; Hugo von Salza, the Thuringian; the semi-mythical Heinrich von Ofterdingen; and the two Suabians Heinrich von Rücke and Ulrich von Gutenberg. The thirteenth century witnessed the highest cultivation of the minnelied, and also the beginning of its decay. Its greatest masters were Walther von der Vogelweide, Wolfram von Eschenbach, Gottfried von Strassburg, and Hartmann von Aue. The German lyrists were distinguished from the French by the greater attention they gave to subjects other than love. They devoted their verse to three main objects of praise—women, God, and their masters.

All the poets just mentioned flourished in the early part of the thirteenth century. Among the more conspicuous of their successors were Otto von Botenlaube, Ulrich von Singenberg, Gottfried von Neifen, Walther von Metz, and Ulrich von Liechtenstein. Before the close of the century the muse of lyric poetry seemed to have fled from Germany. After the art had ceased to be practised by the minnesingers, it was taken up by the artisans of the towns under the name of meistersingers (*q. v.*).

The minnesingers were knights, or at least men of good family, who lived and sang at the courts of princes. After the fashion of the Provençal troubadours, the minnesingers engaged in poetical contests for the gratification of princes and ladies of the courts. Some among them were poor, and earned their living by reciting their songs from court to court; but most of them sang for pleasure when their swords were unemployed. Many princes played the part of minnesingers. This poetry, essentially chivalric, breathes the romantic spirit of the age. Every poet sang his compositions, accompanying himself. Traveling minstrels, who made a trade of singing these lyrics, learned them from the authors, and went from castle to castle repeating them, even carrying them far beyond the boundaries of Germany. In some cases, in order to assist their memory, the traveling minstrels wrote down the songs that they had thus learned from the minnesingers, and to those minstrels we owe many extant manuscripts.

Minnesota, a State in the North Central Division of the North American Union; bounded by Manitoba, Ontario, Lake Superior, Wisconsin, Iowa, North Dakota, and South Dakota; admitted to the Union May 11, 1858; number of counties, 82; area, 79,205 square miles; pop. (1900) 1,751,394; (1910) 2,075,708; capital, St. Paul.

Topography.—The surface of Minnesota is undulating, with no mountains, but having a broad low elevation in the N., 280 miles in length. This elevation constitutes the watershed for three great basins, the Mississippi, the St. Lawrence, and the Hudson bay. This elevation is about 1,000 feet above the S. of the State, toward which it descends in a gradual slope. There are several elevated plains W. of the Mississippi, of which the Coteau des Prairies and the Coteau de Grand Bois are the most extensive. The principal river system is the Mississippi, which has its source in this State. The principal affluents of this river are the Minnesota, the Root, Zumbrota, Cannon, Crow Wing, Willow, St. Croix, and Rum. The Red river of the North forms over half the W. boundary line of the State and is fed by the Buffalo, Wild Rice, and Red Lake. Many small streams flow into Lake Superior, and several discharge into Rainy Lake river and the chain of lakes running along the N. boundary.

Minnesota

The State has numerous large lakes, including Red Lake, Leech, Mille Lacs, Vermillian, Big Stone, Traverse, Otter Tail, Itasca, and Winnebegoshish. The Mississippi river has numerous beautiful waterfalls, the largest being the Falls of St. Anthony, and the cascade of Minnehaha.

Geology.—The rocks of the N. and S. E. portions of the State are of Lower Silurian origin, and the river valleys are underlaid by magnesium limestone. The lake shore is principally of metamorphic origin, with schists, alternating with sandstone, basalt, and occasional drift deposits.

Soil.— The soil is of alluvial deposit of great richness, and especially adaptable to wheat-growing. It is a rich loam from two to five feet in depth. The top covering of the land known as "black dirt" is due to the residuum of prairie fires and accumulations of decayed vegetation. The climate is less rigorous than usual in such latitudes. The winters are long, and the temperature even, with but little snow. The principal forest trees are the oak, beech, elm and maple; spruce, pine, and other coniferous trees; elm, ash, birch, linden, basswood, butternut, wild plum, and crab apple.

Mineralogy.—The N. E. portion of the State is known as the mineral region and is quite rich in mineral resources. The State ranks second in the United States in its iron production, with an output in 1899 of 8,161,289 long tons, valued at $9,924,853. Considerable copper and plumbago are found near Lake Superior, and coal is found in the N. W. The building stones included in 1899, granite, valued at $159,959; sandstone, valued at $294,615; and limestone, valued at $496,462.

Agriculture.—The fertility of the soil, the extent of country, and abundance of water, make Minnesota an ideal agricultural State. The farm crops in 1900 were, wheat, 51,509,252 bushels, valued at $32,450,829; oats, 41,907,046 bushels, valued at $10,057,691; corn, 31,794,708 bushels, valued at $9,220,465; hay, 1,423,344 tons, valued at $9,892,241; potatoes, 8,636,058 bushels, valued at $2,590,817; barley, 7,275,251 bushels valued at $2,764,595; rye, 1,036,444 bushels, valued at $435,306; and buckwheat, 143,460 bushels, valued at $81,772.

Manufactures.— According to the Federal census of 1900 the State had 11,114 manufacturing establishments, employing $165,832,246 capital and 77,234 persons; paying $32,484,825 for wages and $173,425,615 for materials, and yielding products valued at $262,655,881. The principal articles were flour ($83,877,709); lumber ($43,585,161); packed meat ($7,810,555), and railroad cars ($6,319,876).

Banking.—On Oct. 31, 1901, there were reported 97 National banks in operation, with $12,333,000 in capital, $4,574,082 in outstanding circulation, and $4,299,600 in United States bonds. There were also 208 State banks with $6,865,240 capital and $1,137,978 surplus; 49 private banks, with $717,907 capital and $165,629 surplus; 49 trust and loan companies, with $1,971,300 capital and $65,052 surplus. The exchanges for the year ending Sept. 30, 1901, at the United States clearing houses at Minneapolis, and St. Paul, amounted to $824,381,719, a decrease from those of the preceding year of $7,324,166.

Education.— In 1900 the children of school census age numbered 506,770; the enrollment in public schools 399,207; and the average daily attendance 243,224. There were 10,586 teachers, 7,303 public school buildings, and school property valued at $16,101,029. The receipts for the previous year amounted to $5,716,474 and the expenditures $5,630,013. For higher education there were 112 public high schools, 29 private secondary schools, 5 public, and 2 private normal schools, 9 colleges and universities for men and for both sexes, and the Albert Lea College for Women. Among the more noted colleges are the University of Minnesota, at Minneapolis; Hamline University, at St. Paul; St. John's University, at Collegeville; and Gustavus Adolphus College, at St. Peter.

Churches.— The strongest denominations in the State are the Roman Catholic; Lutheran, Independent Synods; Methodist Episcopal; Lutheran Synodical Conference; Lutheran General Council; Regular Baptist; Presbyterian; Congregational; and Protestant Episcopal. In 1899 there were 1,606 Evangelical Sunday-schools, with 18,410 officers and teachers and 153,040 scholars.

Postoffices and Periodicals.— In 1901 there were 1,667 postoffices of all grades, and 683 periodicals, of which 36 were daily, 4 semi-weekly, 569 weekly, 1 tri-monthly, 1 bi-weekly, 19 semi-monthly, 59 monthly, 1 bi-monthly, and 3 quarterly.

Railroads.— The total length of railroads within the State on Jan. 1, 1901, was 7,023 miles, of which 251 miles were completed during the previous year.

Finances.— On Jan. 1, 1901, the total bonded debt of the State was $1,209,000, and on Feb. 1, 1901, there were $399,000 in State bonds held in various Minnesota towns. The taxable valuation in 1900 was real estate, $490,537,617; personal property, $120,441,641; total, $610,379,258. The total tax collected in 1899 was $14,539,285, and the tax rate $1.80 per $1,000.

State Government.— The governor is elected for a term of two years, and receives a salary of $5,000 per annum. Legislative sessions are held biennially beginning on Tuesday after the first Monday of January, and are limited to 90 days each. The Legislature has 60 members in the Senate and 119 in the House, each of

PORTION OF MINNESOTA
(COOK COUNTY)
COOK
LAKE SUPERIOR
Scale same as Large Map
Grand Marais
Grand Portage
Hovland
Lutsen
Tofte
Schroeder
Gunflint Iron Mine
Arrow R.
Pigeon R.
Brule R.
Cross R.
MANITOBA
DOMINION
ONTARIO
CANADA
NORTH DAKOTA
Lake of the Woods
Rainy Lake
Upper Red Lake
Lower Red Lake
RED LAKE IND. RES.
Leech Lake
LAKE SUPERIOR
602 ft. above mean sea level
Apostle Islands
KITTSON
ROSEAU
MARSHALL
RED LAKE
POLK
BELTRAMI
KOOCHICHING
ITASCA
SAINT LOUIS
LAKE
COOK
CLEARWATER
NORMAN
MAHNOMEN
CLAY
BECKER
HUBBARD
CASS
AITKIN
CARLTON
WADENA
CROW WING
WHITE EARTH
MAHNOMEN IND. RES.
CHIPPEWA IND. RES.
Leech Lake Ind. Res.
Bois Fort Ind. Res.
Fond-du-Lac Ind. Res.
Winnibigoshish Ind. Res.
Source of the Mississippi R.
DULUTH
Superior
Two Harbors
Crookston
Thief River Falls
Bemidji
Grand Rapids
Hibbing
Virginia
Ely
International Falls
East Grand Forks
Moorhead
Detroit City
Cloquet
Red Lake Falls
Ada
Fargo
Hallock
Roseau
Warren
Walker
Cass Lake
Eveleth
Brainerd

MINNESOTA

SCALE OF MILES

0 10 20 30 40 50 60

State Capital ☆ County Seats ⊙

Size of type indicates relative importance of places

Hammond's 8 x 11 Map of Minnesota
Copyright 1908, by C.S. Hammond & Co., N.Y.

A 96° B 95° Longitude C West 94° from D Greenwich 93° E 92° F 91°

whom receives $5.00 per day and mileage. There are seven Representatives in Congress. The State government in 1901 was Republican.

History.— The site of the present State of Minnesota was first visited by a French exploring party under Louis Hennepin, a Franciscan priest, who ascended the Mississippi river as far as the Great Falls. By the treaty of Versailles in 1763, this region was ceded to Great Britain, and in 1766 it was explored by Jonathan Carver, a native of Connecticut. In 1783 the Northwest Territory including Minnesota, E. of the Mississippi, was ceded to the United States. No attempt was made to extinguish the Indian title till 1805, when a purchase was made of a tract of land for military purposes at the mouth of the St. Croix, and another at the mouth of the Minnesota river, including St. Anthony's Falls. In 1827 a small tract of country between the St. Croix and Mississippi was ceded by the Indians to the United States, and lumbering operations commenced upon the St. Croix. The Territory of Minnesota was established, and the government organized in 1849. It embraced nearly twice the area of the present State, its W. limits extending to the Missouri and White Earth rivers. In 1851 the Sioux ceded to the United States all their lands in the territory between the Mississippi and Big Sioux rivers and in 1858 Minnesota was admitted to the Union. That portion of the State lying E. of the Mississippi belonged originally to the "territory N. W. of the Ohio," while that portion W. of the Mississippi was included in the territory known as the Louisiana Purchase. In 1862 the Indians attacked the frontier settlements, and in a few days killed about 800 settlers. In consequence the Sioux and Winnebagoes were removed from the State, and their lands opened to settlement. SAMUEL R. VAN SANT.

Minnesota, The, a single-screw wooden cruiser of the old type, now used by the Massachusetts naval militia. At one time this vessel was one of the largest wooden ships in the United States navy. It has a displacement of 1,700 tons more than the "Pensacola," and a horsepower of 1,000. It carries 9 guns in the main battery.

Minnesota, University of, a coeducational non-sectarian institution in Minneapolis, Minn.; chartered in 1851, opened in 1868; has endowment of over $1,400,000; grounds and buildings valued at nearly $4,000,000; volumes in the library, about 135,000; scientific apparatus, etc., $520,000; average number of faculty, 350; students, 5,000; graduates, over 7,500.

Minnesota River, a river in the United States, which flows through Minnesota and falls into the Mississippi 5 miles above St. Paul; length, 470 miles.

Minniwakan (min-nē-wâ-kän'), or **Devil Lake,** in North Dakota, a large lake on the S. border of the Salt Water Region; length about 50 miles, average breadth 15 miles; between lat. 47° 50′ and 48° 20′ N. and lon. 98° 35′ and 99° 30′ W.; area about 750 square miles. The waters are too brackish to be drunk by man, though buffaloes and other wild animals drink them freely. It has no apparent outlet, and is of a deeper tint than the neighboring fresh-water lakes.

Minnow, or **Minim,** in ichthyology, *Leuciscus phoxinus,* common all over Europe. Dr. Günther says that it grows to a length of seven inches in favorable localities; its average size is about three inches. It is generally found in the same streams with trout, preferring gravelly bottoms, and swimming in schools. The top of the head and the back are dusky olive, mottled, and lighter in color on the sides; belly white, rosy in summer, when it is sometimes called the pink. Known also as the minim. Also a popular name in the United States for the small fishes of many genera of *Cyprinidæ.*

Minor, in music, a term applied to intervals containing one semitone less than major. Also a scale is said to be in the minor mode when its third and sixth are minor; formerly a minor scale was described as "with the lesser third." In ordinary language, a person who is under age; one of either sex who is under a certain age, and therefore legally incapacitated for the performance of certain acts; also a Minorite; a Franciscan. In logic, the minor term, or minor premise. In music, the minor key. In Scots law, a term used to express a person above the age of pupillarity (12 in females and 14 in males) and under that of majority, of 21. In the Roman Catholic Church, Minors: Orders beneath Holy Orders in dignity, four in number, viz., acolyte, exorcist, lector, and ostiarius; they are usually conferred at the same time. Flute-minor, klein flute, a small flute-stop on the organ, of four-foot or two-foot pitch.

Minorca, the second largest of the BALEARIC ISLANDS (*q. v.*), lying 25 miles N. E. of Majorca; length, 28 miles, average width, 10 miles; area, 284 square miles; pop. (1900) 37,512. Its coast is rocky and inaccessible, but broken by numerous inlets, and its surface low, undulating, and stony. Its productions and climate are similar to those of Majorca, though the soil is less fertile. Chief towns, Port Mahon and Ciudadela (8,000). The island is remarkable for its great number of ancient megalithic remains (called talayots) and its stalactite caves (at Prella).

Minor Prophets, The, so-called from the brevity of their writings, are 12 in number, viz., Hosea, Joel, Amos, Obadiah, Jonah, Micah, Nahum, Habakkuk, Zephaniah, Haggai, Zechariah, and Malachi. Their prophecies are found in the Hebrew canon.

Minos, in Greek mythology, a ruler of Crete, said to have been the son of Zeus and Europa, and a brother of Rhadamanthus. During his lifetime he was celebrated as a wise lawgiver and a strict lover of justice, and after his death he was made, with Æacus and Rhadamanthus, one of the judges of the infernal world. Also another legendary King of Crete, who forced Athens to send yearly seven boys and seven girls to be devoured by the Minotaur.

Minotaur (min'-), in Greek mythology, a monster half man and half bull, said to have been the son of Pasiphaë, wife of Minos, King of Crete, by a bull (ταῦρος) ; hence the term Minotaur. According to one version of the myth, Minos shut him up in the labyrinth of Dædalus, feeding him with criminals, and afterward with youths and maidens sent from Athens. Theseus, by the assistance of Ariadne, succeeded in destroying him, and thereby rescued the Athenians from the obligation of sending their children to be devoured.

Minot's Ledge, or **Cohasset Rocks,** in Massachusetts, a promontory and lighthouse on the S. W. shore of Boston Harbor, about 8 miles S. E. of Boston Light; it exhibits a fixed light 66 feet high.

Minsk, chief town of a Russian province; on an affluent of the Beresina, 331 miles E. N. E. of Warsaw; existed in the 11th century; was Lithuanian in the 13th; Polish in the 15th; and was annexed by Russia in 1793; pop. (1893) 80,070; (1897) 91,494. The province of Minsk has a generally flat surface, and abounds in marshes, swamps, moors, lakes, and forests; area, 35,293 square miles; pop. (1897) 2,156,123; less than 24 per cent. of the total area is actually cultivated.

Minster, the church of an abbey or priory; but often applied, like the German "Münster," to cathedral churches without any monastic connection, as especially to York Minster, England.

Minstrel (Old French *menestrel, menestral*), a singer and performer on musical instruments. Minstrels in the Middle Ages were a class of men who lived by the arts of poetry and music. The minstrels or jongleurs only recited or chanted poems, but did not write or invent them; or perhaps accompanied on some instrument the troubadour, who sang his own compositions. It was not an unusual thing for a troubadour to have several minstrels or jongleurs in his service. The minstrels in later times formed a separate guild, uniting for the purposes of mutual protection and support. With the decline of chivalry, the profession of the minstrel also declined, and eventually sank so low that they are classed among vagabonds and beggars in statutes in the reign of Elizabeth.

Mint, the name given to several herbaceous aromatic plants of the genus *Mentha*, natural order *Labiatæ*. They are nearly all perennial, having square stems which bear opposite and simple leaves; they are widely distributed throughout temperate regions; and they abound in resinous dots which contain an essential oil. Mint has an agreeable odor, and partakes in the highest degree of tonic and stimulating properties. Spearmint (*M. viridis*) is generally used, mixed with vinegar and sugar, in sauce. Peppermint (*M. piperita*) yields the well-known stimulating oil of the same name. Pennyroyal (*M. Pulegium*) is used for the same purposes as peppermint.

Mint, the place where a country's coinage is made and issued under special regulations and with public authority. In former times the coinage was made by contract at a fixed price. In England there used to be a mint in almost every county; the sovereign, barons, bishops, and principal monasteries exercised the right of coining; and not till the reign of William III. were all the provincial mints abolished. The present mint on Tower Hill, in London, was erected between the years 1810 and 1815. The English mint supplies the whole of the coinage of the British Empire, except Australia and the East Indies, which are supplied from branch mints at Sidney, Melbourne, Perth, Calcutta, and Bombay. In the United States there are mints at Philadelphia, established in 1792; at San Francisco, established in 1853; at Carson City, established in 1869 (operations at this mint have been discontinued since May, 1893, and probably it will never be opened again, it is now conducted merely as an assay office); at Denver, established in 1862; and at New Orleans, established in 1835. The total coinage of the United States mints from 1792 to June 30, 1910, aggregated $4,168,798,091.12. See COINAGE.

In the United States the Bureau of the Mint was established as a division of the Treasury Department in 1873. It has charge of the coinage for the government and makes assays of precious metals for private owners. The rolling machines are four in number. The rollers are adjustable and the space between them is governed by the operator. About 200 ingots are run through per hour on each pair of rollers. When the rolling is completed the strip is about six feet long. As it is impossible to roll perfectly true it is necessary to "draw" these

strips, after being softened by annealing. The drawing benches resemble long tables, with a bench on either side, at one end of which is an iron box secured to the table. In this are fastened two perpendicular steel cylinders. These are at the same distance apart that the thickness of the strip is required to be. It is drawn between the cylinders, which reduces the whole to an equal thickness. These strips are now taken to the cutting machines, each of which will cut 225 planchets per minute. The press now used consists of a vertical steel punch. From a strip worth $1,100 about $800 of planchets will be cut. These are then removed to the adjusting room, where they are adjusted. After inspection they are weighed on very accurate scales. If a planchet is too heavy, but near the weight, it is filed off at the edges; if too heavy for filing, it is thrown aside with the light ones to be remelted. The planchets, after being adjusted, are taken to the coining and milling rooms, and are passed through the milling machine. The planchets are fed to this machine through an upright tube, and as they descend are caught on the edge of a revolving wheel and carried about a quarter of a revolution, during which the edge is compressed and forced up. By this apparatus 560 half-dimes can be milled in a minute; for large pieces the average is 120. The massive but delicate coining presses coin from 80 to 100 pieces a minute. These presses are attended by women and do their work in a perfect manner. After being stamped the coins are taken to the coiner's room. The light and heavy coins are kept separate in coining, and when delivered to the treasurer they are mixed in such proportions as to give him full weight in every delivery. By law, the deviation from the standard weight, in delivering to him, must not exceed three pennyweights in 1,000 double eagles. GEORGE E. ROBERTS.

Minto, Sir Gilbert Elliot, 1st Earl of, an English politician; born in Edinburgh, Scotland, April 23, 1751. As a boy he spent two years at a school at Fontainebleau under the eye of David Hume, and, after passing through the Universities of Edinburgh and Oxford, in 1769 entered Lincoln's Inn, and was called to the bar in 1774. Two years later he entered Parliament as a supporter of Lord North, but from 1782 attached himself to Fox and Burke. In 1794–1796 he was viceroy of Corsica. He was created Baron Minto in 1797, and went out to India as governor-general in 1806. He showed great vigor in his measures for establishing order and securing the frontiers by treaties, like that of Armitsar with Ranjit Sing. He next captured Mauritius and Bourbon, the Spice Islands and Java, but returned to England as Earl of Minto and Viscount Melgund in May, 1814, to die on June 21.

Minto, Gilbert John Murray Kynymond Elliot, 4th Earl of, an English military officer; born July 9, 1847. He was educated at Eton and Cambridge; served with the Turkish army (1877); in the Afghan war (1879); was private secretary to General Lord Roberts at the Cape (1881); volunteer in the Egyptian campaign (1882); military secretary to the governor-general of Canada (the Marquis of Lansdowne) 1883–1885; chief of staff in N. W. Canadian rebellion (1885); Governor-General of Canada (1898-1904); Viceroy of India (1905-1910).

Minto, William, a Scotch scholar; born in Alford, Aberdeenshire, Scotland, Oct. 10, 1845. He was editor of the London "Examiner," 1874–1778; Professor of Logic and English Literature at the University of Aberdeen, 1880. Besides several novels, articles in the "Encyclopædia Britannica," contributions to reviews, etc., he published "English Prose Writers" (1872); and "English Poets" (1874). He died in Aberdeen, Scotland, March 1, 1893.

Minucius (-nū'shi-us) **Felix,** an early Latin apologist, of whose history nothing is known with certainty. His name survives through his "Octavius," a dialogue held on the beach at Ostia, between the pagan Cæcilius Natalis and the Christian Octavius Januarius. The latter succeeds in convincing his opponent, though his Christianity shows no trace of such distinctive dogmas as that of the resurrection.

Minuet, the name of a graceful dance said to have been invented in Poitou about the middle of the 17th century, and performed in ¾ or ⅜ time; it continued to be fashionable till the reign of George III. Also a time or air suited for the dance so called, or composed to the same time.

Minus, as a substantive, less. A term applied to the sign of subtraction —, which, when placed between two quantities signifies that the latter is to be subtracted or taken from the former; thus, $a - b$ (read a minus b) means that b is to be subtracted from a. As an adjective, a term applied to quantities which have the sign — or minus, before them, as, $-a$, $-3b$, etc.; also called negative quantities.

Minute, a division of time and of angular measure. As a division of time it is the 60th part of an hour. As a division of angular measure it is the 60th part of a degree. In astronomical works minutes of time are denoted by the initial letter m, and minutes of a degree or of angular space, by an acute accent (′).

Minute Men, in the American Revolutionary War, the militia, who were prepared for service at a minute's notice.

Miocene, in geology, a term introduced in 1835 by Sir Charles Lyell to designate the beds formerly called Middle Tertiary. The term Miocene denotes that only a minority of the shells belong to recent species. He founded it on the Faluns of France, which, according to M. Deshayes, have 17 per cent. of their shell species recent. Subsequent discovery has slightly modified the number, especially as other beds than the Faluns have their own proportions of recent and fossil shells. Beyrich separated from it its lower portion, and, combining this with the Upper Eocene, founded a new division, the Oligocene.

Miquelet, one of a body of partisan troops raised in the N. of Spain, and chiefly in Catalonia. The Miquelets became first known in the wars between Spain and France in the 17th century. At several periods (in 1687–1787, and again in the wars of Napoleon) the French endeavored to organize several corps to oppose the Miquelets in the mountain warfare in these districts.

Miquelon (mēk-lo*ng′*), **Great** and **Little,** two islands connected by a long, narrow, sandy isthmus, off the S. W. coast of Newfoundland; area 83 square miles; pop. 550. With St. Pierre they form the sole remaining colony of France in North America. Fishing is nearly the sole occupation, and dried and fresh cod and cod liver oil are exported.

Mir (mēr), the Russian commune, consisting of the inhabitants of one or more villages, who are as a community owners of the surrounding land, and redistribute the same to the members from time to time.

Mira (mē′rä), or **Stella Mira** (the wonderful star), the star Omicron Ceti, a remarkable variable, whence the name. It is in the neck of "the whale." Its variability was discovered in 1596 by Fabricus. The period is somewhat irregular, but averages about 331 days. During the greater part of this time the star remains of about the 9th magnitude, but during about 100 days it rises to a maximum which may vary from the 2d to the 5th magnitude, remains for a week or 10 days there, and then sinks to its minimum again. When shining with a brightness of the 2d magnitude, it is giving out more than 600 times as much light as when at the 9th magnitude.

Mirabeau (mē-rä-bō′), **André Boniface Riquetti, Vicomte de,** a French royalist, brother of Honoré Gabriel de Mirabeau; born in Bignon, Provence, France, Nov. 30, 1754. From an early age he was notorious for his ill-regulated life and for a thirst that earned him the nickname of "Barrel Mirabeau." It was as he said the only vice his brother had left for him. He fought with distinction in the American war, and at the outbreak of the Revolution was returned to the States-General by the nobility of Limoges. Here he showed himself a fierce aristocrat in policy, and after the death of his brother he quitted France, and raised on the Rhine the "Hussars of Death," a legion of embittered *émigrés,* with whom he began in 1792 a bloody partisan warfare against his country. He was run through by accident in Freiburg, Baden, Sept. 15, 1792.

Mirabeau, Honoré Gabriel Riquetti, Count de, one of the most celebrated characters of the French Revolution; born in Bignon, Provence, France, March 9, 1749. He was the son of the Marquis Victor Ri-

COUNT DE MIRABEAU.

quetti de Mirabeau, an author on political economy. On leaving school, he entered the military service; and his intercourse with young and dissipated officers familiarized him with all their vices. His active mind, however, could not remain idle, and he read all the books he could procure on the military art. He also fell in love, and his passion was marked by all the impetuosity of a strong and wild character. His father, who systematically thwarted his inclinations, procured his confinement in a fortress on the island of Rhé. After his liberation he went, as a volunteer, to Corsica, distinguished himself, and obtained a commission as a captain of dragoons; but his father refusing to purchase him a regiment, he abandoned, though unwillingly, the military profession. In 1772 he espoused a rich heiress of Aix, but he soon squandered the fortune he received with her and plunged himself in debt. He was confined in different prisons, and on obtaining his liberty, eloped to Holland with the wife of the Marquis de Monnier. For this he was after-

ward imprisoned in the castle of Vincennes, and remained there 3½ years. He then instituted an ineffectual lawsuit against his wife, who obtained a separation from him. In 1784 he visited London, and afterward Berlin, being sent to the latter city on a secret political mission; and he was variously employed in literary quarrels and occupations till the commencement of the French Revolution.

This offered Mirabeau an ample field for his activity. After unsuccessfully offering himself to the states of Provence as deputy to the States-General, he was elected for Aix and Marseilles as deputy of the third estate, and by courtiers he was termed the plebeian count. In this new capacity, his extraordinary eloquence, his talent, and his boldness, soon gave him irresistible weight in the assembly, and rendered him the idol of the people. The story of his life thenceforth would be the history of the assembly, of which he was long the master spirit, and was chosen president in January, 1791 At length he entered into a treaty with the court, to use his influence in stopping the progress of republicanism. Before, however, he could carry his intentions into effect, a sudden illness terminated his existence in Paris, France, April 2, 1791. His remains were honored with a public funeral, and deposited in the Pantheon. They were, however, in the following year, removed from the Pantheon, and deposited by night in a churchyard, and the great orator himself was declared traitor by the assembly. The works of Mirabeau have been several times republished.

Mirabilis (-rab′-), a genus of *Nyctaginaceæ*. The corolla is tubular; the fruit one nut-like seed, invested with the indurated tube of the corolla. *M. jalapa* was once erroneously supposed to be the true jalap plant. *M. dichotoma*, the Marvel of Peru, called in the West Indies the four o'clock flower, and *M. longiflora* are very drastic. *M. suaveolens*, a species having the flavor of anise, is given in Mexico against diarrhœa and rheumatism.

Miracle, a wonderful sight or thing; a wonder; a marvel; a prodigy. An event or effect contrary to the established constitution and course of things, or a deviation from the known laws of nature; an effect above human or natural power, performed in attestation of some truth; a supernatural event.

Miracle Plays, a sort of dramatic entertainments common in the Middle Ages, in which the subjects were taken from the lives of saints and the miracles they wrought. They were originally performed in church, but latterly outside, in market places and elsewhere. In England they were first produced in the 12th century. They differed from the mysteries mainly in subject. See MYSTERY.

Mira de Mescua, or **Amescua, Antonio** (mē′-rä dā mā′-skwä), a Spanish dramatist; born in Guadix, about 1570. He was court chaplain at Granada, and afterward chaplain of honor to Philip IV. at Madrid. Calderon and Corneille borrowed from his works. A few of his lyrics can be seen in Vol. xiii., five of his plays in Vol. xiv., of Rivadeneyra's "Library of Spanish Authors." He died in Madrid in 1635.

Mirage (mē-räzh′), an optical illusion by which images of distant objects are seen as if inverted, below the ground or raised in the atmosphere. The phenomenon is best observed in the Egyptian or other deserts, though occasionally seen elsewhere, and the inverted images so much resemble those made in water as to create the illusion that a lake is really near. The soldiers of Napoleon I., when in Egypt, were much tantalized by the mirage; and Monge, who accompanied the expedition, was the first to explain the illusion. The layers of air in contact with the heated soil are rarefied and expanded more than those immediately above them; a ray of light from an elevated object has to traverse strata of air less and less refracting, and the angle of incidence continually increases in amount till refraction gives place to internal reflection. According to the varying density of the strata of air the mirage varies in character. In 1822 Captain Scoresby, sailing in the polar regions, saw the mirage of a ship inverted in the air. He recognized it as his father's vessel, the "Fame," and found afterward that she was at the time 30 miles off. The mirage is sometimes reflected sideways. The mirage was known in ancient Jewish times; it is mentioned in Isaiah xxxv : 7, "And the parched ground shall become a pool and the thirsty land (Hebrew *sharabh* = the mirage) springs of water." The Fata Morgana, what sailors call the "loomings," the Flying Dutchman, the Enchanted Island, Cape Flyaway, etc., are all produced by the mirage.

Miramar (mē-rä-mär′), a palace standing on the rocky shore of the Adriatic near Grignano, 6 miles N. W. of Trieste, the home of the Archduke Maximilian, afterward Emperor of Mexico. See MAJORCA.

Miramichi (mir-a-mi-shē′), the second river of New Brunswick, entering the Gulf of St. Lawrence through Miramichi Bay; length 220 miles. It is navigable to 2 miles above Newcastle, the principal town on its banks. Salmon and trout abound both in the river and its tributaries, in one of which there is a government fish-breeding establishment.

Miramon, Miguel, a Mexican military officer; born in the City of Mexico, Sept. 29, 1832; became a student in the government

military academy in 1846; participated in the defense of Chapultepec and Molino del Rey in September, 1847; returned to the academy after the war and was graduated with honors; and was commissioned a colonel in July, 1855. In October of that year when Alvarez was elected president, he declined to serve under him, and in the following December, while second in command against the rebels of Zacapoaxtla, made him a prisoner. He then joined the insurrectionary movement and took Puebla, but in March, 1856, that place was retaken and he was captured. He soon escaped, however, and began a guerilla warfare. In 1858 when Zuloaga became president he was made a Brigadier-General; in December, 1858, the government of Zuloaga was overthrown and in January, 1859, Miramon was chosen provisional president of the Conservative government. He was defeated by the forces of the Liberal party at the battle of Calpulaepan on Dec. 22, 1860, and soon afterward fled to Europe. When the regency was installed in 1863 he returned to Mexico, but his services were declined and he was again compelled to flee the country. Later, however, his offer was accepted by Maximilian and he returned in November, 1866. He was placed in command of a division which suffered defeat at the battle of San Jacinto, Feb. 1, 1867. Subsequently he was captured and shot with Maximilian and Mejia in Queretaro, June 19, 1867.

Miranda, or **Sá de Miranda, Francisco de** (sä de mē-rän′dä), a Portuguese poet, founder of the school of which Camoens is the most brilliant representative; born in Coimbra, Portugal, Oct. 27, 1495. His earlier efforts were written in Spanish; his sonnets were the first written in Portuguese; his most characteristic works, his epistles in verse, are all in Portuguese but one. His works apeared at Lisbon in 1595; a better edition in 1614; the most scholarly one, by Vasancellos, at Halle in 1885. He died in Coimbra, March 15, 1558.

Miranda, Don Francisco, a Spanish-American military officer, the first martyr in the cause of freedom in South America; born of an old Spanish family in Caracas, Venezuela, June 9, 1756. He presented to different courts plans for the emancipation of the Spanish American colonies, and with this view went to Paris in 1792, where he connected himself with Pétion and the Girondists. While waiting for an opportunity to commence operations in America, Miranda was appointed general of division under Dumouriez. Some time after, he was imprisoned in consequence of his political intrigues. In 1794 he was liberated, but received orders to quit France, and took refuge in England. Having procured some secret assistance, he sailed from New York in 1806 with one ship and a number of volunteers, and landed in Venezuela; but his attempts to arouse the inhabitants were altogether unsuccessful, and he found himself compelled to reëmbark. In 1810 he renewed his attempt with more success, but was finally obliged to capitulate to the Spanish general Monteverde, who, in violation of the articles of surrender, treated him as a prisoner. Miranda was sent to Spain and confined in the dungeons of the Inquisition of Cadiz, where on July 14, 1816, he died, after an imprisonment of four years.

Mirandola, Giovanni Pico Della (mē-rän′dō-lä), an Italian nobleman, distinguished for his precocious talents; born in 1463. He studied at Bologna, and at many other universities in Italy and France, and attained extraordinary acquirements in language, logic, philosophy, theology, and other subjects. Like the "Admirable Crichton," a century later, he showed his vanity and arrogance by publishing a challenge to dispute with any person on any one of 900 propositions then set forth. He was then 23 years of age, and was living at Rome. Some of his propositions were submitted to the Pope as heretical, and he had them inquired into and censured. Pico, after some further wanderings, settled at Florence, where he enjoyed the friendship of Lorenzo de Medici, Poliziano, and other eminent scholars. He visited Lorenzo on his deathbed, and did not long survive him. The works of Pico have been several times republished, but are now neglected. His "Life" was written by his nephew, Giovanno-Francesco, who also wrote the "Life of Savonarola." Died in Florence, Italy, Nov. 17, 1494.

Mirecourt, Eugène de (mēr-kör′), originally **Jacquot Mirecourt,** a French writer; born in Mirecourt, France, Nov. 19, 1812. Among his novels were: "Confessions of Marion Delorme" (1848); "Memoirs of Ninon de Lenclos" (1852); "The Marchioness de Courcelles" (1859). He died in Tahiti, Feb. 13, 1880.

Miriam, the sister of Moses and Aaron, probably the one who watched over Moses in the ark of bulrushes (Ex. ii : 4, 5; Num. xxvi : 59; Mic. vi : 4). As a prophetess, she led the women of Israel in their song of worship and thanksgiving to God on the drowning of the Egyptians (Ex. xv : 20, 21). Her jealous murmurs against Moses and his Cushite wife were punished by a temporary leprosy (Num. xii.; Deut. xxiv : 9); but she was forgiven and restored, and near the close of the wanderings of Israel, died at Kadesh-barnea (Num. xx : 1).

Miriam. See MARY.

Miribel, Marie François Joseph de (mē-rē-bel′), a French military officer, chief of the general staff of the French army; born in Montbonnet, Isère, France, in 1831.

He was at the siege of Sebastopol, and in the Italian campaign in 1850; served under Bazaine in Mexico, and during the siege of Paris by the Germans was conspicuous for his gallantry. In 1890 he was made chief of the general staff of the army. By the French he was regarded their greatest living strategist. The efficiency attained by their army in recent years is attributed to his masterly direction. He died Sept. 11, 1893.

Mirror, a smooth surface capable of regularly reflecting a great proportion of the rays of light that fall on it. Mirror making is a simple process, but is not without its elements of danger. The method is as follows: A smooth stone table is arranged to be easily canted a little on one side by means of a screw set beneath. Around the edges of the table is a groove, in which mercury may flow and drop from one corner into bowls. The table is first made perfectly horizontal, and then tinfoil is carefully laid over it, covering a greater space than the glass to be coated. A strip of glass is placed along each of three sides of the foil to prevent the mercury from flowing off. The metal is then poured from ladles on the foil till it is nearly a quarter of an inch deep. The plate of glass is slid on from the open side, and its advancing edge is kept in the mercury, so that no air or floating oxide of the metal or other impurities can get between the glass and the clean surface of the mercury. When exactly in place it is held till one edge of the table has been elevated 10° or 12° and the superflous mercury has run off. It is left for several hours and then placed on a frame, the side covered with the amalgam, which adheres to it. After the amalgam becomes hard the plate is ready for use. The dangers arising from mirror making come chiefly from the use of the quicksilver, and there is a general belief that this occupation is especially injurious to health in consequence of the danger of poisoning from the fumes, but it is not sustained by the figures collated by the insurance companies. A process has recently been devised by which mirrors are rendered translucent, without impairing their power of reflection.

Mirza (a contraction of Emir Zadah, "son of the prince"), a Persian title, equivalent to "Prince" when it follows the surname, and merely the common title of honor (like "Mr.") when it is prefixed to it.

Mirzapur (mēr-zä-pör′), a district in the new United Provinces, British India; area, 5,223 square miles; pop. (1891) 1,161,808, almost all Hindus. Capital, Mirzapur; situated on the right bank of the Ganges, 45 miles S. W. of Benares; has manufactures of shellac, carpets, and brasswares; pop. (1901) 79,862.

Misdemeanor, an offense against the laws of a less heinous nature than a crime. Smaller faults are comprised under the gentler name of "misdemeanors" only, and are so designated in contradistinction to felonies, the former class comprehending all indictable offenses which do not fall within the other, such as assaults, nuisances, nonrepair of a highway, and the like.

Miseno (mē-sā′nō), a promontory forming the W. side of the Bay of Pozzuoli (Cumæ), 10 miles S. W. of Naples. On it are ruins of the ancient city of Misenum, which Augustus made one of the principal stations of the Roman fleet.

Miserere (miz-ur-ā′re), a name given to a psalm in the Roman Catholic service, taken from the 51st psalm in the Vulgate, beginning "*Miserere mei, Deus*" (Have Mercy on me, O God). It was frequently given as a test by the ordinary to malefactors sentenced to death who had benefit of clergy allowed them. Also a piece of music composed to the "Miserere" or 51st Psalm. Also a small projection or shelf fixed on brackets in the under side of the seat of a stall or pew in churches, designed to afford some degree of rest to the person, making a compromise between sitting and standing. They were frequently elaborately decorated with wood-carving, occasionally of a grotesque character.

Misericordia, or **Misericorde** ("mercy"), a narrow-bladed dagger used by a knight in giving the *coup de grâce* or finishing stroke to a wounded foe. Also the name of a society (of laymen) in Florence, founded in the 13th century, who tend the poor sick, carry victims of accidents or disease to the hospitals, and the dead to their burial. Members of all classes of the community, including the highest, are enrolled in this charitable association; and their somber and forbidding costume — a dark monastic dress, with the cowl pulled down over the face so that the eyes merely peep through little holes — is not assumed because the Frati della Misericordia are penitents, but to check demonstrations of gratitude to the individual brethren.

Mishna, or **Mishnah,** in Jewish literature the second or oral law, supposed to have been given to Moses to be transmitted to the doctors of the written law in all ages. Also the collection of the traditional laws, each one of which is likewise called Mishna, or Halacha. The name Mishna is especially given to the canonical work edited by Jehudah, the Prince, also called the Holy (born about A. D. 150). It contains an abstract of the more ancient Halacha collections made by his predecessors. It consists of six orders or books, divided into 60 treatises and 525 chapters. Order 1 treats on seeds; 2, on festivals; 3, on women; 4, on damages; 5, on holy things,

and 6 on purifications. The Mishna has been translated into Latin and into almost all European languages. See TALMUD.

Misiones (mē-se-ō′nes), an Argentine territory; lying between the Uruguay and the Paraná; bounded on all sides but the S. W. by Brazil and Paraguay; area 11,282 square miles; pop. (1905) 39,978, though before the expulsion of the Jesuits (1767) it exceeded 100,000. There are three low mountain chains radiating from the center. The greater portion of the surface is covered with forest, producing building and dye-woods, oranges, medicinal herbs, and the *yerba maté*. Maize is largely grown, and sugar-cane to some extent; of late years several sugar-houses have been erected. Capital Posadas, on the Paraná.

Mispickel, arsenical pyrites, an ore of arsenic, containing this metal in combination with iron, sometimes found in cubic crystals, but more often without any regular form.

Misprision, in law, every such high offense as is under the degree of capital, but nearly bordering thereon; and it is said that a misprision is contained in every treason and felony whatsoever. Misprisions are either negative, which consist in the concealment of something which ought to be revealed; or positive, which consist in the commission of something which ought not to be done. Of the first or negative kind, is what is called "misprision of treason," consisting in the bare knowledge and concealment of treason, without any degree of assent thereto, for any assent makes the party a traitor. "Misprision of felony" is also the concealment of a felony which a man knows, but never assented to, for if he assented, this makes him either principal or accessory.

Misrepresentation, in law, a false statement affecting the validity of a contract or transfer of property. Wilful misrepresentation is the same as FRAUD (*q. v.*). Innocent misrepresentation affects the formation of a contract in cases where one party has to rely on statements made by the other. An insurance company grants a policy in reliance on the statements made by the insured; a purchaser of land must rely on statements made by the vendor; an applicant for shares in a company relies on the truth of the prospectus. In these cases even unintentional misrepresentation will prevent the party responsible for it from enforcing the agreement against the party who has been misled. There are also cases in which a party is taken to warrant the truth of his statement; in these cases even an innocent misstatement may give the other party a right to be discharged altogether, or a right to claim damages for breach of warranty.

Missal, the book containing the whole service of the mass throughout the year. In its present arrangement it dates from about the middle of the 14th century. The Roman missal is used generally throughout the Roman Church, though the Ambrosian obtains in the diocese of Milan, and many religious orders have their own missals, differing only in unimportant particulars from the Roman. Eastern Christians of the Communion with Rome have missals peculiar to their own rite. Missals from which mass is said are, of course, in the ecclesiastical languages; those for the use of the laity have a translation in the vernacular, side by side with the Latin or other ecclesiastical language.

Missing Link. What was claimed to be the missing link between man and the ape was found by Dr. Eugene Dubois, in 1895, of parts of a fossil in strata on the banks of the Bengawan river, in Central Java. These remains consist of a skull, a thigh bone, and two molar teeth, and from them scientists have constructed an animal, not human, yet nearer to man than the ape. The brain capacity of the skull is as far below that of the lowest existing man, the Papuan, as it is above that of the highest known ape, the chimpanzee. The teeth also show a mixture of human and ape characteristics. The formation of the skull and the thigh bone indicate that the animal walked in an upright position. The late Prof. O. C. Marsh, Professor of Palæontology in Yale University, and Professor Haeckel, a leading scientist of Berlin, both agree that the remains of the Pithecanthropus Erectus, or man-ape, of Java, as the fossil has been named, are those of the missing link. See EVOLUTION.

Missions, an organized method of propagating a religion: specifically, the propagandanism of Christianity among the heathen, based on the command "Go ye into all the world and preach the Gospel to every creature."

Apostolic and Mediæval Missions.— The Gospel made great progress during the lifetime of the apostles and found a footing in most countries to the E. and N. of the Mediterranean. It was also successfully introduced into Egypt and other African regions. As the result of "the persecutions which arose about Stephen" thousands of converts were scattered abroad and went everywhere "preaching the word." Through the labors of these primitive evangelists under the direction of the apostles, Christian churches were founded in many places such as Persia, Mesopotamia, and Arabia. There is a tradition that a church was founded in the kingdom of Edessa by Thaddeus and another ascribes the introduction of the Gospel into India to the apostle Thomas. Within a century after Christ the

Gospel had probably been preached over a large part of the Roman world; in some provinces, as for instance Bithynia, threatening to supersede the worship of the gods of the empire. Alexandria early became noted for its missionary college from which teachers were sent to all parts of the world. By the close of the 2d century also Carthage had its church with Tertullian at its head. In 306 19 bishops assembled at Elvira in Spain. The Goths and Vandals came down on the Roman empire from the N. and carried away many Christian captives. Ulfilas, the descendent of one of these, translated the Bible into Gothic and is regarded as the Apostle of the Goths. Before the time of Constantine there were churches of considerable extent in the S. and N. sections of Britain due not so much to missionaries as to the natural intercourse of Britain with Rome. These churches, however, became distinguished for their missionary zeal and Saint Patrick is commonly regarded as their leader. He found Ireland entirely heathen and lived to see it become Christian — changed from a condition of barbarism into a land of saints and scholars, in whose schools were trained the youths of neighboring Britain and many also of the continent of Europe. As the Scotch Patrick was the apostle to Ireland, so in a certain way was the Irish Colomba the apostle of Scotland. The island of Iona with its monastery became a sort of missionary center and Aidan went from there to Northumbria and established missions. The Scotch-Irish missionaries were the evangelists of a large part of the European continent. Columbanus, Gallus and "a host of others numerous as a swarm of bees," introduced, together with religion, agriculture and civilization into France, Switzerland and other parts of Europe. The English Boniface became the apostle of Germany. Ansgar, a monk of Corvey in the 9th century, under the influence of Louis the Pious, preached in Denmark and Sweden. The story of the mission of the two bishops, Cyril and Methodius, corresponding almost precisely with the conquest of the Slavs by the Variags, is most interesting. This dates back to the year 860. The Russian prince Vladimir was baptized in 988 with all of his sons (in the Dnieper at Kief) and his people. What the Irish and the Scots had been doing for Europe in the early Middle Ages the Nestorians had been attempting in Asia. Kublai Khan, a grandson of the famous Genghis Khan, a ruler of the E. Mongol empire, was anxious to learn about Christianity and sent for missionaries to tell him about the new doctrine. It is possible that this Mongol prince may be identified with the Prester John, legends of whom were spread through the Middle Ages with all sorts of strange and curious details. It is supposed that the Nestorian-Tartar church flourished till the country was devastated by the Mongols. It is almost certain that the Nestorians introduced the Gospel into India and that they passed through Tartary into China and founded churches there which existed till the end of the 9th century. As early as the year 1200 Albert I. of Appeldern went with a band of pilgrims to the mouth of the Düna river and founded the city of Riga and established there the Brotherhood of the Knights of Christ, or the Brethren of the Sword. He has been called the Bishop of Livonia. One of the most remarkable missionaries of the Middle Ages was Raymond Lully (see LULLY, RAYMOND). The Roman Catholics after the discovery of the new world founded several missionary orders, chief among which were the Jesuits, Capuchins, Dominicans, and Franciscans. Their object was the extension of the Church among the Mussulmans of Spain, North Africa and Western Asia. Francis Xavier was sent as an apostolic nuncio for India, and worked with wonderful success in all parts of India and the islands of the Chinese archipelago. He labored for years with success in Japan. Dominican missionaries also made many converts on the W. shores of Africa. The story of the Roman Catholic missions to North and South America belongs to the romance of history, being full of wonderful adventures, unselfishness, sacrifice and courage. In 1622 Pope Gregory XV. established a society for the propagation of the Gospel, and that has ever since controlled the mission enterprises of the Church. It has its seat in Rome where there is a college for the training of missionary priests. After the labors of Ricci and Schall there are said to have been in China 300,000 Catholics in 1663. The "Missiones Catholicæ" (Catholic Missions) states that the number of European missionaries belonging to the Roman Catholic Church in 1886 was 2,800, of mission adherents nearly 2,800,000; in India there being 1,180,000, in Indo-China over 500,000, nearly 500,000 in China, 210,000 in Africa, and over 100,000 in Oceania.

Protestant Missions.—Not till two centuries after the Reformation was there any organized attempt made by the Protestants to establish missions. In 1555 a company of men including several missionaries sailed for Brazil with a hope of establishing there an asylum for the Huguenots. The condition of the savage tribes attracted their attion and they made attempts to reach them. They themselves however were persecuted and the enterprise was speedily unsuccessful. Those who had not been killed returned to France within a year. Thus the hopes of Coligny and of John Calvin who had taken an interest in the expedition were disappointed. In 1559 Gustavus Vasa sent a missionary to Lapland, but it was

Missions

more than half a century before the Christianization of the country was placed on a firm basis. In 1612 a college for the training of missionaries was established at the University of Leyden and a few years later the Dutch introduced Christianity into Java. Their success was so great that 100,000 Christians were counted there in 1721 and a single missionary in Formosa had baptized nearly 6,000 adults and taught 600 of the natives to read. In Ceylon alone the Dutch Church in 1722 reckoned over 240,000 members. John Eliot, "the apostle of the Indians," came to America early in the 17th century under the auspices of the Corporation for the Spread of the Gospel in New England. The Hon. Robert Boyle, first governor of that society, contributed to the translation of the Gospels into Malay, and left a bequest for foreign missions. Bishop Berkeley labored for the foundation of a missionary college in Bermuda; and the Society for the Propagation of the Gospel in Foreign Parts was founded in 1701 for work among the British colonies rather than among pagans. Its first missionary to India sailed in 1818. In the middle of the 17th century a party of men of Lübeck decided to engage in foreign missionary work. One of the party named Peter Heiling went to Abyssinia and did good work there. In 1664 the Austrian Baron von Welz after trying in vain to rouse enthusiasm for the subject of missions renounced his title and went to Dutch Guiana as a missionary. Leibnitz, in 1700, urged the Berlin Academy to occupy itself with the propagation of true faith and Christian virtue among the remote and unconverted nations, especially China. Early in the 18th century the first Protestant mission was sent to India. It was projected by the King of Denmark. The first missionaries were two men who went to the Coromandel coast of India, where they learned the Tamil language and prepared a translation of the Bible. This mission was known as the Danish-Halle Mission and continued throughout the greater part of the 18th century. At first, and for a long time, Germany supplied the missionaries; but the pecuniary support of the mission soon devolved on England, Prince George of Denmark, the husband of Queen Anne, having recommended the object of the Society for Promoting Christian Knowledge. Among many noble men who have been engaged in this mission the most notable was Christian Friedrich Schwarz, who obtained a remarkable influence over all classes of the people of India. In 1847 the entire mission passed into the hands of the Leipsic Society. In 1731 Count Zinzendorf, the patron of the United Brethren called the Moravians, visited Copenhagen and there saw two Eskimos and a negro boy from the Danish West Indies. When he returned to Herrnhut he told the story and two of the Moravians resolved to go to St. Thomas and teach the slaves the Gospel. This was the beginning of the missionary enterprises of the Moravians. Their work from their first beginnings in St. Thomas and Greenland in 1732 to their latest undertaking in the Tibetan Himalayas is most interesting. There is scarcely a country where they have not gained a foothold.

In 1786 Thomas Coke, the Methodist who had been sent to Nova Scotia to preach Methodism among the settlers, was driven to the West Indies by a storm and began to realize the conditions of the heathen world. The story which he brought back was the foundation of the Methodist missions which have been so extensive throughout the world. William Carey was the first to urge effectually on British Protestants the duty of missions and the first English Protestant to engage personally in the work. In 1792 he published his "Inquiry into the Obligation of Christians to Use Means for the Conversion of the Heathen." This and a sermon which he preached shortly after caused the foundation of the Calvinist Baptist Society for Propagating the Gospel among the Heathen and in 1793 he, with his family, set sail for India and landed at Calcutta where he laid the foundations of the later missions in Asia. In 1794 an address to professors of the Gospel calling for the support of at least 20 or 30 missionaries among the heathen was published. This led to the foundation of the London Missionary Society which began its work by the dispatch to the South Seas of the ship "Duff" with 29 missionaries. For a long time the mission was not successful but finally it met with great success and now there are many of the islands in which heathenism has long been extinct. In 1818 the mission in Madagascar was established. The Church of England felt the impulse of missions and in 1799 started a society for missions to Africa and the East which was afterward called the Church Missionary Society for Africa and the East. Henry Martyn, the pioneer missionary, had intended to go out under their auspices but he went out as a British chaplain. Their first expedition was to West Africa. They went to New Zealand in 1814, the Levant in 1815, India in 1816, and Ceylon in 1817. Work among the Indians of Northwest America in 1826, work in equatorial Africa in 1844, in China in 1845 and in Japan in 1869 was carried on by this remarkable society. It has had a large income and a noble army of missionaries. The Wesleyan Missionary Society was formed in 1814 and entered the field in South Africa. Missions in New South Wales were established in 1815, in Tasmania in 1821, among the Maoris of New Zealand in 1822, in the Friendly Islands in 1826, in the Fiji Islands in 1834, in Victoria in

1838, in Queensland in 1850, and in China in 1853.

The American Board of Missions was organized at Bradford, Mass., June 29, 1810. At first they had difficulty in getting a charter from the State of Massachusetts: it was not granted them for nearly two years. Finally in January, 1812, the first missionaries sailed to India, but when they reached Calcutta they were ordered home by the British East India Company, on the ground that commercial interests would be jeopardized if any attempt were made to interfere with the religious faith of the Hindus. Two of the missionaries to India changed their views in regard to baptism and this led to the formation of the American Baptist Missionary Union in May, 1814. The first actual mission established in foreign lands was established among the Marathos of Western India. The Ceylon mission was begun in 1816 and a foreign mission school was founded at Cornwall, Conn., in the same year, but the school was abandoned in 1826. Missions were opened among the Cherokee Indians in 1817 and among the Choctaws in 1819. The first mission in the Hawaiian Islands was established in 1819. The first missionary to China went out in 1829. The total receipts for the first 10 years amounted to over $202,000. In 1830 missions were established in Asia Minor and Persia and in 1831 in Athens. The Gabun mission in West Africa was sent out in 1834 and that to the Zulus in South Africa in 1835; that in Japan in 1869.

The first mission work of the Presbyterian Church was directed to the evangelization of India. The Western Missionary Society was organized in Fitchburg about the close of the 18th century. In 1818 the United Foreign Missionary Society was formed but did not enter the foreign field. The Presbyterians worked through the American Board till 1870. In 1870 the Presbyterian Board of Missions was formed and took charge of the Persian, Syrian and Gabun missions. The missionary society of the Methodist Church was organized in 1819. In 1835 they established the Brazil Mission. The first Methodist missionaries to China sailed in 1847, to Bulgaria in 1852, to India in 1856, to Japan in 1872, to Mexico in 1873, to Korea in 1885 and to Malaysia in 1889.

A Domestic Foreign Missionary Society of the Episcopal Church was founded in 1835, occupying China in the same year, Japan in 1859, and Haiti in 1861.

Numerous other missions have been established till practically the whole world has been occupied by zealous and self-sacrificing pioneers. Aside from the religious influence of the missions the amount of knowledge which has been acquired by the missionaries in the way of studying languages and distant regions of the world is most invaluable. For the massacre of missionaries in the Boxer rising of 1900, in China, see CHINA. E. E. STRONG, D. D.

Mississippi, a State in the South Central Division of the North American Union, bounded by Tennessee, Alabama, Louisiana, Arkansas, and the Gulf of Mexico; admitted to the Union, Dec. 10, 1817; counties 75; area 46,340 square miles; pop. (1910) 1,797,114; capital, Jackson.

Topography.— The State is divided into two portions by a low broad water-shed between, the rivers flowing toward the Atlantic, and the streams emptying into the Mississippi. A lateral branch of this ridge terminates in the bluff of Vicksburg. E. of this ridge, the surface of the State consists of broad rolling prairies, while to the W. the land is broken into valleys and ridges. The State is very low, the highest altitude being but 800 feet. Mississippi is well watered. Flowing W. from the central water-shed are the Homochitto, Big Black, Yazoo, Sunflower, and Tallahatchie rivers, all emptying into the Mississippi, which forms the entire W. boundary line. On the E. of the ridge are Pearl river, the Pascagoula, and Tombigbee, all emptying into the Gulf of Mexico. A chain of islands extends along the coast, separated from it by Mississippi sound, the largest being the Cat Islands, Petit Bois, Horse, and Ship Islands. There is but one good harbor on the Gulf coast, Ship Harbor, the mouths of all the rivers being swampy. The principal ports on the Misssissippi river are Vicksburg and Natchez. Mississippi is often called the Bayou State.

Geology.— The geological formations of Mississippi are principally of the Carboniferous, Cretaceous, Tertiary, and post-Tertiary periods. In the N. the Carboniferous is represented by the limestones and sandstones along the Tennessee river. S. of this are four groups of Cretaceous limestone, bounded on the W. by silicious deposits of Tertiary formations. This region abounds in brown coal, pipe and fire clay, and mineral fertilizers. The alluvial or Quaternary period is represented in the bottom lands of the Mississippi river. An orange sand of post-Tertiary formation is found over the entire S. portion of the State. Fossil remains of a gigantic marine animal resembling the alligator are found in the prairie regions. In 1900 the clay products of Mississippi amounted in value to $573,368. There were six mineral springs reported, with an output of 282,228 gallons, valued at $48,617.

Soil.— In the N. section and the uplands of the central portion the soil is very fertile, but the land in the Mississippi bottoms, though of exceeding fertility in places, contains much clayey and wet ground. The

prairie lands are, as a rule, quite fertile. The most fertile land in the State is in the Yazoo delta, in the extreme W. part of the State, N. of Vicksburg. Mississippi has still a vast area covered by virgin forests. The principal trees are the oak, willow, chestnut, wateroak, walnut, butternut, dogwood, black gum, sweet gum, beech, cottonwood, sycamore, magnolia, locust, mulberry, hickory, pine, cypress, and live oak.

Agriculture.—The prairie region in the N. W. of the State has always been noted as having the best farming land in the South. Cotton is the largest and most valuable crop. During the crop year 1899–1900, the output of cotton was 1,203,739 bales, making Mississippi the largest cotton-producing State in the Union. In 1900 the principal farm crops were, corn, 25,231,998 bushels, valued at $14,634,559; wheat, 40,781 bushels, valued at $34,256; oats, 2,390,052 bushels, valued at $1,099,424; potatoes, 347,094 bushels, valued at $288,088; and hay, 99,922 tons, valued at $994,224.

Manufactures.—In 1900 there were 4,772 manufactories, using a capital of $35,807,419, and yielding products of a combined value of $40,431,386, principally lumber.

Banking.—On Oct. 31, 1901, there were reported 14 National banks in operation, with $1,130,000 in capital, $941,128 in outstanding circulation, and $912,500 in United States bonds. There were also 117 State banks, with $4,890,811 capital, and $720,920 surplus; 5 private banks, with $152,000 capital; and 3 trust and loan companies, with $15,000 capital, and $29,015 surplus.

Education.—In 1900 the children of school census age numbered 558,800; the enrollment in public schools 360,177; and the average daily attendance 201,593. There were 8,156 teachers; 6,687 public school buildings, and school property valued at $1,636,055. The receipts for the previous year amounted to $1,364,438, and the expenditures to $1,306,186. For higher education there were 91 public schools, 46 private secondary schools, 7 public, and 11 private normal schools, 9 colleges and universities for men, and 12 colleges for women. The men's colleges include Mississippi College, at Clinton; Jefferson College, near Natchez; Rust University, at Holly Springs; Millsaps College, at Jackson; and University of Mississippi, at University. Among the most notable women's colleges are the Industrial Institute and College, at Columbus; Blue Mountain Female College, at Blue Mountain; East Mississippi Female College, at Meridian; and Stanton College for Young Ladies, at Natchez.

Churches.—The strongest denominations in the State are the Regular Baptist, colored; Regular Baptist; Methodist Episcopal, South; African Methodist; Methodist Episcopal; Roman Catholic; Presbyterian, South; Cumberland Presbyterian; Disciples of Christ, and Protestant Episcopal. In 1899 there were 1,664 Evangelical Sunday-schools, with 11,967 officers and teachers and 93,533 scholars.

Postoffices and Periodicals.—In 1901 there were 1,951 postoffices of all grades; and 224 periodicals, of which 14 were daily, 1 tri-weekly, 5 semi-weekly, 181 weekly, 1 tri-monthly, 11 semi-monthly, and 11 monthly.

Railroads.—The total length of railroads within the State on Jan. 1, 1901, was 2,955 miles, of which 128 miles were completed during the previous year.

Finances.—The total indebtedness of the State on Sept. 1, 1901, including $2,208,300 of debt for school funds, on which interest alone is paid, was $2,811,300, and this is nearly all held by State funds. The assessed valuation in 1900 was as follows: Real estate, $131,315,821; personal property, $57,400,338; total, $215,765,947; and the tax rate, $6.00 per $1,000.

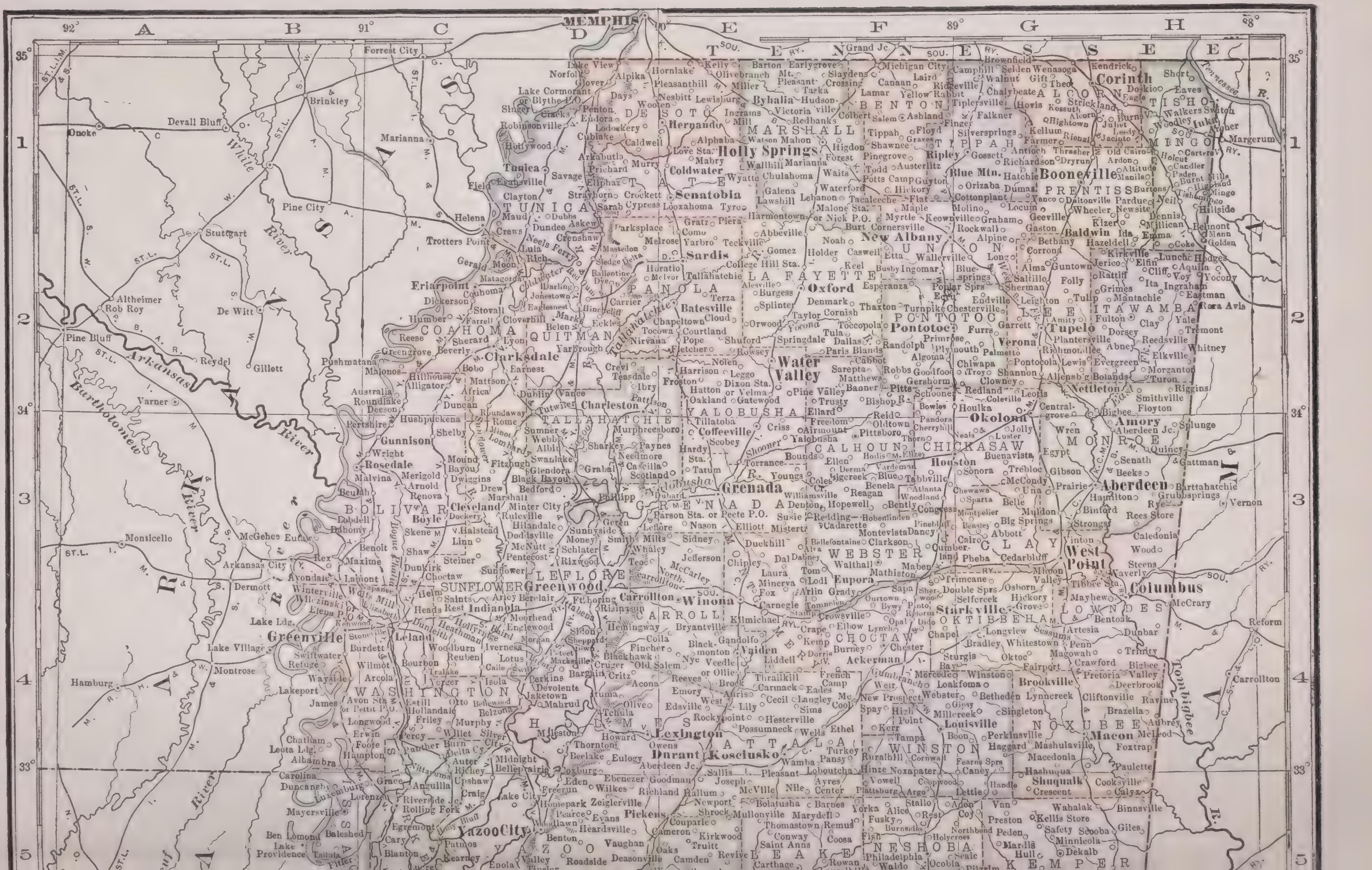
State Government.—The governor is elected for a term of four years, and receives a salary of $3,500 per annum. Legislative sessions are held quadrennially, beginning on Tuesday after the first Monday of January, and are unlimited as to length of session. The legislature is Democratic, with the exception of two Populists in the House, each member receiving $400 per annum and mileage. There are 7 representatives in Congress. The State government in 1901 was Democratic.

History.—Mississippi was originally part of the colony of Louisiana, being settled by the French in 1716. In 1728 the settlers were nearly exterminated by the Indians, and in 1763 the territory was ceded to Great Britain. At the end of the Revolution it became a territory of the United States, and was admitted to the Union as a Federal State Dec. 10, 1817. In 1861 it passed an ordinance of secession, took a prominent part in the Civil War, and finally, in January, 1869, was readmitted to representation in Congress, after ratifying the 15th amendment. Amendments to the State constitution were made in 1875 and 1877. Since the war the State has made much progress, and has entered a state of continued prosperity.

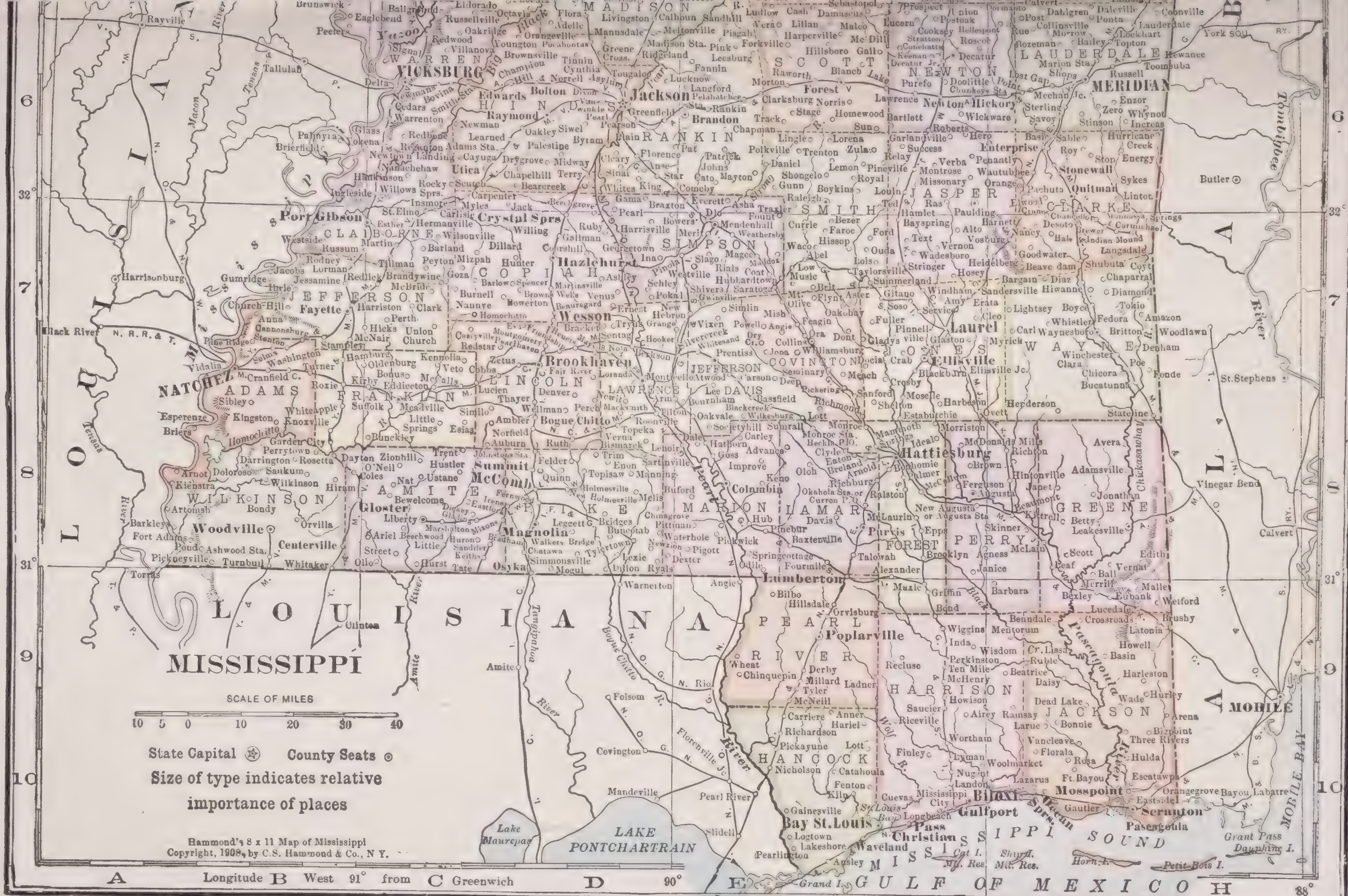
ANDREW H. LONGINO.

Mississippi, University of, a coeducational non-sectarian institution at University Station, Miss.; chartered in 1844, opened in 1848; has grounds and buildings valued at over $600,000; endowment, $700,000; scientific apparatus, etc., $100,000; volumes in the library, 26,000; ordinary income, $150,000; average number of faculty, 45; students, including summer school, 500.

Mississippi College, an educational institution in Clinton, Miss.; opened in 1827 under the auspices of the Baptist



A
B
C
D
E
F
G
H
1
2
3
4
5
92°
91°
90°
89°
88°
35°
34°
33°
MEMPHIS
TENNESSEE
ARKANSAS
Forrest City
Brinkley
Devall Bluff
Onoke
Marianna
Helena
Pine City
Stuttgart
De Witt
Gillett
Altheimer
Rob Roy
Pine Bluff
Reydel
Varner
Monticello
Hamburg
Montrose
Lake Village
Dermott
Arkansas City
McGehee
White River
Arkansas River
Bartholomew
DE SOTO
MARSHALL
BENTON
TIPPAH
ALCORN
TISHOMINGO
PRENTISS
TUNICA
TATE
PANOLA
LA FAYETTE
UNION
PONTOTOC
LEE
ITAWAMBA
COAHOMA
QUITMAN
TALLAHATCHIE
YALOBUSHA
CALHOUN
CHICKASAW
MONROE
BOLIVAR
SUNFLOWER
LEFLORE
GRENADA
CARROLL
MONTGOMERY
WEBSTER
CLAY
LOWNDES
OKTIBBEHA
CHOCTAW
WASHINGTON
HOLMES
ATTALA
WINSTON
NOXUBEE
YAZOO
MADISON
LEAKE
NESHOBA
KEMPER
ISSAQUENA
SHARKEY
Hernando
Holly Springs
Senatobia
Coldwater
Tunica
Sardis
Batesville
Oxford
New Albany
Ripley
Corinth
Booneville
Iuka
Tupelo
Pontotoc
Okolona
Aberdeen
Amory
Clarksdale
Friarpoint
Charleston
Water Valley
Coffeeville
Grenada
Greenwood
Winona
Carrollton
Houston
West Point
Columbus
Starkville
Louisville
Macon
Ackerman
Eupora
Kosciusko
Durant
Lexington
Greenville
Leland
Indianola
Cleveland
Rosedale
Yazoo City
Tombigbee River
Mississippi River
Tallahatchie
Sunflower
Bogue Phalia


MISSISSIPPI
SCALE OF MILES
10 5 0 10 20 30 40
State Capital
County Seats
Size of type indicates relative
importance of places
Hammond's 8 x 11 Map of Mississippi
Copyright, 1908, by C.S. Hammond & Co., N.Y.
Longitude West 91° from Greenwich
LOUISIANA
ALABAMA
GULF OF MEXICO
MISSISSIPPI SOUND
LAKE PONTCHARTRAIN
Lake Maurepas
MOBILE BAY
Tombigbee River
Pearl River
Pascagoula River
VICKSBURG
Jackson
NATCHEZ
MERIDIAN
Hattiesburg
MOBILE
Biloxi
Gulfport
Bay St.Louis
Laurel
Brookhaven
McComb
Woodville

Church; has grounds and buildings valued at over $40,000; aggregate endowment funds, about $120,000; volumes in the library, 3,500; ordinary annual income, about $20,000; average number of faculty, 13; average student attendance, 345.

Mississippi River (from an Indian word signifying Great Water, or Father of Waters), a river of the United States, forming with its tributaries one of the great water systems of the world. Its course lies between the 29th and 48th parallels of N. latitude. From the headquarters of the Missouri, which is now recognized as the parent stream (the upper Mississippi being really a tributary) to the mouth of the Mississippi is a distance of 4,200 miles, the longest river course in the world. It drains an area of 1,246,000 square miles, occupied by the States lying between the Appalachian mountains on the E., the Rocky Mountains on the W., the Great Lakes on the N., and the Gulf of Mexico on the S. The Mississippi forms the boundary between the States of Minnesota (in part), Iowa, Missouri, Arkansas, and Louisiana (in part) on the W. bank, and Illinois, Kentucky, Tennessee, and Mississippi on the E. bank. There are several cataracts, the best known being the Falls of St. Anthony at Minneapolis,

DELTA OF THE MISSISSIPPI.

Minn., marking the headwaters of navigation. The falls are 16 feet in height. Rapids occur for several miles farther down. At the junction of the Des Moines river, the Mississippi is a mile broad, with clear waters of a bluish tint. There are numerous islands and the current averages 2 miles an hour. The banks are bordered in many places by steep bluffs, cut by ravines and covered with forests. In other places there are prairies covered with wild rice. The principal affluents above the entrance of the Missouri are the St. Peter's, St. Croix, Chippewa, Wisconsin, Rock, Des Moines and Illinois. Below the junction of the Missouri, the character of the river,

which is here about one and a half miles broad, and of a muddy nature, is due to its tributary. The united waters have only, from their confluence to the mouth of the Ohio, a medial width of about three-quarters of a mile. The junction of the Ohio seems also to produce no increase, but rather a decrease, of surface; and the river, in its natural state is still narrower at New Orleans, which is only 120 miles from its mouth. Its depth, nevertheless, is so much increased that, at the shallowest places, there are usually six feet of water when the river is lowest. The rapidity of the current is more than doubled; and it presents, except in the dry season, a turbid and dangerous volume of water, passing between jagged and continually falling shores, and leaving, wherever its waters have receded, large deposits of mud. Accidental circumstances often shift the current on to the islands or bends of the river, and every season makes great changes in the channel. Thus, by continually shifting its course, the Mississippi sweeps away, during a great portion of the year, considerable tracts of alluvium, which were gradually accumulated by the overflow of former years. About 190 miles below the confluence of the Missouri, the Mississippi receives the Ohio, flowing, with its light-green stream, from the E., bringing with it also the waters of its tributaries. At this point, not only does the stream turn S. W., but the bluffs on both sides retire, and a plain extends on both sides the river, ranging from 30 to 50 miles in breadth, still expanding as it approaches the mouth, where it is probably three or four times that width. About 380 miles below the influx of the Ohio, is the junction of the Arkansas and White rivers, which enter the main stream close to each other on the W. bank. Thence to the confluence of the Red river is a distance, S. by W., of 360 miles, measured along the stream; and below this latter point the river trends S. E., and enters the Gulf of Mexico, after a course of 335 miles from the Red river.

The lower part of the Mississippi is so much flooded after the rainy season that there is often a space of inundated woodland from 30 to 100 miles in width; large swamps and bayous, also, are found, during the whole year, on both sides the river. The Mississippi is subject to inundations, often destructive in their effects. The waters, however, which are thus sent down from the colder regions of the W. and N., and the temperate region of the Ohio valley, are not supplied simultaneously — the S. rivers sending down their floods early in the year, while the N. keep up their supplies as late as midsummer. To secure the land from these inundations, immense embankments, or levees, as they are generally called, have been formed along the Mississippi, and the

canals or bayous through which its waters overflow. Below the Arkansas river dilatation the swamps receive a vast body of water, by which means the current becomes less rapid. As soon as the river enters the delta, its rapidity is further slackened through the diffusion of its waters into various subordinate channels. From this point to New Orleans no variation is perceptible. The white waters of the Mississippi do not readily mix with the sea, and may be distinguished from 9 to 14 miles from Balize. The facilities afforded by the Mississippi and its various tributaries for internal navigation are wholly unequalled, except, perhaps, by the Amazon and the Kongo, with their feeders. The Mississippi is united with the Great Lakes and the basin of the St. Lawrence by canal system, and goods taken on board at New York may be transported to New Orleans without being unshipped, and conversely. De Soto, 1541, was the first European who explored the Mississippi. He died upon it, and was buried in it. Marquette and Joliet in 1673, and La Salle in 1682, made explorations, the latter descending to its mouth.

Mississippi River Improvements. As early as 1886 the attention of the United States government was directed to the improvement of the Mississippi. At that date JAMES B. EADS (*q. v.*) laid plans before Congress looking to the removal of snag obstructions, but no money was then appropriated. By 1879 the engineer above mentioned had succeeded in deepening the mouth of the Mississippi to a considerable degree. In the same year Congress authorized the appointment of a Mississippi River Commission, but it was not until 1892 that expenditure upon the levees became a settled policy. From 1850–1890 about $35,000,000 had been spent upon these embankments, but nearly one-half of the sum was paid by five States of the lower Mississippi valley. The general government now places in the hands of the commissioners from $2,000,000 to $3,000,000 a year for improvements in the river. It was estimated by the commission, in 1897, that $18,000,000 were still needed to complete the work, and that further outlay would be chiefly in the line of maintenance of constructions.

The congressional appropriation for 1900–1901 was apportioned as follows:

Upper St. Francis Levee District	$ 20,000
Lower St. Francis Levee District	114,500
White River Levee District	50,000
Upper Yazoo Levee District	94,000
Lower Yazoo Levee District	150,000
Upper Tanzas Levee District	300,000
Lower Tanzas Levee District	110,000
Atchafa Levee District	55,000
La Fourche Levee District	28,000
Barataria Levee District	14,000
Lake Borque Levee District	14,500
Dredges and dredging	400,000
Surveys and observations	40,000
Plum Point Reach	80,000
Hopefield Point	50,000
Ashbrook Neck	70,000
Lake Providence Revetment	75,000
Kemple Bend Revetment	75,000
Giles Bend Revetment	150,000
For Surveys	15,000
Plant	75,000

Mississippi Scheme, a bubble scheme projected by John Law in Paris in 1717. Part of the scheme was for the colonization and development of the Mississippi valley, but combined with this there was a banking scheme and a scheme for the management of the National debt, the whole being supported by the French government. Such were the hopes raised by this undertaking that the shares originally issued at 500 livres (say $100) were sold at 10, 20, 30, and even 40 times their value. People came from all parts of France, and even from foreign countries, in order to invest in the company, and there was a general mania of speculation. The State took advantage of the popular frenzy to issue increased quantities of paper money, which was readily accepted by the public creditors and invested in shares of Law's company. This went on till the value of the paper money became depreciated in value and the shares fell in price. All attempts to check the downward course failed, and when Law, the originator of the bankrupt company, fled from France in 1720 the State acknowledged itself debtor to the shareholders to the extent of $340,000,000. See LAW, JOHN.

Missolonghi (-long'gē) (Mesolongion), a seaport town of Greece, in the nomarchy of Ætolia, on the N. shore of the Gulf of Patras, 24 miles W. of Lepanto. A modern place, built on a swampy flat, in 1821–1822 it was vainly invested for three months by land and sea by the Turks; in 1825–1826 it was again besieged by an overwhelming Ottoman force, and, after 10 months of resistance and suffering, its garrison, reduced from 5,000 to 3,000 fighting men, cut their way through the ranks of the enemy, carrying with them a great number of women and children. The Turks then entered the town, which was all but totally destroyed. There is a statue (1835) over the grave of Bozzaris, and another (1881) of Lord Byron, on the spot where his heart is interred. Pop. about 9,000.

Missouri, a State in the South Central Division of the North American Union, bounded by Iowa, Illinois, Tennessee, Arkansas, Indian Territory, Kansas, and Nebraska; admitted to the Union, Aug. 10, 1821; number of counties, 115; area, 68,735 square miles; pop. (1900) 3,108,665; (1910) 3,293,335; capital, Jefferson City.

Topography.— Though the surface of the State presents no considerable elevations, it is greatly diversified. In the S. W. part are the Ozark Mountains, a series of isolat-

SOUTH EAST CORNER OF MISSOURI
Same scale as large map
ATCHISON
NODAWAY
WORTH
HARRISON
MERCER
PUTNAM
SULLIVAN
GENTRY
GRUNDY
HOLT
ANDREW
DAVIESS
DEKALB
LIVINGSTON
LINN
BUCHANAN
CLINTON
CALDWELL
CARROLL
CHARITON
PLATTE
CLAY
RAY
CARROLL
RANDOLPH
HOWARD
SALINE
LAFAYETTE
JACKSON
CASS
JOHNSON
PETTIS
COOPER
MORGAN
BENTON
HENRY
BATES
ST CLAIR
HICKORY
CAMDEN
VERNON
CEDAR
DADE
POLK
DALLAS
LACLEDE
BARTON
JASPER
NEWTON
LAWRENCE
GREENE
WEBSTER
DOUGLAS
OZARK
TANEY
BARRY
STONE
CHRISTIAN
MONITEAU
MILLER
MARIES
PHELPS
PULASKI
CRAWFORD
DENT
REYNOLDS
WRIGHT
TEXAS
SHANNON
CARTER
RIPLEY
BUTLER
STODDARD
DUNKLIN
PEMISCOT
NEW MADRID
MISSISSIPPI
SCOTT
CAPE GIRARDEAU
BOLLINGER
WAYNE
CLARK
SCHUYLER
ADAIR
KNOX
LEWIS
SHELBY
MARION
RALLS
PIKE
LINCOLN
WARREN
MONTGOMERY
CALLAWAY
BOONE
AUDRAIN
PIKE
MONROE
RANDOLPH
CHARITON
SULLIVAN
ADAIR
MACON
SHELBY
KNOX
LEWIS
CLARK
SCHUYLER
SCOTLAND
ANDREW
BUCHANAN
DEKALB
CLINTON
CALDWELL
CARROLL
RAY
CLAY
PLATTE
HOLT
ATCHISON
NODAWAY
WORTH
HARRISON
MERCER
PUTNAM
SULLIVAN
GRUNDY
LIVINGSTON
LINN
MACON
ADAIR
KIRKSVILLE
MEXICO
MOBERLY
HANNIBAL
PALMYRA
LA PLATA
MACON
BROOKFIELD
CHILLICOTHE
TRENTON
GALLATIN
PLATTSBURG
LIBERTY
KANSAS CITY
INDEPENDENCE
LEXINGTON
MARSHALL
SEDALIA
WARRENSBURG
CLINTON
HARRISONVILLE
PLEASANTHILL
HOLDEN
BELTON
RAYMORE
GARDNER
OLATHE
LENEXA
SHAWNEE
MERRIAM
PRAIRIE VILLAGE
LEAVENWORTH
ATCHISON
TOPEKA
OSKALOOSA
TONGANOXIE
LAWRENCE
OTTAWA
BURLINGAME
OSAGE CY
LOMAX
LYNDON
BURLINGTON JC.
WAVERLY
GARNETT
BURLINGTON
LEROY
COLONY
YATES CENTER
IOLA
MORAN
BLUEMOUND
MOUND CITY
TRILBY
FORT SCOTT
EDWARD
PIQUA
ROPER
CHANUTE
BENEDICT
BENEDICT JC.
FREDONIA
ERIE
WALNUT
OSKALOOSA
GIRARD
MIDWAY
CHEROKEE
PARSONS
CHERRYVALE
MINERAL
MOUND VALLEY
INDEPENDENCE
OSWEGO
COLUMBUS
DEARING
COFFEYVILLE
CHETOPA
WEBB CITY
CARTERVILLE
CARTHAGE
JOPLIN
DUENWEG
SARCOXIE
PIERCE CITY
MONETT
AURORA
MARSHFIELD
SPRINGFIELD
NIXA
OZARK
GALENA
REEDS SPRING
CASSVILLE
EXETER
WHEATON
PURDY
MCDONALD
NEWTONIA
SENECA
GRANBY
NEOSHO
DIAMONDVILLE
TIPTONFORD
RACINE
DELFAST
SARALAND
CAGLE
CHILWOOD
PROSPERITY
TUCKAHOE
KNIGHTS
REEDS
STOTTS CY
ELLIOTT
MT. VERNON
REPUBLIC
BILLINGS
NIXA
OZARK
GALENA
REEDS SPRING
CASSVILLE
EXETER
WHEATON
PURDY
MCDONALD
NEWTONIA
SENECA
GRANBY
NEOSHO
DIAMONDVILLE
TIPTONFORD
RACINE
DELFAST
SARALAND
CAGLE
CHILWOOD
PROSPERITY
TUCKAHOE
KNIGHTS
REEDS
STOTTS CY
ELLIOTT
MT. VERNON
REPUBLIC
BILLINGS
NIXA
Campbell
Tallapoosa
Clarkton
Gideon
Conran
Portageville
Holcomb
Pine City
Wardell
Frisby
Burgess
Godair
Whitewater
PEMISCOT
Buckhorn
City
Root
Terry
Kennett
Pascola
Hayti
Carruthersville
Johnson
Senath
Deering
Carleton
Micola
Canady
Steele
Cardwell
Hornersville
Holland
Dyersburg
Paulding
Hollywood
State Line
ARK
TENN
Mississippi River
36°
90°
36° 30'

MISSOURI

SCALE OF MILES

0 10 20 30 40

State Capital ☆ County Seats ⊙

Size of type indicates relative importance of places.

H 92° J 91°30′ K 91° L 90°30′ M 90° N 89°30′ O 89°

1 2 3 4 5 6 7 8

40° 39°30′ 39° 38°30′ 38° 37°30′ 37° 36°30′ 36°

SPRINGFIELD ST. LOUIS

Jefferson City

Hannibal Louisiana Bowling Green Mexico Columbia Fulton Montgomery City Warrenton Troy Wentzville St. Charles Washington Union Hermann Rolla Salem Farmington Desoto Bonne Terre Ironton Pilot Knob Fredericktown Cape Girardeau Jackson Sikeston New Madrid Kennett Poplar Bluff Dexter Piedmont Van Buren Eminence Ellington Doniphan Ava Mountain View West Plains Willow Springs Houston Licking Waynesville St. Robert Lebanon Marshfield Hartville Mansfield Gainesville Ozark Forsyth Springfield Ash Grove Bolivar Buffalo Hermitage Stockton Clinton Warsaw Osceola Lamar Nevada Butler Rich Hill Appleton City Harrisonville Pleasant Hill Lee's Summit Independence Kansas City Liberty Plattsburg Gallatin Trenton Chillicothe Brookfield Macon Moberly Mexico Fulton Columbia Boonville Glasgow Marshall Sedalia Warrensburg Clinton Maryville Bethany Cameron Savannah St. Joseph Albany Stanberry Gallatin Hamilton Cameron Plattsburg Richmond Lexington Carrollton Brunswick Keytesville Chillicothe Trenton Princeton Unionville Milan Kirksville Memphis Edina Shelbyville Bethany Albany Maryville Tarkio Rock Port Fairfax Oregon Forest City Craig Mound City Hopkins Skidmore Maitland Barnard Guilford Conception Junction Conception Conception Jct. Cosby Stewartsville Easton Agency Amazonia Savannah Rushville Plattsburg Smithville Liberty Kearney Excelsior Springs Richmond Orrick Camden Point Napoleon Lexington Wellington Waverly Corder Higginsville Mayview Odessa Lone Jack Grain Valley Blue Springs Independence Kansas City Raytown Grandview Belton Peculiar Harrisonville Cleveland Pleasant Hill Lee's Summit Greenwood Holden Kingsville Warrensburg Knob Noster Sedalia La Monte Green Ridge Smithton Dresden Hughesville Versailles Tipton Syracuse Otterville Boonville Arrow Rock Glasgow Fayette Huntsville Moberly Clark Centralia Sturgeon Hallsville Columbia Ashland Rocheport Harrisburg Boone Sturgeon Hallsville Centralia Mexico Vandalia Laddonia Bowling Green Louisiana Clarksville Frankford Perry McCune's Sta. Curryville Nadine Farber Vandalia Cyrene Ashley Edgewood New Hartford Whiteside Elsberry Silex Middletown Gazette Rush Hill Benton City Martinsburg Wellsville Auxvasse Mokane Portland Bluffton Steedman Hermann Washington Union Pacific Gray Summit Labadie Sherwood Kirkwood Webster Groves St. Louis Belleville Shattuck Centralia Salem Ashley Nashville Waterloo Columbia Jefferson Barracks Quarantine Sulphur Springs Ldg. Pevely Bushberg Herculaneum Festus Crystal City Hillsboro Silica Horine Sta. Hematite Victoria Plattin Selma Fluorspar Valles Mines Little Rock Big River Bonne Terre Desloge Leadwood Elvins Esther Doerun Ironton Pilot Knob Arcadia Blush Frederickstown Mine La Motte Cornwall Precinct Shawneetown Daisy Cape Girardeau Jackson Oriole Jonesboro Mayfield Marquand Zion Bessville Glenallen Marblehill Choat Whitewater Allenville Arbor Delta Rockview Ways Graysboro Commerce Mound City Bloomfield Dexter Poplar Bluff Qulin Harviell Taft Naylor Neelysville Campbell Gideon Clarkton Hickman Madrid Lilbourn Tallapoosa Risco Caruthersville Hayti Steele Kennett Senath Cardwell Charleston Bertrand Samos Henson Matthews Charter Oak Dudley Fisk Essex Grayridge La Valle Maulsby Como Mary Ristine Laforge Farmington Mound Sta. Columbus Belmont Cresco Tram Sw. E. Prairie Morehouse Bloomfield Idalia Bluffington Homine Spgs. Hillard Sawyer Nye Dudley Fisk Dexter Bernie Poplar Bluff E. Poplar Bluff Quercus Calhoun Paragon Dunklin Campbell Gibson Success Neelysville Naylor Taft Oxly Harviell Briarcreek Grandin Pleasantgrove Brady Alton Many Spgs. Cottrell Brandsville Cottrell Bly Koshkonong Hy Couch Myrtle Thayer Lebo Lanton Moody Gatewood Burr Glenn Donophan Ava Cureall Chapin Thomasville Greer Braswell Bardley Cull Westplains Grimmet Olden Pomona Cobalt Whitechurch Bandyville Barren Hutton Valley Trask Monteer Bartlett Mountainview Willow Springs Burnham Vanceburg Success Summerfield Morrellton Stanton Sullivan Hulsey Bourbon Coffeyton Hollin Rockspring Vineland Blackwell Cuba Leasburg Knobview St. James Arlington Newburg Rolla Steelville Patsy Fanning Hinch Koland Latty Potosi Cadet Shirley Mineralpoint Summit Hopewell Savoy Maryllen Bismarck Quaker Dillard Sligo Bangert Lacoma Winkler Cook Sta. Wesco Keysville Huzzah Brazil Palmer Cherryville Decamp Elk Prairie Beaver Meramec Spgs. Steelville Crawford Phelps Pulaski Franklin Jefferson Washington Ste. Genevieve St. Francois Perry Cape Girardeau Bollinger Stoddard Scott Mississippi New Madrid Pemiscot Dunklin Butler Ripley Oregon Howell Texas Shannon Carter Reynolds Iron Madison Wayne Lincoln Pike Audrain Montgomery Warren St. Charles Callaway Boone Cooper Howard Chariton Randolph Macon Shelby Marion Ralls Monroe Lewis Clark Scotland Knox Adair Sullivan Linn Grundy Mercer Putnam Schuyler Sullivan Adair Knox Scotland Clark Lewis Shelby Marion Ralls Pike Audrain Montgomery Warren St. Charles Lincoln Callaway Boone Cooper Howard Chariton Randolph Macon Monroe Adair Sullivan Linn Grundy Mercer Putnam Schuyler Clark Lewis Shelby Marion Ralls Pike Audrain Montgomery Warren St. Charles Lincoln Callaway Boone Cooper Howard Chariton Randolph Macon Monroe

Illinois River Mississippi River Missouri River

Longitude 92° J West 91°30′ K from 91° L Greenwich 90°30′ M 90° N 89°30′ O 89°

Copyright, 1908, by C.S. Hammond & Co., N.Y.

Hammond's 8 x 11 Map of Missouri.

Missouri

ed knobs, peaks, and cliffs of sandstone, some reaching an altitude of 1,500 feet. The Mississippi river, forming the E. boundary line, is bordered by highlands in the shape of limestone bluffs, in some cases reaching a height of 350 feet. W. of these highlands the State is high and broken, becoming more and more level till the Osage river is reached. The principal rivers are the Mississippi, having a course of 470 miles along the E. boundary, the Missouri, which forms 200 miles of the W. boundary, and turning E. crosses the State, and flows 250 miles to the Mississippi. The Osage, St. Francis, Black, White, Gasconade, Current, Grand, and Charlton are all navigable for small boats at high water. Among unnavigable streams of importance are the Platte, Sac, Piney, Castor, Salt, South Grand, Nodaway, Fabrus, Meramec, Cuivre, and Niaugua rivers.

Geology.— The geological formations of Missouri are principally of Carboniferous origin, especially in the N. and W. Devonian rocks occur in the N. E. and S. W., extending in a S. direction toward St. Louis. The S. of the State is principally of Silurian formation, and the rocks include shale, limestone, conglomerate, and sandstone. Granite, greenstone, porphyry, and other Eozoic and Archean rocks occur in the S. and S. W.

Mineralogy.— Missouri has numerous valuable mineral resources. Gold is found in the drift sands of the N., and silver, lead, and iron ores are scattered over the entire State. In 1899 the output of coal was 3,025,814 short tons, valued at $3,591,945. This coal is of various varieties from a common bituminous to a fine cannel, and is much used for smelting purposes, and for firing boilers. The coal measures cover over 26,000 square miles. Missouri ranks second as a lead mining State, with an output in 1899 of 54,440 short tons; the iron production was 22,720 long tons; zinc 8,805 short tons; and coke was manufactured to the value of $5,520. The building stones include granite, valued at $151,688; sandstone, valued at $57,662; and limestone, valued at $977,399. Other important mineral products are sulphuret of nickel, manganese, wolfram, gypsum, asbestos, bitumen, fire clay, kaolin, hydraulic lime, saltpeter, and mica. There were many sulphurous, saline, and other mineral springs, with an output of 647,364 gallons, valued at $138,820.

Soil.— The soil is generally fertile, excepting on the hills, where it is mixed with such a proportion of iron oxides as to make it unproductive. The alluvial deposits of the Mississippi and Missouri are exceedingly fertile, and the swamps, when drained, yield enormous crops. The prairies produce tobacco and wheat of the best quality. Only about one-third of the State is cultivated, the remainder being to a large extent densely timbered. The principal forest trees are the elm, ash, oak, sugar maple, hackberry, dogwood, sassafras, sweet gum, black gum, calapa, tupelo, pawpaw, and pecan. Yellow pine grows abundantly around the head waters of the Black, White, and Current rivers, and extensive pine forests extend along the Arkansas border.

Agriculture.— Missouri ranks 3d among the United States in her agricultural wealth. In 1900 the principal farm crops were: Corn, 180,710,404 bushels, valued at $57,827,329; wheat, 18,816,713 bushels, valued at $11,873,429; oats, 24,695,373 bushels, valued at $5,679,936; potatoes, 10,106,961 bushels, valued at $3,537,436; hay, 2,768,015 tons, valued at $19,237,704; rye, 134,498 bushels, valued at $68,594; and buckwheat, 31,187 bushels, valued at $21,519. Other important crops are pear, clover, flax, hemp, garden fruits, and barley. Agricultural and creamery products, such as butter, cheese, barley, sorghum, beeswax, wine, and maple syrup, and molasses, are all developed to a high standard. Much of the territory N. of the Missouri river is covered with blue grass and is finely adapted to stock-raising.

Manufactures.— According to the Federal census of 1900 there were 18,754 manufacturing establishments reported, employing $249,888,581 capital and 134,975 persons; paying $60,719,428 for wages and $214,988,018 for materials; and having a combined output valued at $385,492,781.

Banking.— On Oct. 31, 1901, there were reported 72 National banks in operation, with $20,185,000 in capital, $17,328,523 in outstanding circulation, and $16,341,400 in United States bonds. There were also 588 State banks, with $17,836,800 capital and $5,752,779 surplus; 24 private banks, with $873,370 capital and $265,513 surplus; and 9 trust and loan companies, with $6,551,393 capital and a surplus of $2,569,118. The exchanges for the year ending Sept. 30, 1901, at the United States clearing houses at Kansas City and St. Joseph amounted to $1,145,732,742, an increase over those of the preceding year of $158,403,235.

Education.— In 1900 the children of school census age numbered 966,400; the enrollment in public schools 719,817; and the average daily attendance 460,012. There were 16,201 teachers, 10,478 public school buildings, and school property valued at $18,866,156. The receipts for the previous year amounted to $7,146,747 and the expenditures $7,816,050. For higher education there were 211 public high schools, 74 private secondary schools, 4 public, and 5 private normal schools, 27 colleges and universities for men and for both sexes, and 11 colleges for women. Among the

most noted men's colleges are Washington University, Christian Brothers College, and St. Louis University at St. Louis; William Jewel College, at Liberty; and the University of the State of Missouri, at Columbia. The women's colleges include Hardin College at Mexico; Christian College at Columbia; Cotte College for Young Ladies at Nevada, and Stephens College at Columbia.

Churches.— The strongest denominations in the State are the Roman Catholic; Regular Baptist, South; Disciples of Christ, Methodist Episcopal, South; Methodist Episcopal; German Evangelical Synod; Cumberland Presbyterian; Lutheran, Synod, Conference; Regular Baptist, Colored; Presbyterian, North; African Methodist; and Presbyterian, South. In 1899 there were 7,236 Evangelical Sunday-schools, with 70,013 officers and teachers, and 613,106 scholars.

Postoffices and Periodicals.— In 1901 there were 2,983 postoffices of all grades; and 1,045 periodicals, of which 84 were daily, 9 semi-weekly, 780 weekly, 4 bi-weekly, 13 semi-monthly, 143 monthly, 3 bi-monthly, and 9 quarterly.

Railroads.— The total length of railroads within the State on Jan. 1, 1901, was 6,974 miles, of which 65 miles were completed during the previous year.

Finances.— On Jan. 1, 1901, the total bonded debt was $1,887,000; school and seminary certificates, $4,393,839; total debt, $6,280,839. The assessed property valuation amounted to $1,004,469,071, and the tax rate was $1.90 per $1,000. The valuation of railroad and telegraph property, not included above, amounted to $112,673,986; and machinery, merchandise, etc., $63,144,571.

State Government.— The governor is elected for a term of four years, and receives a salary of $5,000 per annum. Legislative sessions are held biennially beginning on Wednesday after the first Monday of January, and are unlimited as to length of session. The Legislature has 34 members in the Senate and 140 in the House, each of whom receives $5 per day and mileage. There are 15 representatives in Congress. The State government in 1901 was Democratic.

History.— Missouri was first visited by the whites, under De Soto in 1541, and under Marquette in 1673. In the early part of the 18th century a brisk trade in furs between the French and the Indians led to French settlement. St. Louis, St. Genevieve, and other towns were founded about the middle of the century, but in 1762, after the conquest of New France by the English, this country was transferred to Spain. It was restored to France in 1800, and purchased by the United States in 1803, as part of the Louisiana Purchase. In 1812, a portion of Louisiana was set aside as the Territory of Missouri, and in 1821 it was admitted into the Union as a State. The question of its admission gave rise to a long and bitter political controversy in the halls of Congress, the South wishing to make of it a slave State and the North vigorously resisting. The dispute was at length settled by a compromise offered by Henry Clay, to the effect that slavery should be permitted in Missouri, but forever excluded from all other parts of the Louisiana Purchase N. of lat. 36° 30′. In 1836 Missouri was reduced from its Territorial to its present State limits. On the outbreak of the Civil War the people of Missouri were divided in sentiment, and both sides took up arms. Many conflicts took place in the State, but the activity of the Union party saved it from secession. After the war the State entered upon a career of unusual prosperity.

ALEXANDER M. DOCKERY.

Missouri, University of, a coeducational and non-sectarian institution in Columbia, Mo.; chartered in 1839, opened in 1841; has endowment exceeding $1,250,000; grounds and buildings valued at over $1,730,000; scientific apparatus, etc., $350,000; ordinary income, $625,000; volumes in the library, 115,000; average number of faculty, 170; average students, 2,850; graduates, over 4,000.

Missouri, a river of the United States; formed in the Rocky Mountains, in Montana, winds circuitously along the base of the mountains, then E. till it reaches the W. boundary of North Dakota and receives the Yellowstone. Here it begins to flow S. E. through North and South Dakota, then forms the E. boundary of Nebraska, separating it from Iowa and Missouri; separates for a short distance Kansas from Missouri, then strikes E. across the latter State, and joins the Mississippi after a course of 2,908 miles. It is navigable 2,500 miles from the Mississippi. Its affluents are very numerous on both banks, but by far the most important of them are the Yellowstone, the Nebraska or Platte, and the Kansas, all from the W.

Missouri Compromise, a term given to a compromise under an act of Congress passed in February, 1821, at which time Missouri was admitted into the Union as a slave State, declaring that all territory W. of Missouri and N. of lat. 36° 30′ (the S. boundary of Missouri) should forever be free from slavery. This compromise was virtually repealed in 1854, when territorial governments were established for Kansas and Nebraska.

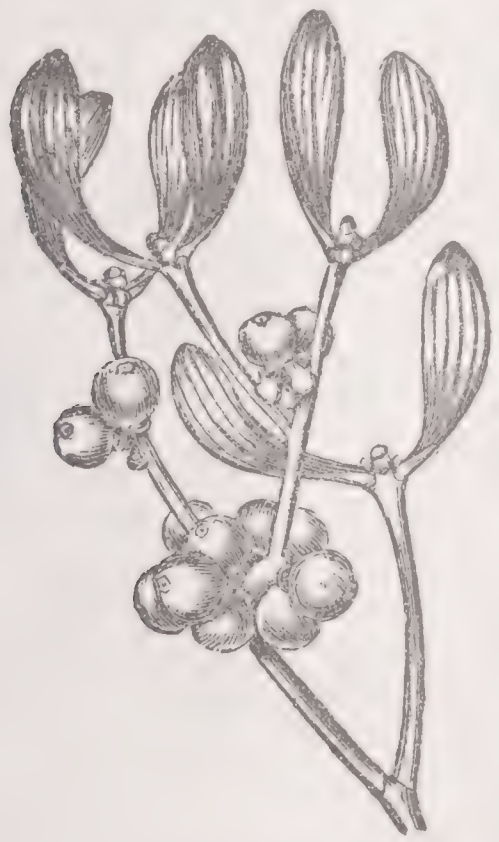
Missouri Valley College, a coeducational institution in Marshal, Mo.; founded in 1889 under the auspices of the Cumber-

land Presbyterian Church; has grounds and buildings valued at over $170,000; endowment funds aggregating $200,000; scientific apparatus, etc., $60,000; ordinary income, about $25,000; volumes in the library, about 14,000; average number of faculty, 15; average students, 215; graduates, over 650.

Mist. See Fog.

Mistassini (-sē′nē) **Lake,** a sheet of water in Canada, in about lat. 51° N., lon. 72° to 73° W.; length, about 125 miles; average width, 20 miles; it forms the head waters of the Rupert river. Up to 1885 it had never been thoroughly explored, but in that year an expedition visited its shores, and proved that it somewhat exceeded in extent the area previously assigned to it.

Mistletoe, *Viscum album,* a plant parasitic on the apple and other fruit trees, on the thorn, the oak, the poplar, the lime, the ash, etc. It sometimes kills the branch



MISTLETOE.

or even the tree on which it is a parasite. It occurs as a yellow-green glabrous pendent bush, one to four feet long, with the fibers of the roots insinuated into the wood of the tree on which it preys; its branches dichotomous, knotted; its leaves, one to three, glabrous; its flowers in threes, inconspicuous, green; its berries globose or ovoid, yellow, viscid. Found in the United States, also in Europe, and the N. of Asia. The United States mistletoe differs from that found in Europe in the fact that it has much broader leaves. Its botanical name is *Phoradendron flavescens.* In the Middle Ages the mistletoe was believed to be of use in epilepsy, a view since abandoned. Bird-lime (*q. v.*) is made from the berries. It was deemed sacred by the Druids, and still finds a large market in the United States and England when preparation is being made for Christmas festivities and sports. Kissing under the mistletoe, Scandinavian mythology: The wicked spirit, Loki, hated Balder, the favorite of the gods, and, making an arrow of mistletoe, gave it to Häder, the god of darkness and himself blind, to test. He shot the arrow and killed Balder. He was restored to life, and the mistletoe given to the goddess of love to keep, every one passing under it receiving a kiss as a proof that it was an emblem of love, and not of death.

Mistral, a violent cold N. W. wind experienced in the Mediterranean provinces of France, destroying fruit, blossoms, crops, etc. It blows most fiercely in the autumn, winter, and early spring.

Mistral, Frédéric (mēs-träl′), a Provençal poet; born a peasant's son, near Maillaune, Bouches-du-Rhone, France, Sept. 8, 1830. He studied law at Avignon; but not liking law, he went home to work on the land and write poetry, as Burns did before him. In 1859 he published the epic "Mirèio" (7th ed. 1884; Eng. trans. 1890), written in his native Provençal dialect. This charming representation of life in Southern France made Mistral's name famous throughout the country, and gained for him the poet's prize of the French Academy and the cross of the Legion of Honor. It also led to the formation of the society called Lou Felibrige, which set itself to create a modern Provençal literature. In 1867 Mistral published a second epic, "Calendou"; in 1876 a volume of poems, "Lis Iselo d'Or" (Golden Islands); a novel, "Nerto" (2d ed. 1884); and a dictionary of the Provençal dialect (2 vols. 1878–1886), the preparation of which occupied him many years.

FRÉDÉRIC MISTRAL.

Mistress of the Seas, the same as Sovereign of the Seas (*q. v.*).

Mistress of the World, a name anciently given to Rome; for many centuries she was the recognized capital of Christendom.

Mitau (mē'tou), the capital of the Russian province of Courland, on the right bank of the Aa, 27 miles S. W. of Riga; has a castle, begun by Biron in 1738 and now the seat of the governor of the province, six churches, a museum, etc., with some very important manufactures, and a trade in grain and timber; founded in 1271 by the grand-master of the Teutonic Knights, and annexed to Russia in 1795. From 1798 to 1807 it offered an asylum to Louis XVIII. Pop. (1897) 350,011, of whom more than one-half are Germans.

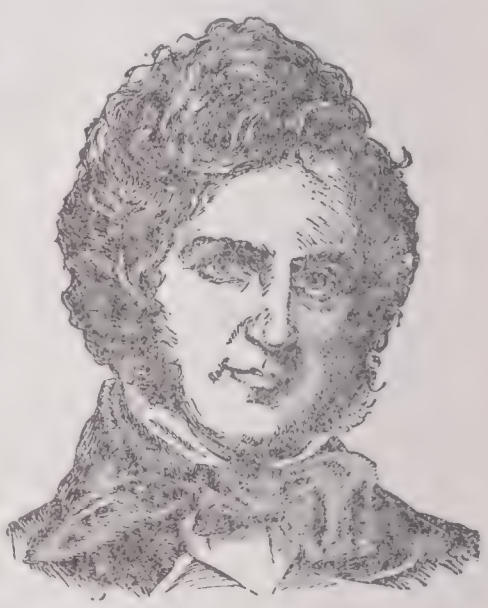
Mitchel, Frederick Augustus, an American author; born in Cincinnati, O., Dec. 4, 1839; was graduated at Brown University in 1860; served in the Union army in the Civil War and was fiction editor of the American Press Association. Wrote: "Chattanooga" and "Chickamauga," two romances of the Civil War.

Mitchel, John, an Irish patriot; born the son of a Presbyterian minister, in Dungiven, County Derry, Ireland, Nov. 3, 1815. He studied at Trinity College, Dublin, and practised several years as an attorney at Banbridge. Soon after the formation of the Young Ireland party, and the starting of the "Nation," in 1842, Mitchel began to contribute, and after the death of Thomas Davis, in 1845, he became assistant editor. But his language was too violent for the paper, and three years later he started the "United Irishman," for his articles in which he was tried on a charge of "treason-felony" and sentenced to 14 years' transportation. He was sent to Bermuda, and next to Van Diemen's Land, whence he made his escape to the United States in the summer of 1853. In New York he published his "Jail Journal, or Five Years in British Prisons" (1854). Next followed a series of short-lived newspapers, the "Citizen," the "Southern Citizen," the Richmond "Inquirer," and the "Irish Citizen," which cost him the confidence of many of his American friends by its enthusiastic defense of slavery and the South. Books were: "Life of Hugh O'Neill, Prince of Ulster" (1845); "History of Ireland from the Treaty of Limerick" (1868). In 1874 he returned unmolested to Ireland, and was elected to Parliament for Tipperary, but declared ineligible. Again elected, he died in Cork, Ireland, March 20, 1875.

Mitchel, Ormsby Macknight, an American astronomer and soldier; born in Morganfield Co., Ky., July 28, 1809. He was graduated at the United States Naval Academy in 1829; became Professor of Mathematics and Astronomy at Cincinnati College, O., in 1834, and was largely instrumental in building and equipping the observatory there; and was director of the Dudley Observatory, Albany, N. Y., 1859. He was made Brigadier-General in the Federal service, 1861; won the battle of Huntsville, Ala., April, 1862; was promoted to Major-General and Commander of the Department of the South. He delivered many popular lectures on astronomy, and published "Planetary and Stellar Worlds"; "The Orbs of Heaven"; "Elementary Treatise on the Sun"; and "Astronomy of the Bible." He died in Beaufort, S. C., of yellow fever, Oct. 30, 1862.

Mitchell, a city and county-seat of Davison co., S. D.; on the Chicago, St. Paul, Minnesota, and Omaha, and the Chicago, Milwaukee, and St. Paul railroads; 65 miles W. by N. of Sioux Falls. It is in an agricultural region, and is the seat of Dakota University (M. E.). It has manufactories of well-boring machinery and chemicals, and an assessed property valuation of nearly $1,000,000. Pop. (1890) 2,217; (1900) 4,055; (1910) 6,515.

Mitchell, Donald Grant, pseudonym IK MARVEL, an American author; born in Norwich, Conn., in April, 1822; was graduated at Yale in 1841; traveled in Europe; studied law in New York; and in 1847 published "Fresh Gleanings; or, a New Sheaf from the Old Fields of Continental Europe." He was in Europe in 1848, and wrote "The Battle Summer." This was succeeded by a satirical work entitled "The Lorgnette," which appeared anonymously, 1850. In the same year appeared "The Reveries of a Bachelor," and in 1851 his "Dream Life." In 1853 he became United States consul at Venice. Later publications were: "Fudge Doings" (1855); "My Farm of Edgewood" (1863); "Wet Days at Edgewood" (1865); "Seven Stories, with Basement and Attic" (1864); "Doctor Johns" (1866); "Rural Studies" (1867); "Out-of-Town Places" (1884); "English Lands, Letters, and Kings"; "American Lands and Letters"; etc. He died Dec. 15, 1908.



DONALD G. MITCHELL.

Mitchell, Elisha, an American chemist; born in Washington, Litchfield co., Conn., Aug. 19, 1793. He was graduated at Yale in 1813; in 1818 became Professor of

Mathematics in the University of North Carolina; and in 1825 of chemistry; in 1821 was ordained a Presbyterian minister; and was for some time State surveyor. He first ascertained that the mountains of North Carolina are the highest E. of the Rocky mountains. To settle some disputed points in regard to these heights, he re-ascended them in 1857, lost his way at night, fell down a precipice, and was killed June 27.

Mitchell, John, an American labor executive; born in Braidwood, Ill., Feb. 4, 1869; received a common school education; later studied law; worked in coal mines in 1882; joined the Knights of Labor in 1885, and went West, where he worked in coal mines till 1890; became secretary-treasurer of the sub-district of the United Mine Workers of America in 1895; President of the United Mine Workers of America in 1898; and was Vice-President of the American Federation of Labor in 1898 and 1900. President Mitchell took personal charge of the great strike in the anthracite coal mines in the summer of 1902.

Mitchell, John Ames, an American journalist; born in New York city, Jan. 17, 1845; studied at Lawrence Scientific School; studied architecture in Boston, Mass., and at the École des Beaux Arts in Paris, 1867–1870; practised as an architect in Boston, 1870–1876; afterward engaged in artistic and decorative work; studied drawing and painting in Paris, 1876–1880; was then in New York till 1883 as artist, illustrator, and writer; founded Jan. 3, 1883, "Life," of which he was editor. Wrote: "The Summer School of Philosophy at Mt. Desert" (1881); "Romance of the Moon" (1886); "The Last American" (1889); "Amos Judd" (1895); "That First Affair" (1896); "Gloria Victis" (1897); etc.

Mitchell, Maria, an American astronomer, daughter of William Mitchell; born in Nantucket, Mass., Aug. 1, 1818. She inherited her father's love of astronomy, which she made her life-work. She discovered a considerable number of nebulæ and a comet (in 1847), for which she received a medal from the King of Denmark. In 1858 she visited the principal observatories of Great Britain and the Continent. She was librarian of the Nantucket Athenæum for many years, and a computor on the "American Nautical Almanac." In 1865 she was appointed Professor of Astronomy and Director of the Observatory of Vassar College, a position which she held till 1888. She took part in several eclipse expeditions with parties of her students. She died in Lynn, Mass., June 28, 1889.

Mitchell, Silas Weir, a distinguished American physician, poet, and novelist; born in Philadelphia, Pa., Feb. 15, 1829; studied at the University of Pennsylvania; was graduated at Jefferson Medical College (1850); practised in Philadelphia and became prominent as a physiologist, especially as a neurologist and toxicologist; was member of National Academy of Sciences (1865), British Medical Association, etc.; LL. D. (Harv. and Univ. of Edinburgh), M. D. *honoris causa* (Bologna). He wrote treatises on "Neurology," "Serpent Poisons," "Comparative Physiology," and a number of papers on neurological subjects; "Doctor and Patient" (essays); "Hephzibah Guinness, and Other Stories" (1880); "In War Time" (1885), a novel; "Poems" (1882–1887); "Characteristics" (1893); "Hugh Wynne" (1897); "Adventures of François" "Autobiography of a Quack" (1900); "The Wager, and Other Poems" (1900); etc.

S. WEIR MITCHELL.

Mitchell, Walter, an American clergyman; born in Nantucket, Mass., Jan. 22, 1826; was graduated at Harvard University (1846); admitted to the bar (1849); became priest in the P. E. Church (1860); was rector of a number of parishes; chaplain of Kenyon College, and connected with the "Churchman," New York. He published: "Two Strings to His Bow"; "Bryan Maurice"; "Tacking Off Shore"; "The Mocking Bird"; etc. He died in 1908.

Mitchell, William, an American astronomer; born in Nantucket, Mass., Dec. 20, 1791. As a young man he fought for several years; then became bank cashier in Nantucket; made systematic astronomical determinations in connection with the United States Coast Survey; was made A. M. by Brown University in 1848, by Harvard in 1860, being overseer of the latter university and chairman of the committee to visit the observatory in Cambridge; contributed to "American Journal of Science"; etc. Astronomy and mathematics furnished the pastimes of his busy life. He died in Poughkeepsie, N. Y., April 19, 1868.

Mite, a name common to numerous small, in some cases microscopic animals, of the class Arachnida (spiders) and division

Acarida. The cheese mite is the *Acarus domesticus*, the flour mite *A. farinæ*, the sugar mite *A. saccharinus*.

Miter, or **Mitre,** in ordinary language, a form of head-dress worn by the inhabitants of Asia Minor; a head-band. In carpentry, a MITER JOINT (*q. v.*). In the Jewish religion, the divinely-appointed head-dress of the Jewish high priest. It had on it a golden plate, inscribed "Holiness to the Lord" (Exod. xxxix: 28–30). In the Christian religion, the head-dress of a bishop. Miters are supposed to have been first worn between the 7th century and the 10th. Cardinals at first wore them too, till the Council of Lyons, in 1245, enjoined them to use hats. The episcopal miter was doubtless suggested by that of the Jewish high priest. It is, however, considered to symbolize the "cloven tongues as of fire" which descended on the early Church on the day of Pentecost.

MITER.

Miter Joint, a joint formed by the meeting of matching pieces in a frame, the parts uniting on a line bisecting the angle, which is usually but not necessarily 90°.

Mitford, Mary Russell, an English writer; born in Alresford, Hampshire, England, Dec. 16, 1787; when 10 years old she drew a lottery prize of $100,000. Her father (a physician), having dissipated several fortunes, she adopted literature as a means of family support. Her most famous works were: "Our Village" (5 vols. 1824–1832); and "Recollections of a Literary Life" (1852–1854). Other works were the tragedies "Julian" (1823), "The Foscari" (1826), and "Rienzi" (1828), all produced by Macready or Charles Kemble, the last being the best; "Belford Regis" (1835), a novel; poems, short stories, juvenile stories, etc.; besides which she was a contributor to periodicals and all sorts of occasional publications. She died in Swallowfield, Jan. 10, 1855.

MARY R. MITFORD.

Mitford, William, an English historian; born in London, England, Feb. 10, 1744. He entered Queen's College, Oxford, but left without a degree. In 1761 he succeeded to the family estate of Exbury, near the New Forest, and in 1769 became a captain in the South Hampshire Militia, of which Gibbon was then major. By Gibbon's advice and encouragement he was induced to undertake his "History of Greece" (5 vols. 1784–1818), which held the highest place in the opinion of scholars till the appearance of Thirlwall and Grote. He sat in Parliament, 1783–1818, and died in Exbury, Feb. 8, 1827.

Mithras, the sun-god of the Persians, to which they paid adoration as the purest emblem of the divine essence. The worship of Mithras was introduced into Rome, seemingly not long after the fall of the republic, and soon spread over all parts of the empire. It was one of those which resisted Christianity the longest. The god is commonly represented as young, and kneeling on a bull which he has thrown on the ground, and which is also attacked by a dog, a serpent, and a scorpion.

MITHRAS.

Mithridates (-dā'tēz), surnamed EUPATOR, and THE GREAT, King of Pontus, and the 16th of the name; born about 131 B. C. He was the son of Mithridates Euergetes, was brought up at Sinope, and displayed in his youth the extraordinary daring and tact which distinguished him through life. He diligently cultivated his mind by study and travel, and is said to have been master of more than 20 languages. He succeeded his father, 120 B. C., and his first acts were the murder of his mother and his brother. He then began his career of conquest by mak-

ing himself master of Colchis and the Tauric Chersonese. The kingdoms of Bosporus, Cappadocia and Bithynia were successively added to his dominions. Friend and ally, as he professed to be, of the Romans, he obeyed the decree of the Senate, to restore the two last-named countries to their lawful sovereigns. But in 88 he again expelled those kings, and did not shrink from a war with the Romans; took Phrygia and Galatia, almost all Asia Minor, and occupied Thrace and Athens. All hope of reconciliation with Rome was taken away by the massacre, which he is said to have ordered, of all the Romans found in Asia. Eighty thousand are said to have been slain. Sulla was then sent against him, who, after taking Athens, and defeating his general, Archelaus, at Chæonea and Orchomenos, reconquered Ionia, Mysia, and Lydia. After four years of war, Mithridates was compelled to give up his conquest and his fleet, and pay a heavy contribution to the Romans. More fighting took place in 83 and 82, between Mithridates and the Roman commander Murena; and on the death of Nicomedes, King of Bithynia, in 74, the possession of his kingdom was disputed, and war again broke out.

Mithridates invaded Bithynia, defeated the Romans at Chalcedon, and besieged Cyzicus. Lucullus soon compelled him to raise the siege, defeated him in Pontus, and drove him into Armenia, where he obtained the aid of Tigranes, his son-in-law. Lucullus, however, defeated the allied sovereigns again and again, and but for the mutiny of his troops, which compelled him to retire, would probably have ended the war. Again the tide turned, and Mithridates recovered a large part of his dominions. In 66, Pompey was sent to carry on the war, and defeated him near the Euphrates, so that he had no choice but to retire into the kingdom of Bosporus. His spirit was still unbroken, and he formed the bold plan of invading Italy from the N.; but eventually his son Pharnaces was proclaimed king by the soldiers, and the great warrior, who had withstood the power of Rome for 25 years, took poison to end his life. This proved ineffectual, from the frequent use he had before made of poisons and antidotes, and he was put to death by a faithful Gaul in his service, 63 B. C.

Mitla (mēt'lä), a ruined city of Mexico, 15 miles S. E. of Oajaca, with extensive remains of a prehistoric race.

Mitrailleuse (mē-trā-yuhz'), in ordnance, a weapon designed to fire a large number of cartridges in a short time. The name is given chiefly to those which are intended for use against men, firing, therefore, ordinary rifle bullets; but weapons of higher caliber, designed to discharge heavier projectiles against "material," are usually called "machine guns." In each instance, however, the weapon is a breechloader, and the shot is carried in a metal cartridge. The earliest forms were the French mitrailleuse and the Belgian Montigny mitrailleuse, both being composed of a number of barrels fastened in a group surrounded by a metal casing, the cartridges being contained in steel blocks, which are dropped successively into a "slot" or opening in the breech, and replaced, when discharged, by a fresh plate. The rate of the firing of the Montigny was about 444 shots per minute, of the French piece 300 per minute. Those at present mostly in use are the Gatling (caliber .45-inch) with 10 revolving barrels, and the light Nordenfeldt and Gardner patterns, with fixed barrels. These are fed from a drum containing cartridges, which is placed over a slot on the upper surface of the case covering the barrels. A scattering arrangement is usually fitted to the mitrailleuse, which causes the barrels to move from side to side while the piece is being discharged. The machine guns firing shot large enough to penetrate even thin iron plates are the Gatling (caliber .65-inch), the Nordenfeldt (caliber 1-inch), and the Hotchkiss (caliber 1.46-inch), and all these have fixed barrels without any scattering machinery. The first-mentioned fires 200 rounds per minute; the Nordenfeldt, 100 rounds in the same time. The Nordenfeldt pattern consists of four barrels fastened side by side horizontally in a frame. It is fed from a carrier on top of the breech of the machine, which is filled by hand as it becomes empty. In the Hotchkiss gun the barrels, five in number, revolve, and in addition to solid cast iron and steel shots, it fires explosive shells and canister, at the rate of 25 per minute. See AUTOMATIC GUN.

Mitscherlich, Eilhard (mitsh'er-li*h*), a German chemist; born in Neuende, near Jever, Germany, Jan. 7, 1794. At the University of Heidelberg (1811–1813) he devoted himself to philology, especially to Persian. At this time of his life his ambition was to go to Persia, and for this end he visited Paris and began to study medicine in Göttingen after 1814. But while studying medicine, his deepest interest was arrested by the sciences of geology and mineralogy, chemistry, and physics. Work in the Berlin laboratory in 1819 led him to discover the law of ISOMORPHISM (*q. v.*). Berzelius invited the young chemist to Stockholm (1820), from which city he returned (1822) to fill the chair of chemistry at Berlin. One of his earliest discoveries after his appointment was that of the double crystalline form of sulphur, one of the first observed cases of DIMORPHISM (*q. v.*). His

investigations regarding the production of artificial minerals, and his memoirs on benzene and the formation of ether, must also be noted. His principal work is "Handbook of Chemistry" (1829–1835; 4th ed. 1840–1848; 5th begun in 1855, but not completed). He died in Schöneberg, near Berlin, Aug. 29, 1863.

Mittimus (mit′-), in law, a precept or command in writing given by a justice of the peace, or other proper officer, directed to the keeper of a prison, requiring him to receive and hold in safe keeping an offender charged with any crime till he be delivered by due course of law; a warrant of commitment to prison. Also a writ for removing records from one court to another.

Mitylene, or **Mytilene** (mit-i-lē′ne), an island of the Grecian Archipelago, belonging to Turkey, 7 miles from the coast of Asia Minor; between lat. 39° and 39° 20′ N., lon. 25° 50′ and 26° 35′ E.; area, 276 square miles; pop. about 40,000. It is traversed by a range of mountains attaining the height of 3,000 feet, and covered with pine forests; soil generally fertile; two bays indent the island on the S., and there are several good harbors. Products, corn, wine, oil, cotton, pitch, and fruits. Chief towns, Castro, or Mitylene, Molivo, and Culoni. Lesbos is said to have been peopled by the Pelasgians, who were followed by the Ionians and the Æolians. It was made a Roman province about 48 B. C.; and during the Middle Ages received the name of Mitylene from its chief city. Mohammed II. conquered it, and annexed it to the Turkish empire, in 1462. During the War of Independence, the Turkish and Greek squadrons fought a battle off Mitylene, Oct. 7, 1824, on which occasion the Turks were defeated and their fleet was destroyed. In consequence of strained relations between France and Turkey, a French fleet was sent to Mitylene, Nov. 5, 1901; and remained there till the Porte agreed in full to the demands made.

Mivart, St. George (miv′ärt), an English naturalist; born in London, England, Nov. 30, 1827; was educated at King's College, London, and at St. Mary's College, Oscott; Professor of Biology in University College, 1874–1877; Professor of the Philosophy of Natural History at the University of Louvain, Belgium, 1890. In 1844 he became a Roman Catholic. Among his chief works are: "Genesis of Species" (1870–1871); "Man and Apes" (1873); "Contemporary Evolution" (1876); "Origin of Human Reason" (1889); "Types of Animal Life" (1893); "Introduction to the Elements of Science" (1894). Though an evolutionist, he is well known as denying that evolution accounts for the human intellect. He died April 2, 1900.

Mixed Marriages, marriages between persons of different religions. In the United States the term generally defines a marriage between a Roman Catholic and a Protestant. In England a marriage between a baptized and an unbaptized person is ecclesiastically invalid, one being a member of the Roman Church and of any other Christian communion is valid, but illicit, unless a dispensation is first obtained. In the last century mixed marriages led to serious dissensions in Europe, and opposition to them, in obedience to papal briefs, to the imprisonment of the Archbishop of Cologne in 1837, and of the Archbishop of Posen in 1839. If a Roman Catholic and a Protestant desire to marry, they must, according to Catholic practice, promise that the children shall be brought up in the Roman communion; the bishop may then grant a dispensation and the marriage, without the nuptial benediction, must take place in a Roman Catholic church, without any repetition of the ceremony in a Protestant church.

Mizzen, or **Mizen,** the aftermost of the fore-and-aft sails of a ship; called also the spanker or spencer. Also the aftermost mast in a three-masted ship, or in those two-masted ships in which the forward mast is the larger, such as the ketch and yawl. The main is always the larger mast. When the larger mast in a two-masted vessel is forward, the one abaft is the mizzen; when the larger mast is abaft, the one nearer the bows is the fore-mast. The word mizzen indicates the relation of many parts, as mizzen top, mizzen shrouds, mizzen rigging, etc. The bonaventure mizzen is a second or additional mizzen mast employed in some ships with four masts.

Mnemonics (nē-mon′iks), the art of assisting the memory; a mode of recalling to the mind any fact or number, or a series of disconnected terms or figures. The various systems that have been proposed depend on the procedure that, to recall in the future a fact or figure, we associate it now with something else which is more to our hand; and afterward the mental reproduction or actual presentation of the latter will give a suggestion of the former in accordance with the psychological "law of contiguity." For example, what association has the date 871 with King Alfred? None whatever, directly; but if those digits immediately appear as "ami" by a scheme which the pupil has already accepted or invented, then a clue or linkword is furnished to serve for a lifetime: $a = 8$, $m = 7$, $i = 1$. Some rhythmical mnemotechnic contrivances have been used for ages: one, for example, which, notwithstanding the enormous multiplication of printed calendars, still survives is — "Thirty days hath September," etc. The

Mnemonics

Latin student is thankful for the mnemonic rhyme.

> In March, July, October, May,
> The ides are on the fifteenth day,
> The nones I on the seventh lay;
> The rest thirteenth and fifth alway;

and for centuries no text-book on logic has omitted the five hexameter lines (Barbara, Celarent, etc.) which compress the doctrine of the syllogism into a marvelous minimum of space. In these, however, as well as in the case of those numberless Latin verses over which so much time was till recently spent in our grammar schools, the only help afforded is from the association of the sounds of certain barbarous dactyls and spondees in the ear. The perfection of mnemotechny is when there is an association by sense or natural suggestiveness. The thought of A will frequently bring Z to the mind sooner than B, because there is something not only not similar but grotesquely dissimilar in the ideas they awaken. Whoever practises the art of memory with success always selects unconsciously such associations as are best suited to the situation from his own point of view; and thus the art cannot be imparted in detail.

The value of mnemotechny under certain aspects is incontestable, considering that many in every class of life are constantly applying some method of storing and then utilizing their knowledge. The art is, however, to be distinguished from the general faculty — memory, which is the essential and distinctive faculty of "mind." As such it depends not only on attention (as philosophers have ever taught), but on the healthy action of the nervous system and general physique, assisted perhaps in some individuals by a certain plastic and assimilative brain-power.

The topical mnemonics (Greek *topos*, "place") of the ancients is adapted for recalling in order the arguments and illustrations of a public speech, or the succession of ideas in a poem or narrative. It was attributed to Simonides the Greek poet, who died 469 B. C. The speaker having selected, for example, a house with which he is so familiar as to remember well the position, not only of each room and passage, but of all the prominent objects in every room, associates as vividly as possible the introduction of his discourse with the entrance hall, and systematically assigns thought after thought to the chief points there visible. The first main division of his subject may then be identified, as it were, with the dining room; and every piece of furniture, every picture, etc., be judiciously utilized for recalling the succession of arguments with their illustrations and results. The second main division may then be associated in like manner with the drawing room, and everything in it if need be; and thus for the rest of his discourse, till the successive rooms, statues, and windows, etc., are pressed into service, and all the series of his thoughts passed under review. The principle is that to recall a series of ideas they can be associated more easily with familiar (and, as it were, visible) objects or places than with each other. Another form of topical mnemotechny was based on imagining the four walls of each room, and its floor, to be each divided into nine places, and a distinct object — such as a particular bust, picture, or tree, etc. — to be inseparably associated with each place. When these objects are thoroughly known so as to be promptly and faultlessly recalled, then the mnemotechnist who has a succession of things to be remembered assigns them to a particular room and compels himself to detect some association, no matter how incongruous, between each of them and one of the "hieroglyphs" which are to serve as memorial links.

Many minor systems for learning dates and detached numbers have been based on that of Gregor von Feinaigle, a German who lectured in London, 1811. His scheme was

1	2	3	4	5	6	7	8	9	0
t	n	m	r	l	d	k	b	t	s

each letter was more or less suggestive of the figure which it represents: moreover, *p* may be supplanted by *f*, *k* by *c* or *g*, and *b* by *v* or *w*, etc. Thus, as an example, the Anglian kingdom from the Humber to the Firth of Forth was founded in 547, and by Feinaigle's scheme that date becomes *lrk*. By inserting vowels we form the mnemonic words lark, lurk, large, lyric, Alaric, etc., any one of which the historical student may choose to suit his notions of King Ida the Flamebearer, so as to remember the date of his landing in Yorkshire. Another student, for the same date, might prefer la race, la rage, etc., or Latin *lorica* ("cuirass").

The following system (1730), that of Richard Grey, D. D. (1694–1771), does not require, like Feinaigle's, the insertion of arbitrary vowels, and is therefore not so elastic:

1	2	3	4	5	6	7	8	9	0
b	d	t	f	l	s	p	k	n	z
a	e	i	o	u	au	oi	ei	ou	y

A more recent mnemotechnist, Dr. Pick, has improved Feinaigle's method by introducing a principle not unlike that which we have noted in describing the topical systems. Given a list of detached words — *e. g.*, "garden, hair, watchman, philosophy," etc.— they can be recalled in order by inserting between each pair a connective word which links them or forms a bridge. Thus, garden, maidenhair fern; hair, bonnet; watchman, wake, study; philosophy, etc. Other mnemotechnists have been Schenkel, 1547; Aimé Paris, 1833; Karl Otto, 1840; Gouraud, 1845; and Loisette. Grey's sys-

tem was really a modification of that of Winckelmann, which attracted the notice of Leibnitz and gave him the suggestion of a universal alphabet.

Mnemosyne (nē-mos′i-nē), in Greek mythology, the daughter of Uranus, and mother of the nine muses of Zeus. The principal seat of her worship was at Eleutheræ, in Bœotia.

Moa, the native New Zealand name for a gigantic bird, now extinct, which the natives describe as being of a fierce disposition, and for which Owen formed the genus *Dinornis.* Its fossil remains are found in New Zealand in deposits of recent age. The Maori traditions recount the wars of extermination which their early ancestors waged with the moa; and the natives profess to show the spot where the last moa was killed. Its remains show that this *Dinornis* was a wingless bird, and must have stood at least 14 feet in height; and the traditions of the natives appear thus to be confirmed by the researches of the palæontologist.

Moabites, a pastoral people who inhabited the bleak and mountainous country E. of the lower part of the Jordan and of the Dead Sea, divided into two portions by the deep bed of the Arnon. Their capitals were Ar-Moab and Kir-Moab, both S. of the Arnon, but their kings often resided in their native places, as Mesha in Dibon. Their sovereign divinity was Chemosh, and patriotism was an essential part of their religion. They were ethnologically cognate with the Hebrews, and were compelled to become tributary to David, but about 850 B. C. shook off their allegiance to the Jewish kings, and afterward took part with the Chaldeans against the Jews. Their name no longer exists, and the remnants of the people have long been included among the Arabs. The most striking feature about the country in modern times is the immense number of rude stone monuments with which it is covered. Major Conder found no fewer than a thousand of these of the usual varieties (dolmens, menhirs, circles, and alignments) familiar in the British Isles and Brittany, occurring in distinct centers, usually with a cairn at the top of the nearest hill. He rejects the sepulture theory, and believes the dolmens to have been altars. The menhirs were anciently objects of worship, anointed with oil, or smeared with blood, and such a series of alignments and scattered stones as those of El-Mareighât may be supposed to be offerings of pilgrims to this shrine. The so-called Moabite pottery, which Shapira succeeded in selling to the German government for nearly $15,000, was shown by M. Clermont-Ganneau to be an imposture.

Moabite Stone, a stone bearing an inscription of 34 lines in Hebrew-Phœnician letters, discovered by the Rev. F. Klein in 1868 among the ruins of Dhibân, the ancient Dibon. The stone was of black basalt, rounded at the top and bottom, 2 feet broad, 3 feet 10 inches high, and 14½ inches in thickness, but was unfortunately broken up by the Arabs, whose cupidity had been aroused by the indiscreet eagerness to acquire it shown by M. Clermont-Ganneau. The fragments were afterward collected and laboriously fitted into their proper places by means of imperfect squeezes made before the stone was broken, and the monument now stands in the Louvre at Paris. The inscription was discovered to be a record of Mesha, King of Moab, mentioned in II Kings, iii., referring to his successful revolt against the King of Israel. The characters of the inscription are Phœnician, and form a link between those of the Baal Lebanon inscription (10th century) and those of the Siloam text.

Moaria (-ā′ri-ä), in geology, a name sometimes given to a S. continent assumed by Dr. Mantell to have been submerged, leaving as the culminating points Philip and Norfolk Islands, Chatham and Auckland Islands, and New Zealand. Over this continent Dr. Mantell believes that the moa roamed.

Moat, in fortification, a deep ditch or trench round a fort, etc., generally filled with water.

Mobangi (mō-bäng′gē), or **Ubangi** (ö-bäng′gē), a river of Central South Africa, a tributary on the right bank of the Kongo, which it enters nearly opposite Equator Station, lat 0° 30′; navigable for upward of 400 miles, but there are difficult rapids in 40° 20′ N.

Moberly, a city in Randolph co., Mo.; on the Wabash and the Missouri, Kansas, and Texas railroads; 130 miles E. of Kansas City. Here are a high school, Loretto Academy, German parochial school, Wabash Railroad Hospital, public school library, waterworks supplied from wells, and gas and electric lights. It has manufactures of carriages, flour, and tobacco, railroad machine and car shops, and a large trade in farm produce, live-stock, wool, hides, and hard woods. The assessed property valuation exceeds $1,500,000. Pop. (1890) 8,215; (1900) 8,012; (1910) 10,923.

Mobile, a city, port of entry and county-seat of Mobile co., Ala., on the Mobile river near Mobile Bay; 30 miles from the Gulf of Mexico, and on the Mobile and Birmingham, the Louisville and Nashville, and the Mobile and Ohio railroads; 140 miles E. of New Orleans. The city is not only the largest and most important one in the State of Alabama, but commercially and historically ranks among the foremost cities of the South. It is built on a sandy plain,

rising as it recedes from the river, and within a short distance of high and beautiful hills.

Business Interests.— The city is noted for its many industries. Here are manufactories of shingles, boxes, staves, sashes, blinds, and barrels; large flour mills and tobacco and cigar factories; clothing, carriage, confectionery, saddlery and harness, and other plants. It also has a large export trade to Mexico, Central and South America. The most important exports include cotton, rice, coal, grain, lumber, cigars, tar, resin, turpentine, and vegetables. There are National and State banks, and many daily, weekly and monthly periodicals. The assessed property valuation exceeds $16,000,000, and the total bonded debt is a little more than $2,000,000.

Public Interests.— The corporate limits of Mobile extend 6 miles N. and S. and 2 or 3 miles W. from the river. Its streets are generally well paved, shaded, and quite regular. The water supply which is by two systems, is so pure that it is employed for chemical purposes without filtering. Here are the United States Government Building, which cost $250,000, the court house, United States Marine Hospital, city hospital, Providence Infirmary, Odd Fellows' and Temperance Halls, the Battle House, the Cathedral of the Immaculate Conception, etc. The educational institutions include the College of St. Joseph, Spring Hill College, McGill Institute, Barton Academy, Evangelical Lutheran Institute, Convent and Academy of the Visitation, Medical College of Alabama, St. Mary's School, and a public library.

History.— In 1702 a fort was built about 20 miles N. of the present site of Mobile by Le Moyne de Bienville and named St. Louis de la Mobile. In 1711 this settlement was nearly annihilated by a furious hurricane, and a disastrous deluge, which compelled its removal to the present location of Mobile. The colony was ceded to Great Britain in 1763 by the treaty of Paris, but with all the English possessions on the Gulf of Mexico was transferred to Spain in 1783. The Spanish government administered its affairs till 1813, when it was taken by an American army under General Wilkinson. It received its charter as a city in 1819. Mobile was under Confederate rule from Jan. 11, 1861, to April 11, 1864. The fleet of Admiral Farragut sailed up Mobile Bay on Aug. 5, of the latter year, and a great battle with the Confederate vessels and forts was fought. This resulted in the destruction of the Confederate fleet, and the capture of Forts Morgan and Gaines. In the spring of 1865 the city was carried by assault. The name of Mobile was changed to Port of Mobile in 1870, but the place was reincorporated with full city rights in 1886. Pop. (1890) 31,076; (1900) 38,469; (1910) 51,521.

Mobile (mō-bēl′), a river of the United States, in Alabama, formed by the union of the Alabama and the Tombigbee, which unite about 45 miles above the town of Mobile. It enters Mobile Bay by two mouths.

Mobile Bay, Battle of, one of the most important and decisive battles of the Civil War, fought at Mobile Bay, Aug. 5, 1864, between the Union fleet, commanded by Admiral Farragut, and the Confederate ram "Tennessee" and three iron-clads commanded by Admiral Buchanan. Farragut's ships were the wooden vessels "Hartford" (flagship), "Brooklyn," "Metacomet," "Octorara," "Richmond," "Lackawanna," "Monongahela," "Ossipee, "Oneida," "Port Royal," "Seminole," "Kennebec," "Itasca," and "Galena," 14 in all, with these were four iron-clads, the "Tecumseh," "Manhattan," "Winnebago," and "Chickasaw." The "Tecumseh" was blown up by a torpedo and out of a crew of 170 only 17 were saved. The conflict raged all day and was renewed after dark, and fighting was continued till 10 A. M. the next day, when being badly crippled, the "Tennessee" struck her colors. It was during this battle that Admiral Farragut was lashed to the mast of his ship and from there directed the movements of his vessel.

Mobilier, Crédit. See Crédit Mobilier.

Mobilization, in military language, the act of mobilizing; the state of being mobilized; the calling of troops into active service; the placing of an army on a war footing or readiness for active service. It includes the calling out of the reserve and men on furlough, the organizing of the artillery, medical, commissariat, and transport services, the accumulation of provisions, munitions, etc.

Moccasin, Moccason, Mocassin, or **Moccassin,** a deerskin sandal, the sole and upper of which are formed of one piece of leather. It is the ordinary foot-covering worn by the North American Indians.

Moccasin Snake, *Cenchris piscivorus,* of the family *Crotalidæ,* sometimes called the water viper, from its frequenting marshy places. It is a fish-eating snake, as its specific name denotes. Habitat, North Carolina, the country to the S. and across to the Rocky Mountains. Also the name is sometimes, but improperly, applied to *Trigonocephalus contortrix,* the copperhead snake. Both these reptiles are extremely poisonous, but neither possesses a rattle.

Mocha (mō′*hä*), a seaport, and once the capital of Yemen, in Arabia; on the Red Sea, 130 miles W. N. W. of Aden. From early in the 16th century till the middle of the 17th Mocha was the port from which

the coffee of Yemen was principally exported; hence called Mocha coffee. It is now an unimportant place.

Mocking Bird, *Mimus* (*Orpheus*) *polyglottus;* a bird included in the dentirostral section of the order *Insessores* or perching birds, and forms a genus of the thrush family (*Turdinæ*). The plumage is not at all brilliant, being of a general cinereous color; but what this bird lacks in beauty of plumage is fully compensated for by its amazing facility of voice and song. It inhabits North America chiefly, being a constant resident of the Southern States, and but rare and migratory in the N. parts of the continent. It is also found in the West Indian Islands and in Brazil. The female is exceedingly careful of her nest, and if disturbed may desert it altogether; while any intending enemies, such as cats, snakes, etc., are repulsed with great vigor and frequent success. The young, when taken from the nest for domestication, should be removed at an early period; or if taken later, they are generally removed by means of trap door cages. The ordinary song notes of the mocking birds are clear, bold, and varied. They sing during the night, like the nightingales, and appear to begin their song with the rising moon. The imitative notes of these birds are, however, still more varied than their natural tones. They mimic with success the songs of their feathered neighbors and with such exactitude as to deceive the ear of the most experienced sportsman. When they are kept in confinement all the sounds of the household, as well as the mewing of cats, the barking of dogs, the cry of an injured chicken, and the screech of the hawk are all exactly imitated. The ferruginous mocking bird (*Orpheus rufus*) is another familiar species. This latter bird is familiarly known in North America as the brown thrush or thrasher, but it does not appear to equal its more celebrated neighbor in the powers of its song.

Mode, in music, a name given to the ancient Greek scales, and also to the old Church scales founded on them, as Dorian mode, Phrygian mode, etc. In modern music a species of scale, of which two kinds are now recognized, viz., the major mode and the minor mode. A major mode is that division of the octave by which the intervals between the third and fourth and between the seventh and eighth are half tones, all the other intervals being whole tones. The minor mode is that division by which the intervals between the second and third and the fifth and sixth are half tones. See MAJOR: MINOR.

Modena (mō′de-nä) (ancient Mutĭna), capital of the former duchy of Modena; on a broad plain in Northern Italy, 23 miles N. W. of Bologna. It is surrounded with ramparts, now converted into promenades, and has fine streets, many of them arcaded both sides. The ancient Via Æmilia divides it into the old and the new city. The cathedral of St. Geminianus, a Romanesque building, was begun, at the instance of the famous Countess Matilda, in 1099, and has a fine façade; its campanile is one of the great towers of Italy. The ducal (now royal) palace, a picturesque structure of the 17th century, has an infinity of galleries, courts, and marble arches, and contains the Este library of 90,000 volumes and 3,000 MSS., the Este archives, collections of coins, and the gallery of pictures, including works by Guido, and Carracci, Guercina, Correggio, and other great Italian masters. Modena possesses besides a university (1678), with 35 teachers and 287 students, an academy of sciences and arts, an observatory, a botanic garden, and military schools. The chief manufactured products are silk, leather, vinegar, and cast metals. There is a very lively trade in agricultural products. Pop. (1901) 64,843. Originally an Etruscan town, Modena was conquered successively by the Gauls and the Romans, and destroyed by Constantine the Great, the Goths, and the Longobards. Charlemagne made it the capital of a line of counts. The family of Este became its masters in 1288; and in 1452 the reigning marquis was created duke by the Emperor Frederick III. During the first half of the 19th century its dukes pursued a tyrannous reactive policy against liberalism, and were on more than one occasion expelled their dominions, finally and definitively in 1860. The duchy was then incorporated in the kingdom of Italy, and afterward divided into the provinces of Modena, Reggio, and Massa-Carrara. Area of province, 1,002 square miles; pop. (1906) 326,383.

Moderates, a party in the Established Church of Scotland, which was dominant in its councils during the greater part of the 18th century and the early part of the 19th. It claimed to avoid extremes of doctrine, discipline, etc. The germ of moderatism began to develop soon after the Revolution Settlement of 1689; it was strengthened by the act of Parliament, passed in 1712, reintroducing patronage, of which the moderate party ultimately became the warm defenders, and which they carried out so rigidly as sometimes to welcome the aid of military force to settle a presentee on a recalcitrant congregation. Some of them were men of literary culture, Principal Robertson, author of "Charles V.," the "History of America," etc., being their leader from about 1751 to 1781. In 1796 the General Assembly, under moderate guidance, declined to take any steps in favor of Foreign Missions. From the time of the French Reign of Terror in 1793, the evangelical

party, with which the moderates had long been in conflict, gained yearly an accession of strength, till, on May 27, 1824, the moderate party was defeated by 184 to 138 votes, on a motion giving a certain veto on the settlement of an unacceptable minister, and the moderate ascendency was temporarily overthrown. During the 10 years' conflict, which ended in the disruption of 1843, the moderate party, in large measure, approved of the action of the law courts, and when the evangelical party seceded from the Church, they regained their old ascendency in the Scotch establishment. Since then their views have become considerably modified, and at their earnest request patronage has been abolished.

Moderator, in optics, a device, known as Rainey's, consisting of an opal or ground glass to moderate and diffuse the light passing from a lamp to an object on the stand of the microscope. In universities: (1) At Oxford, an examiner for moderations; (2) At Cambridge, a public officer appointed to superintend the examinations for degrees and honors; so called because formerly they presided in the exercises publicly prescribed in the schools between undergraduate candidates for the degree of Bachelor of Arts. (3) At Dublin, the candidates for the degree of Bachelor of Arts who pass out first and second in honors, the first being called the Senior and the second the Junior moderator. In Presbyterianism: One who presides over a called or regular assembly, large or small.

Moderator Lamp. See LAMP.

Modern Athens, The. (1) Edinburgh, Scotland; it is the headquarters of learning in Scotland; as a literary town, it is second only to London, and it is the seat of the supreme courts of Scotland. The good taste and culture of its people are marked. It contains a great university and many schools, and it is famed for the many distinguished men who have been born or who have resided there. Lastly, its topographical situation is very similar to that of its ancient namesake. (2) Boston, Mass. The city is famed alike for its institutions of learning and for the high order of the intelligence and culture of its citizens.

Modern Babylon, London. In point of size, it is the greatest in the modern world, as Babylon is believed to have been of the ancient. But there is also an allusion in the term to the luxury and licentiousness common to both cities.

Modica (mod'ē-kä), an inland town of Sicily, 45 miles S. W. of Syracuse, with trade in fruit, oil, wine, and grain. Pop. 38,390.

Modillion, in architecture, a block carved into the form of an enriched bracket, used under the corona in the cornice of the Corinthian and Composite orders, and occasionally also of the Roman Ionic.

Modjeska, Helena (mod-jes'kä), a Polish actress; born in Cracow, Poland, Oct. 12, 1844. She began to act in a traveling company in 1861. Four years later she made a great name at Cracow, and from 1868 to 1876 was the first actress of Warsaw. Then she settled, with her second husband, near Los Angeles, Cal., to try farming; but the enterprise not succeeding, she returned to the stage, and won a complete triumph as Adrienne Lecouvreur at San Francisco in 1877, though she acted in English, of which language she had known nothing seven months before. After that time she was acknowledged one of the best of modern emotional actresses, achieving her greatest triumphs in such rôles as Juliet, Rosalind, Beatrice, and in "Camille" and Sardou's "Odette." She died April 8, 1909.

Modocs, an Indian tribe of Northern California, which in 1872, after firing on the United States forces, retreated to the neighboring lavabeds, and there defended themselves desperately till June, 1873, killing or wounding 132 of the troops. Their chief, Captain Jack, and three others were hanged in October; about 100 who had not followed him were permitted to remain in California, the rest (145) were transferred to Indian Territory.

Modœtia. See MOUZA.

Modulation, in music, the transition from one key to another. The simplest form is the change from a given key to one nearly related to it, namely, its fifth (dominant), fourth (subdominant), its relative minor, or the relative minor of its fifth. Modulation is generally resorted to in compositions of some length, for the purpose of catching and pleasing the ear with a fresh succession of chords.

Moe, Jörgen Ingebrektsen (mō'e), a Norwegian poet; born in the district of Ringerike, about 1813. He became Bishop of Christiansand in 1875. The influence on Norwegian language, literature, and art, of the popular fairy tales collected at great pains by him, can hardly be exaggerated. He wrote "Digte" (Poems: 2d ed. 1856); "In the Well and in the Tarn" (1851), stories for children; "Norwegian Folk-Tales" (5th ed. 1874; English translation as "Popular Tales from the Norse" by Dasent, 3d ed. 1888), with P. C. Asbjörnsen; etc. ("Works," 1877.) He died in Christiansand, March 27, 1882.

Möen (muh'en), a Danish island in the Baltic Sea, at the S. E. end of Zealand. It is 20 miles in length, and has 13,000 inhabitants.

Mœris (mē'ris) **Lake,** the ancient Greek name of a sheet of water in Egypt,

now in the province of Fayûm, about 50 miles S. W. of Cairo; extreme length from N. E. to S. W., 35 miles. The waters are brackish. In the time of the Pharaohs the revenue derived from the fisheries was applied to the maintenance of the queen's wardrobe and perfumes.

Moero (mwā′rō), or **Meru** (mā′rō) **Lake,** a body of water lying S. W. of Tanganyika in Central Africa, on lat. 9° S. and lon. 29° E., and traversed by the Luapula. This lake was discovered by Livingstone in 1868. Its shores yield salt.

Mœsia (mē′shiä), an ancient Roman province, divided by the river Cibrus (Zibritza) into two parts, the E. corresponding to the present Bulgaria, and the W. (Mœsia Superior) to Servia. Its original inhabitants were mostly of Thracian race. In 75 B. C. the Romans first came into conflict with the Gaulish or Celtic invaders of the land, who had settled in Western Mœsia 200 years previously; but they did not conquer Western or Upper Mœsia till 29 B. C. and Eastern or Lower Mœsia till 15 B. C. To protect these provinces from the Dacians and Sarmatians beyond the river, a wall was built and fortified posts erected along the Danube. The Emperor Valens permitted the Visigoths to settle in Mœsia in A. D. 375. From the 5th to the 7th century Western Mœsia was colonized by the Slav races which still occupy it, and Eastern Mœsia by the Bulgarians.

Mœso-Goths, the name given to the GOTHS (*q. v.*) who in the 3d century and in the 5th settled in Lower Mœsia. It was for them that ULFILAS (*q. v.*) translated the Scriptures.

Moffat, a pleasant watering place and burgh of barony (1635) in Upper Annandale, Dumfriesshire, Scotland, 51 miles S. S. W. of Edinburgh. It lies 370 feet above sea-level, engirt by round grassy hills (the loftiest, Hartfell, 2,651 feet), and in the midst of delightful scenery, chief features of which are "dark Loch Skene," the Grey Mare's Tail, and the Devil's Beef-tub. Its mineral springs, the principal of which, like that of Harrogate, is saline and sulphurous, have been celebrated since 1653; and its visitors have included Home, Hume, Carlyle, "Ossian Macpherson," Boswell, Blair, Burns and William Black.

Moffat, James Clement, an American writer; born in Glencree, Galloway, Scotland, May 30, 1811. He contributed numerous articles to periodicals, and published "A Rhyme of the North Countrie" (1847); "Life of Dr. Thomas Chalmers" (1853); "Song and Scenery; or, A Summer Ramble in Scotland" (1874); "Church History in Brief" (1885); "The Story of a Dedicated Life" (1887). He died in Princeton, N. J., June 7, 1890.

Moffat, Robert, a Scotch missionary; born in Ormiston, East Lothian, Scotland, Dec. 21, 1795. He began missionary work in South Africa in 1813, and in 1818 made a long exploratory tour in the Damara country. In 1819 he married Mary Smith at Cape Town, who henceforth was the constant companion of his labors. During a visit to Great Britain in 1842 he published an account of his travels, and a translation of the New Testament and Psalms in the Bechuana language. He finally returned to England in 1870, and his wife died the following year. He received the degree of D. D. from Edinburgh University, and in 1873 he was presented with a public testimonial ($29,000). One of his daughters became the wife of Dr. Livingstone. He died in Leigh, Aug. 8, 1883.

Mofussil, or **Moffussil** (-fus′-) an Anglo-Indian term for any part of India, except the three capitals, Calcutta, Bombay, and Madras.

Mogador (mog-a-dōr′), or **Sueira** (swā′-rä), a seaport 130 miles W. S. W. of the city of Morocco, on a rocky promontory opposite a small island. It is the best built town in the empire, having been laid out in 1760 by a French engineer. The exports include almonds, olive oil, wool, goat-skins, hair, etc; the imports, woolens, cottons, glass, candles, and hardware. The manufactures are brass trays, daggers, furniture of arar wood, woolen cloth, etc. Pop. about 19,000.

Mogileff. See MOHILEFF.

Mogul (-gul′). The term "great Mogul" is the popular designation of the emperor of Delhi in India. The first Great Mogul was BABER (*q. v.*), a descendant of TIMUR THE TARTAR or TAMERLANE (*q. v.*); he founded the empire in 1526. The dynasty lost its power and territories to the English in 1765. The last emperor, having joined the rebels in 1857, died a prisoner in Rangoon (1862).

Mohács (mō′häch), a town and important river-port of Hungary, province of Baranya, 22 miles E. S. E. of Fünfkirchen, on the Danube river, which is gradually leaving it; has tile fields. The two great battles fought near it may be considered as marking the commencement and conclusion of the Turkish power in Hungary. On Aug. 29, 1526, the Turks, under Solyman the Magnificent, completely defeated the Hungarians, who lost 22,000 men, numerous nobles, and their king, Louis II., on the field; but they received a total defeat from the Imperialists under the Duke of Lorraine, at the second battle of Mohács, Aug. 12, 1687. Pop. (1900) 15,832.

Mohair, the hair of the Angora goat. Also a fabric made from the fine, white, silky hair of the Angora goat and allied

species; sometimes called camlet. The hair is said to be produced in perfect quality in no place excepting Angora in Asia Minor, and has long been a valuable article of export from that place. Also a wool and cotton fabric made in imitation of the above, in mixed colors or plain.

Mohammed (mō-ham'ed), or **Mahomet** (ma-hom'et), the Arabian prophet, and the founder of Islam; born in Mecca, Arabia, A. D. 570 or 571. He was the only son of Abdallah and Amina; his father, celebrated for his singular beauty, being of the family of Hashem, the most illustrious in the noble tribe of Koreish, princes of Mecca, and guardians of the Caaba. Left an orphan in infancy, he was brought up by his uncle, Abu Taleb, who trained him to commerce, and took him to the great fairs of Arabia and Syria. The theory of his high cultivation is now exploded. Some of the greatest Orientalists — Sprenger, Renan, Cousin de Perceval — hold that he could neither read nor write, and that he knew the "Rabbinical traditions" and "Apocryphal Gospels" only by hearsay. When 25 years of age Mohammed married Khadija, a rich and noble widow of Mecca, and the following 15 years of his life were passed in domestic quietness, only interrupted by occasional retirement into the mountain solitudes. From his youth the future prophet had shown a fondness for seclusion and serious meditation, and having attained a ripeness of character and distinctness of aim and views, he began, at 40 years of age, to announce himself as an apostle, and to proclaim the doctrine of Islam (salvation), that "There is no God but Allah, and Mohammed is his Prophet." His wife Khadija was one of the first to believe in him, and among other members of his family who readily acknowledged his mission was his cousin, the heroic, illustrious Ali, son of Abu Taleb. After three years, he made a more public announcement of his doctrine, especially insisting on the unity of God, and denouncing all kinds of idolatry; but his followers were very few for years, and the opposition of the elders and people of Mecca growing more and more bitter and violent, some of his disciples retired into Ethiopia. In A. D. 621, Mohammed lost his faithful and beloved Khadija, who during the 24 years of their marriage had retained his love. The death of Abu Taleb took place about the same time; and soon after, the Koreishites, headed by Abu Sophian, resolved to put the prophet to death.

He fled from Mecca, hid himself in a cave for three days, and then, with his only companion, Abubekr, withdrew to Medina (then called Yatreb). From this flight of Mohammed commences the era of the "Hegira" (July 16, 622). He made a public entry into Yatreb amid the loudest welcomes of the citizens, and at once assumed the offices of king and priest. He also there married his second wife, the beautiful Ayesha, daughter of Abu-bekr, who long survived him. He had, however, many other wives, all widows except Ayesha; and besides, indulged without restraint his sensual propensities. Persuasion, long tried with little success, at length gave place to force and war, and in the battle of Beder — first of the long series of battles by which the faith of Islam was established over so large a portion of the world and gained a hold which 12 centuries have not broken — he defeated Abu Sophian and the Koreish (A. D. 623). He was defeated by them in A. D. 625; they unsuccessfully besieged Medina, and a truce for 10 years was agreed on. Wars with Jewish tribes followed; many Arabian tribes submitted themselves; and in 630 the conquering prophet marched to Mecca, received the keys of the city, and was acknowledged as prince and prophet. He showed no malice against his former enemies, performing the pilgrimage with the customary observances, purified the Caaba, destroyed its 360 idols, and decreed that no infidel should enter the holy city. The whole of Arabia was soon after conquered, and ambassadors with arrogant claims were sent to the Emperor Heraclius, the King of Persia, and the King of Abyssinia. War with the Roman empire was begun; an expedition for the conquest of Syria was prepared; when Mohammed, believed to be immortal by some of his disciples, fell into a fever, and after 14 days of suffering, died in Medina, Arabia, June 7, 632. He was buried in a simple tomb on the spot where he died. See KORAN: MOHAMMEDANISM.

Mohammed I., Sultan of Turkey, succeeded his brother Mousa in 1413; he reëstablished the glory of the Ottoman empire, which had been ravaged by Timur; and fixed the seat of government at Adrianople, where he died in 1421.

Mohammed II., born in 1430, succeeded to the throne in 1451; he was the first who received the title of Grand Seignior. He died after a long and victorious career as he was about to lead an attack against the Knights of St. John, A. D. 1481.

Mohammed III., succeeded his father Amurath III. in 1595. His first act on coming to the throne was to strangle 19 of his brothers, and drown 10 of his father's wives; he then entered Hungary, and massacred the whole garrison of Agram, and next gained a victory over the Archduke Maximilian. After this, his success left him, and he finally had to sue for peace to the Christian princes whose States he had ravaged. He died in 1603.

Mohammed IV., born in 1642, became Sultan in 1648, succeeding his father Ibra-

him I., who was deposed and strangled by the Janizaries. In 1672, the Sultan marched against Poland, but made peace on condition of an annual tribute being paid to him. John Sobieski, irritated at this treaty, raised an army, and defeated the Turks near Choczim, on which a new treaty, favorable to Poland, was signed in 1676. In 1683 the Turks laid siege to Vienna, on which Sobieski marched to its relief, and routed the besiegers. The Janizaries, attributing their misfortunes to the Sultan, deposed him in 1687, and sent him to prison, where he died in 1691.

Mohammed V. (MEHEMMED-RESHAD), Sultan of Turkey; born Nov. 3, 1844; third son of Sultan Abdul-Medjid and brother of Sultan Abdul-Hamid II.; was proclaimed Sultan April 27, 1909, on the deposition of his brother by the National Assembly, after the Young Turks' uprising.

Mohammed Ahmed, a fanatical leader of the Mahdists, of whom mention is made under MAHDI (*q. v.*). He made his appearance in the Sudan in 1878, dressed as a dervish, and traveled about preaching to the Arabs and blacks. His chief topic was the decadence of religion, due to the luxurious mode of living introduced by the Christians. His followers rapidly increased in numbers and soon he announced himself as the Mahdi, or spokesman of God on earth. The Egyptian government became alarmed at his growing influence and requested him to come for an interview. This he refused to do and an armed force was sent to bring him. This company of soldiers was ambushed near the Mahdi's stronghold and massacred. Not long after this exploit which added to his following, he threw off all pretense and with several thousand armed tribesmen set out on the series of raids which made him ruler of the Sudan. In this crisis England sent General Gordon to subdue, if possible, the country by peaceable means. He reached Khartum in 1884 and the city was soon after besieged by the Mahdi's army. The leader merely laughed when Gordon sought to make peace. A rescuing expedition was sent from England, but failed to reach Khartum in time to save the unfortunate garrison and citizens. Through carelessness or treachery an entrance was effected and the Mahdi's army of bloodthirsty Arabs and blacks rushed in, slaughtering every one who came in their way. General Gordon was killed on the steps of his own house and his head cut off and stuck on a pole in the market place as a warning to all unbelievers that no one could contest with the Mahdi. This was on Jan. 26, 1885, and in the same year the blood-stained career of Mohammed Ahmed was brought to an end by his death.

Mohammedan Architecture, the style of architecture adopted by Mohammedan nations as the Moors of Spain, the Arabs, etc. It was gradually developed out of the forms which were found ready to hand in the various countries over which they spread, and which belonged for the most part to early Christian art of the later Roman period, together with an admixture of Asiatic elements. In the earliest times Christian churches were utilized for the practice of the new religion; afterward mosques were erected (see MOSQUE). In accordance with the Oriental manner of life, this style is internal rather than external, especially in palaces and dwelling houses. While the tasteless exterior of the buildings only displays to the eye high walls which are irregularly pierced by small windows, and those few in number, everything in the interior is richly decorated. The richest ornamentation is lavished on the most essential part of these buildings, namely, on the porticoes which surround the open court. There are no fixed orders or proportions for the pillars — sometimes they are squat and heavy; at others slender and graceful, especially in the later period. Three different forms of arches are found, besides the circular arch, which is of rare occurrence. In Egypt and Sicily the pointed arch, resembling that afterward adopted in the Gothic style, was used; in Persia and India the keel arch (the ends of the curves are bent slightly upward like the keel of a vessel); and in Spain the horseshoe arch, which consists of a larger segment of a circle than a semicircle. The walls over these arches, as all flat surfaces, were covered with embellishments in the shape of arabesques, consisting of flat relief in stucco, or painted in brilliant colors. They are formed of the most multifarious entwinings of straight or curved lines or belts. Domes are introduced freely, and are, for the most part, flat or plain externally, or ornamented with stripes like a gourd. Dwelling houses are tasteless externally, but the interiors display wealth and luxury. Overhanging balconies are used in the upper stories, and the windows are small and elevated. The Arabian system of ornamentation is not so pure as the Moorish, and the Turkish style kept more closely to the Byzantine. The finest specimen of Mohammedan architecture and ornamentation is the Alhambra, at Granada.

Mohammedanism, Mahometanism, or **Muhammadanism,** the religion founded by MOHAMMED (*q. v.*). During the Caliphates of his immediate successors Abubeker (632–634) and Omar (634–646), the Arabs, or Saracens, conquered Syria, Persia, and Egypt, and established the new faith. Othman reigned next (644–655). Then the Arabs elected Ali, Mohammed's son-in-law, strangely passed over till now; the Syrians chose Moaviah, son of Abu Sofian, an old enemy of the prophet. Civil war resulted, and the sects of the Sunnis and Shiahs

arose. Ali was assassinated in 661, Hassan and Hosein, his sons, soon after perishing. In 710 Tarik landed in Spain, the straits where he had passed and the adjacent rock being ever afterward called GIBRALTAR (*q. v.*). In 732 Charles Martel (=the Hammer) defeated the Arab Abderrahman at Poitiers, saving Western Europe. The Saracen capitals had been successively at Medina, at Cafa, at Damascus, and at Bagdad; their dynasties were the Ommeyades, Abbasides, etc. About the middle of the 8th century, the Saracen empire in the East began to be broken down by the Turks, then a savage Tartar tribe, who afterward embraced Mohammedanism, and in 1453 took Constantinople, terminating the Greek or Eastern empire. Since the 16th century their power has been less dreaded. The Mohammedans of the world have been estimated at 250,000,000, of whom 50,000,000 are in India, 40,000,000 directly under British rule, and 10,000,000 in allied or tributary states. The Koran (=that which is read or recited) is their sacred book and their code of law. Their faith is called Islam (=surrender of the will to God). Five duties are incumbent on the faithful Mohammedan: A confession of faith that there is but one God, and that Mohammed is his prophet, prayer, fasting, almsgiving, and a pilgrimage to Mecca. Friday is their Sabbath and day of special worship. Raising the nations which have embraced it to a higher creed than their old idolatry, Islam has so stereotyped them as to render all further changes intensely difficult. No other faith offers so stubborn a resistance to the spread of Christianity.

Mohammerah (mō-häm'me-rä) (Muhammrah), a town of Khuzistan, Persia, near the Turkish frontier. It stands on the lower Karun, where the latter connects by the Haffar canal with the Shat-el-Arab. It has about 5,000 inhabitants, and has become of commercial importance since the opening of the navigation of the KARUN (*q. v.*).

Mohave (mō-hä'vā) **Desert,** a basin, with little water or vegetation, chiefly S. E. of California, and extending into Arizona. The Mohave river rises in the San Bernardino range, and finally disappears in the Mohave Sink.

Mohawk, a river in New York, the principal tributary of the Hudson; length about 135 miles. It affords abundant water power, and flows through beautiful scenery.

Mohawks, a tribe of North American Indians, belonging to the confederacy of the Five (afterward Six) Nations (see IROQUOIS). They originally inhabited the valley of the Mohawk river. With the rest of the confederacy they adhered to the British interests during the Revolutionary War, and left the country on its termination for Canada, where lands were assigned them on the Grand river. Their language has been committed to writing.

Mohegan (or **Monhegan** (**Indians** (-hē'-gan), a tribe of North American Indians who formerly lived on the Thames river in Connecticut. They were at one time united with the Pequots and after the death of Sassacus, the Pequot leader, the remainder of the tribe came under the Mohegan chief. After the death of King Philip in 1676, the Mohegan tribe was the only important one in that region. They became scattered, some joining the Brotherton Indians in New York.

Mohileff, or **Moghilev** (mō-gē-lef'), the capital of a province in European Russia; on the Dnieper, 95 miles S. W. of Smolensk. It is the seat of a Greek and a Roman Catholic archbishop, their respective cathedrals dating from 1780 and 1692, and has an old castle, and a town house built in 1679. Tanning is the principal industry; there is also an active trade in cereals, leather, brandy, salt, sugar, fish, timber, etc. The town was burned down by Peter the Great for strategical reasons in 1708. Here July 23, 1812, the French under Davoût defeated the Russians under Bagration. Pop. (1897) 43,106. The province has an area of 18,551 square miles; pop. (1891) 1,417,169; (1897) 1,708,041.

Mohl, Julius von (mōl), a German-French Orientalist; born in Stuttgart, Würtemberg, Oct. 25, 1800. He was Professor of Oriental Literature at Tübingen in 1826; Professor of Persian Literature in the Collège de France, 1845. His principal work was his edition of Firdausi's "Shah Nameh" (The Book of the Kings: 6 vols., Paris, 1836–1868, text and translation). He died in Paris, France, Jan. 4, 1876.

Möhler, Johann Adam (muh'ler), a Roman Catholic theologian; born in Igersheim, Würtemberg, May 6, 1796. He studied at the University of Tübingen, where after being theological tutor, he became ordinary Professor of Theology in 1828. His earliest publication was a treatise "On the Unity of the Church" (1825), which was followed, in 1827, by a historico-theological essay on Athanasius. But his reputation, both posthumous and among his own contemporaries, rests mainly on his well-known "Symbolism," a work on the doctrinal differences between Catholics and Protestants, as represented by their public confessions of faith (1832). This remarkable book passed through five large editions in six years, was translated into all the leading languages of Europe, and drew forth numerous criticisms and rejoinders. In 1835 Möhler accepted a professorship in the new University of Munich. He died in Munich, April 12, 1838. His miscellaneous works were collected and published posthu-

mously (2 vols. 1839–1840) by Dr. Döllinger.

Mohurrum (-huhr′-), the first month of the Mohammedan year. Also one of the greatest of the Mohammedan festivals, held in commemoration of the so-called martyrdom of Hassun and Hosein, sons of Ali, and nephews of Mohammed, which occurred in the 46th year of the Hegira. It commences the evening on which the new moon becomes visible in the month of Mohurrum, and continues fully 10 days. While the festival continues, the people light fires every evening in pits, fencing across them with sticks or swords and leaping across or even through them, crying out Ya Ali, Ya Ali (Oh Ali, Oh Ali), Shah Hassun, Shah Hosein (Noble Hassun, Noble Hosein), etc. They form ullums or facsimiles of Hosein's banner of copper, brass, steel, or even silver and gold, and finally carry past in procession beautiful taboots or tombs, which, in India, at least, are ultimately thrown into some river. There are many other ceremonies.

Mohurrum Fakir, fakirs or religious medicants, dressed up in peculiar ways to take part in the Mohurrum. Jaffur Shurreef enumerates 47 kinds of them, all with distinctive names, among which figure paddy birds, pilgrim fool and pilgrim idiot, tiger, king chafing-dish, king blanket, king tent-peg, dig and bury, tatterdamalion or king clout.

Moidore (moi′-), a Portuguese gold coin, worth 4,000 reis, or about $5.31.

Moir, David Macbeth, a Scotch poet; born in Musselburgh, Jan. 5, 1798. He practised there as a physician. He was much beloved by his friends for his amiability and he earned a wide popularity, and made his pen-name of Delta (Δ) famous in Scotland by his verses contributed to "Blackwood's Magazine." Of these a collection was made by Thomas Aird in 1852. Of more lasting merit is his genuinely humorous and still popular "Autobiography of Mansie Wauch" (1828). Other books were "Outlines of the Ancient History of Medicine" (1831), and "Poetical Literature of the Past Half-century" (1851). He died in Dumfries, July 6, 1851.

Moiré (mwä-rā′), silks figured by the peculiar process called "watering." The silks for this purpose must be broad and of a good substantial make; thin and narrow pieces will not do. They are wetted, and then folded with particular care, to ensure the threads of the fabric lying all in the same direction, and not crossing each other, except as in the usual way of the web and the warp. The folded pieces of silk are then submitted to an enormous pressure, generally in a hydraulic machine. By this pressure the air is slowly expelled, and in escaping draws the moisture into curious waved lines, which leave the permanent marking called watering. The finest kinds of watered silks are known as moirés antiques. The same process has been applied to woolen fabrics called moreen, which is only an alteration of the word moire.

Moirée Métallique (mā-tä-lēk′), tin plate showing a crystallized surface through the action of acids; also, iron plate coated with tin, and having the coating more or less removed by acids, so as to give it a variety of shades.

Mokanna (mō-kän′nä) (surname of **Hakim ben Allah)** ("The Veiled"), the founder of a sect in Khorasan, who first appeared in the 8th century, during the reign of Almahdi, the 3rd Abasside calif. He commenced his career as a soldier. In a fight, an arrow pierced one of his eyes, and in order to hide this deformity he henceforth constantly wore a veil, a habit attributed by his followers to the necessity of shrouding from the eye of the beholder the dazzling rays which issued from his divine countenance. Mokanna set himself up as an incarnation of God. Among other miracles, he is said to have caused a moon or moons to issue from a deep well. Mokanna found many adherents, and his little band increased so that ere long he was able to seize on several fortified places. But Almahdi marched against him, and after a long siege took his stronghold of Kash (720 A. D.), when, together with the remnant of his army, the veiled one took poison.

Mokry, Otokar (mok′rē), a Bohemian author; born in Budweis in 1854. He was State notary at Vodnany, and editor of the "People's Cheap Library." He was a romanticist. He wrote: in verse, "Melodies from Southern Bohemia" (1880), "Poems" (1883), "On the Maiden's Rock" (1885), "Reflections and Legends" (1888); and in prose, "Short Stories and Arabesques" (1883), "Short Stories and Sketches" (1886); etc.

Molasse (-las′), in geology, a soft, coherent, greenish sandstone, occupying the country between the Alps and the Jura. Part of it is Miocene, and part Oligocene. It has been divided into:

(1) An Upper Miocene freshwater molasse, found at Œningen, and consisting of a series of sandstones, marls, and limestones, some of them thickly laminated. The strata seem to have been deposited in a freshwater lake holding carbonate of lime in solution. The great salamander, at first mistaken for human remains, and described in sober seriousness by Scheuchzer as "a human witness of the Flood," was found in one bed. Camper discovered its reptilian character, and Cuvier recognized it as a salamander. Other fossils are the fossil-fox of Œningen (*Galecynus œningensis*), *Mastodon tapiroides,* a fish of the genus *Leuciscus,*

844 species of insects, with many plant remains, including Liquidambar, Cinnamomum, and various Proteaceæ (?), etc.

(2) The Middle or Marine Miocene Molasse, corresponding in age to the Faluns of Touraine. It contains a Dryopithecus.

(3) The Lower Molasse of Switzerland (Aquitanian). Most of the beds are freshwater. More than 500 species of plants have been found, including *Ficus populina*, the palm genera, *Flabellaria* and *Phœnicites*, the pine genus *Sequoia*, etc.

Molasses, the brown uncrystallizable syrup obtained in the refining of sugar. Molasses consists, on the average, of 20 per cent. water, 36 per cent. crystallizable sugar, 36 per cent. inverted sugar, 5 per cent. organic acids and extractive, and 3 per cent. mineral matter.

Molay, Jacques de (mo-lā′), the last grand-master of the Knights Templars; born in Burgundy. He was admitted into the order about 1265, and having signalized himself by his valor in Palestine, was unanimously elected grand master on the death of William de Beaujeu. The great wealth and power of the Templars, their pride and dissolute manners, created them a multitude of enemies, and at length Phillipe le Bel, King of France, and Pope Clement V., formed a plan for their extermination. They were accused of heresy, impiety, and various crimes revolting to human nature. In October, 1307, all the Templars throughout France were arrested at the same hour, and they were tried and convicted, some on their own confessions and others on such evidence as could be procured. Fifty-seven were committed to the flames in 1311; and after an imprisonment of seven years, De Molay shared their fate at Paris, March 18, 1314, declaring the innocence of his order to the last. Many commanderies of the modern Knights Templar in the United States are named after him.

Molbech, Christian Knud Frederik (mol′-be*h*), a Danish poet and dramatist; born in Copenhagen, July 20, 1821. He was Professor of Danish Language and Literature at Kiel, 1853–1864; then a journalist at Copenhagen; censor at the royal theater, Copenhagen. Among his works were: "Pictures from the Life of Jesus" (1840), a volume of poems; "The Bride of the Mountain King" (1845), and "The Venusberg" (1845), dramas; "Twilight" (1851), poems; "Poems, Lyric and Dramatic" (1863); "The Financier," a comedy. ("Poetical Works," new ed. 1879.) He died in Kiel, May 20, 1888.

Mold, a town of Flintshire, North Wales, on the Alyn, in a rich mineral district, 14 miles W. by S. of Chester. Its fine 15th-century church, rich in stained glass, contains the grave of the painter Wilson. The former county prison, built at a cost of $125,000, was sold in 1880 for $17,500 to expelled French Jesuits, who renamed it St. Germanus' House, in memory of the "Alleluia Victory" near by. See GERMANUS.

Mold, or **Mould,** in botany, the name given to any thread-like fungal whether belonging to the Hyphomycetes or the Physomycetes, which are found on bread, ink, gum, etc. Brown, blue or green mold is *Penicillium glaucum;* another green mold is *Mucor mucedo.*

In geology: Vegetable soil consisting of the surface stratum, whether of clay, gravel, sand, or rock, disintegrated by atmospheric influences and modified by the plants, first of lower, and then of higher organization, and by the animals which reside upon or pass over its surface. Of all these animals the most potent in action is the earthworm, which effects changes on the surface of the earth second only to those produced by polypes on that of the deep.

In anatomy: A fontanel or space occupied by a cartilaginous membrane situated at the angles of the bones which form the skull in a human fœtus and a new-born child.

In building: A frame to give shape to a structure, as in the building of houses in concrete, béton, clay, cement, etc.

In founding: Molds for casting are of several kinds: (1) Open molds into which the metal is poured, the upper surface of the fluid metal assuming the horizontal position. Such are ingots and some other objects. (2) Close molds of metal or plaster of Paris, with ingates by which the molten metal enters. Such are the molds for inkstands, cannon balls, bullets, type, and various other articles made of lead, tin, zinc, and their alloys, which fuse at a moderate heat. (3) Close molds of sand, in which articles of iron, brass, bronze, etc., are cast. This is the ordinary foundry work, and includes machinery, stoves, ordnance, and the multitude of articles of domestic and agricultural hardware.

In gold-beating: The package of goldbeater's skin in which gold leaf is placed for the third beating. It is first enveloped in vellum, 150 leaves, with interposed ribbons of gold, one inch square, forming a kutch. The pieces, spreading to the size of the vellum are cut into four pieces and interleaved with goldbeater's skin; 600 pieces and their skin form a shoder, for their second beating. Being again divided into four pieces, they are again interleaved with goldbeater's skin; making 2,400. These are divided into three packages of 800 each, called molds, and receive the third beating.

In papermaking: Hand-made paper is made by a mold and deckle. The mold is an open, square frame with a wire cloth bottom, and a little larger all round than the required sheet of paper.

In plastering: A thin board cut to a pattern and used in forming cornices, etc.

In shipbuilding: A full-sized pattern of the same figure and dimensions as the molding side of the piece which it represents. The mold may be of skeleton form, and may serve for several frames. It is usually a thin plank cut to the form of a ship-timber, and serving as a templet for scribing the timbers for the workmen who saw, hew, and adze them into shape.

Molding, or **Moulding,** in architecture, a term applied to all the varieties of outline or contour given to the angles of the various subordinate parts and features of buildings, whether projections or cavities, such as cornices, capitals, bases, door or window jambs and heads, etc. There are eight sorts of regular moldings: viz. the ovolo, the talon, the cyma, the cavetto, the torus the astragal the scotia and the fillet. These moldings are not to be used at hazard, each having certain situations adapted to its reception, to which it must always be applied. Thus, the ovolo and talon, from their peculiar form, seem intended to support other important moldings or members; the cyma and cavetto, being of weaker contour, should only be used for the cover or shelter of other parts; the torus and astragal, bearing a resemblance to a rope, appear calculated to bind and fortify the parts to which they are applied; the use of the fillet and scotia is to separate one molding from another, and to give a variety to the general profile. The ovolo and talon are mostly placed in situations above the level of the eye; when below it, they should only be applied as crowning members. The place for the scotia is universally below the level of the eye. When the fillet is very wide, and used under the cyma of a cornice, it is termed a corona; if under a corona it is called a band. The curved contours of moldings are portions of either circles or ellipses. In Norman architecture the moldings were almost universally rounds and hollows variously combined and frequently broken up into zig-zag lines. In English architecture of the Middle Ages the moldings are bolder.

In joinery: A mode of ornamentation by grooved or swelling bands, or forms following the line of the object. There are numerous varieties, as the bead, the astragal, the cavetto, the echinus, the fillet, the fascia, the ovolo, the ogee the cyma, the recta or reversa, the quirk, the bolection, etc. A molding is said to be stuck on or laid on, according to whether it is made on the edge of the frame or on a detached slip. In mining, the ore found on the top of veins near the surface of the ground. In shipbuilding, giving the correct outline and depth to ship's timbers, etc; it is one part of the operation of forming.

Moldau (mol'dou) (Bohemian, Vltava), the chief river of Bohemia, and an important tributary of the Elbe, rising in the Böhmerwald mountains, on the S. W. frontier, at an elevation of 3,870 feet above sea-level, and flowing S. E. to Hohenfurt where it bends N., and pursues that direction to its confluence with the Elbe opposite Melnik, after a course of 278 miles. Its course to the point of confluence is longer than that of the Elbe, and the navigation of that river is greatly facilitated by the body of water which it contributes. It receives on the left the Wotawa and the Beraun, and on the right the Luschnitz and the Sazawa. The chief towns on its banks are Budweis and Prague. Navigable from Budweis.

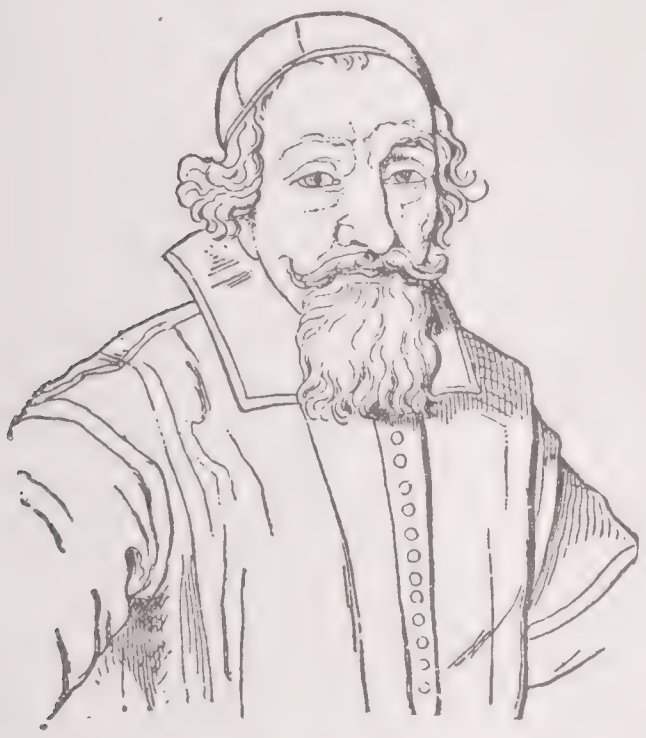
Moldavia (mol-dā'vi-ä), formerly a principality, now forming the N. division of the kingdom of RUMANIA (*q. v.*).

Mole, a jetty or structure erected before a port so as to partially inclose a harbor or anchorage, and protect it from the violence of the waves in the offing. Also a pier of masonry; one is described by Herodotus as circumvallating the harbor of Samos. In Roman antiquities, a mausoleum of peculiar form as the Mole of Hadrian, now known as the Castle of St. Angelo, Rome.

Mole, in zoölogy, the genus *Talpa,* and specially *T. europæa,* the common mole, though the name is sometimes loosely applied to any underground burrowing mammal. The common mole is about six inches in length (including the tail, rather more than an inch); the body is cylindrical, muzzle long and pointed, eyes minute; no ear conches; the fore-feet broad and fossorial, hind-feet long and narrow. Fur, black, soft, and velvety with grayish tinge; but lighter shades often occur, and pure white individuals have been observed. The normal food of the mole is the earthworm. It is very voracious, and no kind of flesh seems to come amiss to it, but it will not touch vegetables. It takes readily to the water. Geographical range, from England to Japan. Moles, the family *Talpidæ.* In husbandry, a cylindrical plug of iron three or four inches in diameter, and with a sharp point, drawn or driven through the subsoil to make a drain.

Molé, Comte Matthieu Louis (mo-lā'), a French statesman, descendant of Matthieu Molé (1584–1656), the mediator between the King of France and the Parliament of Paris during the troubles of the Fronde, and son of Edouard Molé, president of the Parliament in 1788; born in Paris, France, Jan. 24, 1781. After the Revolution, Molé returned to France, and made his début in public life with his "Essay on Ethics and Politics," in which he vindicated the government of Napoleon on the ground of necessity. The emperor appointed him Master of Requests, and eventually raised him (1813) to the dignity of a count, and to a place in the cabinet. Louis XVIII. made him a peer

in 1815, and in the same year he was appointed minister of marine. After Louis Philippe ascended the throne he became minister of foreign affairs, but at the end of a few months gave place to the Duc de Broglie. In 1836 he succeeded Thiers as prime minister; his ministry was unpopular, and in 1839 he appealed to the electors but unsuccessfully. Henceforward he took little part in political affairs, except that after the revolution of 1848 he exerted himself, though in vain, to rally and unite the party



COUNT MATTHIEU MOLÉ.

of order in the Assembly, to which he had been elected. He died at his château, Champlâtreau, Nov. 25, 1855.

Molech (mo'lek), or **Moloch** (mo'lok), a heathen deity chiefly mentioned in the Old Testament as the national god of the Ammonites, to whom children were sacrificed by fire. There is some difficulty in ascertaining at what period the Israelites became acquainted with this idolatry; yet various reasons render it probable that it was before the time of Solomon, the date usually assigned for its introduction. After the restoration, all traces of this idolatry disappear.

Mole Cricket, the *Gryllotalpa vulgaris*, a genus of insects classified in the *Orthoptera*, and is included in the tribe *Gryllina* of that order. These insects occur in Great Britain and France, where they are known under the name of *Courtilières*; but they are local and limited to certain districts in their distribution. In length the mole cricket averages about two inches. It is of a reddish brown color, the middle part of the body inclining toward a grayish hue. The anterior pair of limbs are converted into powerful burrowing organs, being flattened, expanded at the foot portions, and turned outward in the same manner as the hands of the mole, to which animal, in the general conformation of its body, this cricket bears a marked resemblance. These insects burrow in the ground and construct their nests in the form of subterranean galleries in the central portion of which the habitation or dwelling cavity is excavated. In this cavity the eggs, about 200 or more in number, are deposited in the spring. The eggs average each the size of a grain of rice, and the nest is carefully watched and protected from the raids of other insects. The burrowing operations of the mole crickets are exceedingly destructive to the roots of plants, and in this way they become an annoyance to the gardener. Their food appears to consist chiefly of other insects, larvæ, and worms. The male chirps like other crickets; but his sound is of a more feeble description than that of the common species of cricket.

Molecule, the smallest quantity of any elementary substance or compound which is capable of existing in a separate form. It differs from atom, which is not perceived, but conceived, inasmuch as it is always a portion of some aggregate of atoms. Molecular attraction is that species of attraction which operates upon the molecules or particles of a body. Cohesion and chemical affinity are instances of molecular attraction. See CHEMISTRY.

Mole Rat, *Spalax typhlus*, a mouse-like rodent, found in the S. E. of Europe, ranging E. into Asia. The eyes are rudimentary and covered with skin, so that the animal is quite blind; the tail is also rudimentary. The toes are furnished with powerful claws, which the animals use in excavating their burrows. Color, yellowish-brown, tinged with ashy-gray, the lower surface with white streaks and spots.

Moleschott, Jakob (mō'le-shot), a Dutch-Italian physiologist; born in Bois-le-Duc, Holland, Aug. 9, 1822. He studied medicine at Heidelberg, and taught there physiology, anatomy, and anthropology, 1847–1854, when he resigned his chair, the senate of the university having "warned" him on account of the strong materialistic tendency of his writings. In 1853 he established a private laboratory and worked in it till 1856, when he was nominated Professor of Physiology at Zurich; in 1861 he moved to the University of Turin, and in 1878 to that of Rome. He wrote about 20 works, in German and Italian, on various branches of physiological research, including one on the "Natural History of Men and Animals" (1855). He died in Rome, Italy, May 20, 1893.

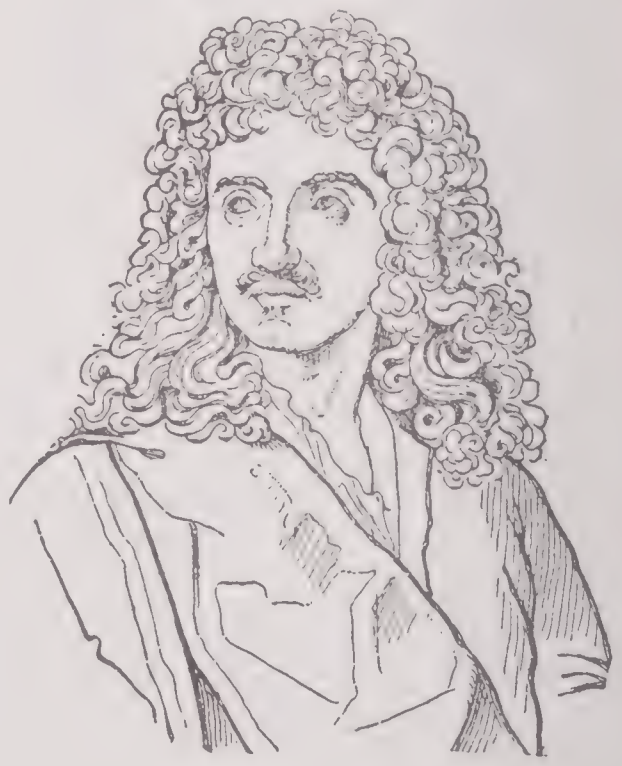
Moleskin, a strong twilled cotton fabric (fustian), cropped or shorn before dyeing; much used for workmen's clothing. So called from its being soft, like the skin of a

mole. In the United States the word is also applied to the padded breeches made of moleskin which are worn by football players.

Molesworth, Mrs. (Mary Louisa Stewart), an English writer; born of Scotch parentage in Rotterdam, Holland. Her childhood was passed in Manchester and Scotland, and partly in Switzerland. She began to write when very young, and her first attempts were published when she was only sixteen. Her first complete works were written under the pseudonym of "Ennis Graham," when she was about 24. They were the novels: "Lover and Husband"; "She was Young and He was Old"; "Not Without Thorns"; "Cicely"; and several years later "Hathercourt Rectory"; and "Miss Bouverie." When she was about 30 she began to write for children and was at once successful. Her children's stories included: "Tell Me a Story" (1875); "Carrots" (1876); "Tapestry Room" (1879); "Herr Baby" (1881); "Rectory Children" (1890); "The Green Casket" (1890); "Children of the Castle" (1890); "The Magic Nuts" (1898); "The Grim House" (1899); "This and That." She also contributed largely to the better class juvenile magazines.

Molesworth, Sir William, an English politician, popularly known as the "liberator and regenerator of Britain's colonial empire"; born in London, England, May 23, 1810; he succeeded as 8th baronet in 1823; studied at Cambridge, at Edinburgh, and in Germany; made the tour of Europe; and sat in Parliament for East Cornwall 1832–1837, for Leeds 1837–1841, and for Southwark from 1845 till his death, having accepted office in 1853 as first commissioner of public works under the Earl of Aberdeen, and in 1855 as colonial secretary under Palmerston. He was the intimate friend of Bentham and James Mill, and was regarded as the parliamentary representative of the "philosophical Radicals," whose organ, the "Westminster Review," he purchased in 1836, and merged with it the "London Review," started a year before by him and Roebuck. A great admirer of Hobbes, he edited his complete works (16 vols. 1839–1845) at a cost of $30,000; but he will chiefly be remembered as having drawn attention to the abuses connected with the transportation of criminals, and as having pointed out the maladministration of affairs in the colonial office, investigated the relations between the imperial government and the colonial dependencies, and expounded the true principles of colonial self-government. He died in London, Oct. 22, 1855.

Molière (mo-lyār), the professional name of **Jean Baptiste Poquelin** (pok-lang), a French dramatist; born in Paris, France, Jan. 15, 1622. He took the name of Molière, out of regard to his parents, when he first became an actor. He was brought up to his father's trade, that of upholsterer; but when 14 years of age he was sent to study at the college of Clermont, where he remained several years. As substitute for his father he attended Louis XIII. as valet-de-chambre on his expedition to Narbonne, in 1642. He studied law at Orleans, and was received advocate at Paris, and in 1646 he began acting there with a company of amateurs. After obtaining great success in the provinces, he settled at Paris in 1658, having previously produced his two comedies, "The Madcap" and "The Loving Spite." In the following year he increased his reputation by the comedy "The Absurd Précieuses," which had a run of about 120 nights. Continuing to produce new plays, and acting in the principal comic parts, he was a favorite both with the court and the people. He succeeded to his father's office under Louis XIV., who gave him, in 1663, a pension of 1,000 livres. He was the



JEAN BAPTISTE MOLIÈRE.

intimate friend of La Fontaine, Boileau, and other distinguished men; but his happiness was impaired by an ill-assorted union with a young actress. He excited the animosity of the medical profession, by several sharp attacks on them in his comedies; and that of the priestly and priest-ridden classes, by his terrible attack on pious hypocrites in the famous "Tartuffe," which was withdrawn from the stage by order of the king. The order was annulled in 1668. Among the most admired plays of Molière are: "School for Women"; "Tartuffe"; "The Misanthrope"; "The Wise Women"; "Physician in Spite of Himself"; and "The Imaginary Invalid." In some of his comedies he borrowed from

or imitated, the Latin comic writers, and in some the Italian and Spanish. Among these imitations are "The Miser"; "Amphitryon," and "Scapin's Knaveries." But in the delineation of character and the portrayal of the vices and follies of social life, Molière is thoroughly original; and whatever materials he may have appropriated from earliest writers, he so treated them as to make the result entirely his own. He is called by Voltaire the Father of French Comedy, and alone among French comic writers is classical. His works, it is said, have been more frequently republished than those of any other French author. In 1673, he took part in the presentation of his last comedy, "The Imaginary Invalid," being at the time seriously out of health; the effort was too much for him, and he died the same night, Feb. 27. He was buried without the usual religious rites, through the influence of the priests, who hated him, though they could allege nothing against his character. His profession excluded him from the French Academy; but a century after his death, his bust was set up in the hall with this inscription: "Nothing is lacking to his glory; he was lacking to ours."

Molina, Juan Ignacio (mō-lē'nä), a Jesuit historian; born in the province of Talca, Chile, June 24, 1737. After 1774 he resided at Bologna, teaching and devoting his leisure to the composition of valuable historical works on Chile. These were: "Compendium of Chilean History"; "Essay on Chilean Natural History" (1782); "Essay on Chilean Civil History" (1787), the last-named being translated into several languages, including English, etc. He died in Bologna, Italy, Sept. 12, 1829.

Molina, Luis, a Jesuit theologian; born in Cuenca, New Castile, Spain, in 1535. He has become known by his theory of grace. In order to reconcile man's free-will with the Augustinian doctrine of grace, he published a work in which he undertook to reconcile the free-will of man with the foreknowledge of God and predestination (see MOLINISTS). It caused lengthened discussion, and passed subsequently into the Jansenist controversy. Molina was attacked by Pascal in the Provincial Letters. He died in Madrid, Oct. 12, 1600.

Moline, a city in Rock Island co., Ill., on the Mississippi river, and on the Burlington route, the Chicago, Milwaukee, and St. Paul, and the Chicago, Rock Island and Pacific railroads; 178 miles W. of Chicago. It contains electric light and gas plants, electric railroads, public library, high school, and National banks; and has manufactories of organs, elevator machinery, plows, wagons, steam engines, carriages, pumps, malleable iron, stoves, paper, screws, castings, etc. The assessed property valuation is nearly $2,000,000. In the vicinity of Moline are highly productive coal mines. Pop. (1890) 12,000; (1900) 17,248; (1910) 24,199.

Molinists (mo'-), the name of a sect in the Roman Catholic Church, which adopted the opinions of Luis Molina (see MOLINA, LUIS). In order to remove the difficulties attending the doctrines of predestination and free will, and to reconcile the jarring opinions of Augustines, Thomists, semi-Pelagians, and others, he had recourse to the hypothesis that the decree of predestination to eternal glory was founded on a previous knowledge and consideration of the merits of the elect; that the grace from whose operations those merits are derived, is not efficacious by its own intrinsic power only, but also by the consent of our own will, and because it is administered in those circumstances in which the Deity, by that branch of his knowledge which is called *scientia media* (mediate knowledge), foresees that it will be efficacious. This *scientia media* is that foreknowledge of future contingents that arises from an acquaintance with the nature and faculties of rational beings, of the circumstances in which they shall be placed, the objects that shall be presented to them, and the influence of these on their actions. This doctrine was soon violently assailed, especially by the Dominicans, and at length Pope Clement VIII. appointed a congregation to investigate the matter. Opinion was so much divided on the subject, that the Pope decided that both doctrines (that of Molina and that of his opponents) might safely be taught in the Church. The Molinists, however, soon disappeared, as other views involving the question of predestination and grace were advanced. See JANSENISTS: MOLINOS, MIGUEL.

Molinos, Miguel (mō-lē'nōs), founder of the Quietists; born near Saragossa, Spain, Dec. 21, 1640. He was a priest at Rome. His principal work, "A Spiritual Guide" (1675), maintained that godliness consists in uninterrupted communion with God through contemplation — the doctrine called "Quietism." This being thought to imperil the doctrine of good actions, the book was condemned (1687); and in spite of recanting, he was imprisoned for life, dying in confinement, in Rome, Dec. 29, 1696 or 1697.

Molise. See ABRUZZI AND MOLISE; CAMPOBASSO.

Mollah (mol'lä), or **Mullah,** an honorary title given to any Mohammedan who has acquired consideration by the purity of his life, or who holds some post relating to worship or the application of the princi-

ples of the Koran. The most fanatical and revolutionary of these leaders are known as mad mullahs. Revolts led by them in India have cost the British government many lives and millions of dollars. In the summer of 1901 the Anglo-Egyptian army (in conjunction with the Abyssinian forces) quelled a revolt led by a mad mullah in the Sudan.

Möller, Peter Ludwig (muhl'lur), a Danish poet; born in Aalborg, Denmark, April 18, 1814. He spent the last 15 years of his life in Paris. He published "Lyrical Poems" (1840); "Critical Sketches" (1847); "Pictures and Songs" (1847); "Falling of the Leaves" (1855, under the pseudonym of "Otto Sommer"); and the interesting work "Modern Comedy in France and Denmark" (1858). He died in Rouen, France, Dec. 7, 1865.

Möller, Poul Martin, a Danish poet; born in Veile, Denmark, March 21, 1794. He was Professor of Philosophy at Christiania, Norway, 1828–1831, and at Copenhagen in 1831. Of a number of fine lyrics, the best known was his "Joy over Denmark." In fiction he wrote "Eyvind the Skald," "A Danish Student's Adventure," etc. His philosophical writings are contained in his "Posthumous Works" (3d ed. 1856). He wrote also "Notes Taken on a Journey to China." "Poetry and Prose," selections, appeared in 1891. He died in Copenhagen, March 13, 1838.

Mollie Myrtle. See HILL, MRS. AGNES.

Mollusca (-lus'kä), in zoölogy, according to Linnæus, an order of Vermes, distinct from Testacea, which immediately follows it. He placed under it a miscellaneous assemblage of genera which he described as naked, not included in a shell, furnished with limbs. They were: *Actiniæ, Ascidia, Limax, Holothuria, Sepia, Aphrodita, Nereis,* etc. ("System of Nature"). Cuvier made the Mollusca one of the four great "divisions" or sub-kingdoms of the Animal Kingdom, of equal rank with the Vertebrata, the Articulata, and the Radiata. He subdivides it into six classes: Cephalopoda, Peteropoda, Gasteropoda, Acephala, Brachiopoda, and Cirrhopoda. Except that the last class has now been merged in Crustacea, and placed with the Articulata or Annulosa, the essential features of Cuvier's arrangement have still been preserved. In 1843 Professor Owen arranged the Mollusca in an Acephalous division, containing the orders *Tunicata, Brachiopodo,* and *Lamellibranchia,* and an Encephalous division, with the orders *Pteropoda, Gasteropodo,* and *Cephalopoda.* S. P. Woodward recognized six classes. Cephalopodo, Gasteropoda, Pteropoda, Brachiopoda, Conchifera, and Tunicata. Professor Huxley separates from the already limited class Mollusca a class Molluscoida. Dr. Henry Woodward defines the Mollusca as animals with a soft body, without segments, naked or covered with a shell of one or two valves composed of carbonate of lime secreted by a fold of the skin — the mantle. They have a brain-mass, and foot and mantle ganglia. Some have an internal hard shell or cartilage. The symmetry of the body is bilateral. Example, the cuttle-fish, the snail, the oyster, etc. He makes Tunicata and the Molluscoida an "intermediate group," and divides the sub-kingdom into four classes: Cephalopoda, Gasteropoda, Peteropoda, and Conchifera. Many thousand recent Mollusca are known, distributed throughout every climate and nearly every part of the world.

The shells of the Mollusca being all but indestructible, and easy of identification, afford us a reliable means for ascertaining the relative age of strata. As some, moreover, inhabit fresh waters, others the land, besides the large numbers which find their home in salt water, they often settle the fresh-water or marine origin of a stratum. The marine ones being distributed also in certain zones of salt water, they frequently afford materials for sounding a sea which has passed away ages ago. Next to the Protozoa, the oldest fossils known are Mollusca. They have abounded from Cambrian times till now. The longevity of molluscous species (not individuals) is much greater than that of the Mammalia. Hence, Lyell's arrangement of the Tertiary formations in accordance with the relative percentage of recent and fossil species must not be extended beyond the Mollusca. See BIVALVES.

Mollwitz (mol'vits), a village of Prussian Silesia, 7 miles W. of Brieg. An obelisk (1878) marks the battlefield where Frederick the Great with 20,000 Prussians defeated an equal number of Austrians under Marshal Neipperg, April 10, 1741. The Austrians lost 5,340 men, the Prussians 5,500.

Molly Maguires, a secret society formed in Ireland, in 1843, to intimidate bailiffs or process-servers distraining for rent, or others impounding the cattle of those who were unable or unwilling to pay rent. The members of the association were young men dressed up in female attire, and having their faces blackened. Also, a similar society formed in 1877 in the mining districts of Pennsylvania. The members sought to effect their purpose by intimidation, carried in some cases to murder. Several were arrested, tried and executed.

Molmutius (-mu'shius), a mythical king of Britain, who promulgated the laws called the Molmutine, and established the privilege of sanctuary. He is alluded to by Shakespeare in "Cymbeline," iii. 1.

Moloch (mō'lok) **Lizard,** a genus of lizards found in Australia. *M. horridus*

(moloch lizard) is one of the most ferocious-looking, though at the same time one of the most harmless of reptiles, the horns on the head and the numerous spines on the body giving it a most formidable and exceedingly repulsive appearance.

Mologa (mō-lō′gä), a town in the Russian province of Jaroslav, near the confluence of the Mologa and Volga, 68 miles W. N. W. of Jaroslav. The river Mologa winds 337 miles S. E. through the provinces of Tver, Novgorod, and Jaroslav, and is one of the links between the Volga and the Neva.

Molokai (mō-lō-kī′), an island of Hawaii, about 40 miles long by from 7 to 9 broad. It is noted for its settlement of lepers, all persons on the islands found to be affected being sent by government to Molokai, and kept entirely isolated from the healthy part of the community. Pop., with Lanai, Maui, and Kahoolawa, (1910) 29,762.

Molokan (-lō′-), plural **Molokani** (-kä′-nē), milk-drinker; one of a sect in Russia who observe the laws of Moses regarding meat, forbid the use of images or the sign of the cross, and consider all wars unlawful. They derive their name from the quantity of milk-food eaten by them.

Moltke, Helmuth Karl Bernhard, Count von (molt′ke), a Prussian military officer, one of the greatest soldiers of Europe; born in Paschim, Mecklenburg-Schwerin, Oct. 26, 1800. He was the son of a German army officer. At the age of 11 he was sent to the military school at Copenhagen, and, after several years of training, entered the Danish army. But in 1819, led by his German sympathies, he resigned his commission and went to Berlin to continue his studies in the Prussian capital. He was very poor, but managed to live and pay his teachers out of his small allowance as lieutenant in the army of Prussia. After 10 years of study and a few more of staff service he went to Turkey on a furlough, and acted (1835–1839) as military adviser of the Sultan. On his return to Western Europe he resumed his connection with the Prussian staff. The unusual character of Von Moltke's genius did not appear till Prince William ascended the Prussian throne as regent in 1858. Bismarck became prime minister, Von Roon was made secretary of war, and Von Moltke was appointed chief of staff. These men coöperated successfully in the reorganization of the armed forces of the kingdom, and perfected the weapon by which Prussia fought her way to the first place in Europe. Von Moltke planned the Danish campaign of 1864, and two years later immortalized himself by the result of the war with Austria. His plan was to "move separately and strike together," and by this method he humbled Austria at Sadowa, July 3, 1866. He keenly foresaw the war with France (1870–1871), and perfected his plan of campaign two years in advance of the outbreak of hostilities. War was declared by France, July 19, 1870, and seven days later three divisions of the Prussian army were on the frontier. By the middle of August Bazaire, with 180,000 Frenchmen, had been penned up in Metz, and on Sept. 1 Napoleon and Marshal MacMahon were entrapped at Sedan and obliged to surrender with 90,000 men. On Sept. 19 the Germans were before the walls of Paris. The Franco-Prussian War established the reputation of Von Moltke as the ablest strategist of his time. His own country showered honors on him, he becoming a count, a marshal, and a life-member of the Prussian House of Lords. In Parliament his only speeches were on military affairs, and he spoke so seldom

COUNT VON MOLTKE.

that he was called "the silent one." It was a common saying in regard to his linguistic talents that "Von Moltke was silent in eight languages." He was retired for age in 1888, and died in Berlin, Prussia, April 24, 1891.

Moluccas, or **Spice Islands,** a name originally confined to the five small islands of Ternate, Tidore, Motir, Makian, and Batshian, but now applied to the widely scattered group lying between Celebes and Papua, between lat. 3° S. and 6° N., and lon. 126° to 135° E.; area, 43,864 square miles; pop. (1900) 430,850 approximately. They are divided into the residences of Amboyna, Banda, Ternate, and Menado; the S. portion being governed directly by the Dutch, and the N. indirectly through native sultans. The islands (several hundreds in number) are nearly all mountainous, mostly volcanic, and earthquakes are by no means uncommon. They abound in gaily-colored birds and gorgeous insects; and are covered by a luxuriant tropical flora. Cloves, nutmegs, mace, and sago

are exported to Europe; and birds'-nests, trepang, etc., to China. The Moluccas have been for centuries alternately in the possession of the Spaniards, Portuguese, and Dutch. They were twice taken by the British and given up to Holland, in whose possession they still remain. The natives belong to Malay and Polynesian races, and the general language on the coast is the Malay.

Molybdenum (-lib'de-num), a metallic, hexad element, discovered by Hjelm in 1782; symbol, Mo; at. wt., 95.5; molecular weight, unknown; sp. gr., 8.6. It is of rare occurrence, but is found in combination, with sulphur as molybdenite, MoS''_2; with oxygen in molybdenum ocher, MoO_3, and as lead molybdate, MoO_2PbO, in wulfenite. The metal is obtained by heating molybdic anhydride, or one of the chlorides, to redness in a current of hydrogen. It is a silver-white, brittle, almost infusible metal, permanent in air at ordinary temperatures, but when heated it oxidizes, and is ultimately converted into molybdic anhydride. It is not attacked by dilute hydrochloric or sulphuric acids, but is readily dissolved in aqua regia, or in hot concentrated sulphuric acid. Molybdenum forms with oxygen the following oxides: Hypomolybdous oxide, MoO; dimolybdous trioxide, Mo_2O_3; molybdous oxide, MoO_2, and molybdic anhydride, MoO_3, all of relatively slight importance. It forms four chlorides, $MoCl_2$, Mo_2Cl_6, $MoCl_4$, and $MoCl_5$; and three sulphides, MoS_2, MoS_3, and MoS_4, the last two being acid sulphides, and forming sulphur salts.

Molyneux. See CLUTHA.

Mombasa (-bä'sä), or **Mombas,** a seaport and the seat of administration of British East Africa, on the N. side of a small island 3 miles by 2½ miles, close to the coast, 150 miles N. of Zanzibar, lat. 4° 3′ S. Here are an old Portuguese fort, a new European hospital, and the offices and workshops of the British East Africa Company. A short railway connects Mombasa with Kilindini, on the other side of the island, where is the residence of the chief administrator of the company. Trade in (imports) piece-goods, brass and iron wire, beads, rice; and in (exports) ivory, gum, copal, copra, ochella weed, maize, and grain; carried on by natives of British India. The harbor is sheltered by a coralline bar, which, however, renders difficult the passage of outward bound vessels against an unfavorable wind. There are an iron pier and a stone wharf. Island and port mentioned as early as 1331. It was visited by Vasco de Gama in 1497, held by the Portuguese from 1529 to 1698, and by the English from 1824 to 1826. Pop. estimated at from 15,000 to 20,000, mostly Arabs and Swahili.

Momentum, in mechanics, the force possessed by matter in motion; the product of the mass by the velocity of a body. Thus a ball of four pounds weight moving uniformly at the rate of 18 feet in a second would have double the momentum that one of three pounds weight moving at the rate of 12 feet per second would possess, for 4×18 is 72, and $3 \times 12 = 36$, or half as much. The force of percussion, that is, the force with which a moving body strikes an object, is the same in amount as the momentum of the former.

"If L stands for length, T for time, and M for mass, their momentum is $\frac{ML}{T}$"

Mommsen, Theodor (mom'zen), a German historian; born in Garding, Schleswig, Nov. 30, 1817. He was Professor of Law at Leipsic, 1848–1850; of Roman law, at Zürich 1852–1854, at Breslau 1854–1858; of ancient history at Berlin, 1868; member of the Prussian House of Delegates. His great work is "Roman History" (1854–1856; 8th ed. 1888–1889; vol. 5, 3d. ed 1886). He wrote besides, "Roman Chronology down to Cæsar" (2d ed. 1859); "History of Roman Coinage" (1860); "Roman Investigations" (1864–1879); "History of Roman Political Law" (3d. ed. 1888). He was editor-in-chief of the great "Body of Latin Inscriptions" (15 vols. and supplement, 1863–1893). His historical work incorporates the results of learning in many fields. He died Nov. 1, 1903.

Momus, the god of mockery and censure among the ancients. He was the son of Night and was expelled from heaven for his free criticism of the gods. Momus is generally represented raising a mask from his face and holding a small figure in his hand.

Mona, *Cercopithecus mona,* a monkey from Senegal. It is remarkable for its brilliant coloration; the head being olive-yellow, with a black stripe on the forehead; yellowish whiskers and a purple face. The back is chestnut-brown, and there is a white spot on each side near the root of the tail, which is black.

Mona, a small island of the West Indies, 42 miles E. of Porto Rico, in the middle of Mona Passage, to which it gives its name; area, nearly 10,000 acres. It is a coral formation. The general level being about 60 feet above the sea-level, with a range of hills on the E. side of the island, running from N. to S., the highest peak of which is 175 feet above the water. The island is well watered and well drained, has a luxuriant vegetation and all kinds of tropical fruits grow in profusion. It is the nesting place of thousands of green turtles, and the waters teem with the finest varieties of fish. Mona came into posses-

sion of the United States under the peace treaty with Spain in 1898. The only resident on the island is a lighthouse keeper.

Monachism (mon'a-kizm), the system of monastic life; monkery, monkishness. The ultimate fact on which monachism rests is that many people are born with a tendency to contemplation rather than to active exertion, and, if pious, consider that they will be more free from temptation to sin by retiring from the ordinary world. Hot climates tend to strengthen these feelings, and monachism has flourished more luxuriantly in Asia, Africa, and Southern Europe, than in the colder North.

Ethnic Monachism.—The most gigantic development of monachism the world has ever seen was that of BUDDHISM (*q. v.*), and it was the earliest in point of date. The Jain system is also monastic. Brahmanism possessed it to a less, but still to a considerable extent. Of the Hindu Triad the worship of Brahma scarcely exists; connected with that of Vishnu and Siva there are many monastic orders or sects. Of the former, Dr. Horace Hayman Wilson enumerates 19, and of the latter 11, with 14 others, some sub-divided ("Works" (1862), i. 12). Curiously enough, most of them arose about the same dates as the leading religious orders of Christendom were instituted, as if Oriental and Western minds advanced equally, or some cause had operated simultaneously both in the East and West.

Jewish Monachism.—The Nazarites were an ascetic sect temporarily under vows, but not bound to celibacy, which is nowhere enjoined even on priests under the Mosaic law. Elijah and John the Baptist had monastic tendencies (I Kings xvii: 3, 4, xix: 1–9; II Kings i: 8; Matt. iii: 4). But genuine Jewish monasticism, with its celibacy as well as its asceticism and seclusion from society, seems to have begun with the ESSENES (*q. v.*), and to have been continued by the THERAPEUTÆ (*q. v.*).

Christian Monachism.—In the 2d century certain persons who aimed at stricter piety than their neighbors often held converse together without quite separating from society. They were called ascetics, and were the successors of the Therapeutæ, who prepared the way for the rise of monachism. In the 3d century Paul ranged through the desert of Thebais in Upper Egypt during the Decian persecutions. He and others who acted similarly were called anachorets or anchorites, or persons who retire from society, recluses, solitaries (see ANCHORET), also eremites or hermits, that is, persons who live in the desert (see EREMITE). They frequently resided in caves. In 305 Anthony, an Egyptian monk, collected many of the eremites into communities. These were called cœnobites from their living in common. In this he was largely assisted by his disciple Pachomius. The same discipline spread through Western Asia and Europe. From among the Eremites who lived apart from each other sprung the Sarabaites and Gyrovagi (Vagabond monks), disreputable races, the Stylites, or Pillar Saints, associated forever with the name of Simeon, who died in 451, with other ramifications. At first all the monastic establishments followed the rule of Pachomius, but in the early part of the 6th century St. Benedict introduced new regulations, and all the monastic orders for some centuries were Benedictine. Many ordinary monks becoming corrupt, the new Order of Canons was instituted in the 12th century, and, as the great wealth which their communities had acquired was believed to be one of the main causes of that corruption, there arose, in the beginning of the 13th century, different mendicant orders, the members of which vowed poverty (see MENDICANT ORDERS). At first all the monks were laymen; now they consist of three classes: (1) Priests; (2) choir monks, in minor orders; and (3) lay-brothers, who act as servants and laborers. Originally they were under the jurisdiction of the bishop, but ultimately they were exempt from all authority except that of the Holy See. The influence of the mendicant orders was on the wane at the Reformation, and the Jesuits took their place. At that date many monasteries in England and elsewhere were deprived of their endowments and suppressed. Those of France were swept away in the first Revolution. Though since restored, they have not attained their former importance. See MONASTERY: MONK: NUN.

Monaco (mon'ä-kō), a principality lying between the French department of Alpes Maritimes (Nice) and the Mediterranean.

MONACO.

In 1861 the Prince of Monaco sold the departments of Mentone and Roccabruna to France for $800,000; and the principality has since been confined to an area of 8 square miles, with a pop. (1900) of 15,180. The prince (a scion of the house of Gri-

maldi) exercises both legislative and executive functions, while the people are exempt from taxation, as the revenue is almost entirely derived from the rents of the gaming establishment. The capital, Monaco, on a rocky height projecting into the sea, is a renowned watering-place. About a mile to the E. is MONTE CARLO (*q. v.*), a collection of hotels and villas which have sprung up near the luxurious gardens of the handsome gambling casino, established here in 1860. This institution is now the property of a joint stock company. The inhabitants of Monaco (Monégasques) are not admitted to the gaming tables.

Monad, in chemistry, univalent element. A name given to those elements which can directly unite with, or replace, one atom of hydrogen in a compound. The monad elements are hydrogen, chlorine, bromine, iodine, fluorine, lithium, sodium, potassium, ruthenium, cæsium, and silver. In philology, a monosyllabic word or root, specifically, a monosyllabic root of the isolating class of languages. In philosophy, a term first used by Giordano Bruno (1548–1600), and adopted in a slightly different sense and brought into prominence by Leibnitz (1648–1716). To avoid the Atomism of Gassendi, he conceived a number of true unities, without extension, but endowed with the depth of an internal life, thus distinguishing them from atoms.

"Monad is the term given by Leibnitz to simple unextended substance; that is a substance which has the power of action . . . All monads have ideas, but the ideas of the different monads are of different degree of clearness. God is the primitive monad, the primary substance; all other monads are its fulgurations. God has none but adequate ideas. Every soul is a monad. Plants and minerals are, as it were, sleeping monads with unconscious ideas. In plants these ideas are formative vital forces; in animals they take the form of sensation and memory; in human souls they disclose themselves in consciousness, reason; they approach, though they do not attain, the clearness of the adequate ideas possessed by God."—"Hist. Pantheism," ii: 207, 208.

In zoölogy:

"No better illustration of the impossibility of drawing any sharply defined distinction between animals and plants can be found, than that which is supplied by the history of what are termed monads. The name monad has been commonly applied to minute, free or fixed, rounded or oval bodies, provided with one or more long cilia, and usually provided with a nucleus and a contractile vacuole . . . Some are locomotive conditions of indubitable plants; others are embryonic conditions of as indubitable animals. Yet others are embryonic forms of organisms which appear to be as much animals as plants; and of others 'it is impossible to say whether they should be regarded as animals or as plants.'"—Huxley, "Anat. Invert. Animals," pp. 44, 45.

Monadnock (-nad'-), **The,** a twin-screw, iron, double-turreted monitor of the United States navy; 3,990 tons displacement; length, 259 feet, 6 inches; breadth, 55 feet, 10 inches; mean draft, 14.6 inches; horse power, 3,000; armor, 9 inches on barbettes; main battery, four 10-inch breech-loading rifles and two 4-inch, rapid-fire guns; secondary battery, two 6-pounder and two 3-pounder, rapid-fire guns; two 37-millimeter Hotchkiss revolving cannons, and two 1-pounder rapid-fire cannons; speed, 14.5 knots; crew, 26 officers and 145 men; cost, $3,178,046.

Monarchians, the followers of Praxeas, a celebrated man and confessor who lived at Rome in the 2d century. He rejected the distinction of three Persons in the Divine Essence, and according to Tertullian ("Liber contra Praxeam") contended for the monarchy of God. Christ was regarded as the Son of God, to whom the Father so joined himself as to be crucified along with the Son, whence the Monarchians were called also PATRIPASSIANS (*q. v.*).

Monarchy, a state or government in which the supreme power is vested in the hands of a single ruler, and which is absolute, limited, or constitutional, hereditary, or elective. An empire; a kingdom; the state or country ruled by a monarch, absolute or constitutional.

Monastery, a class of structures which arose in the Middle Ages to meet the requirements of the large number of monks that then existed. It is proved by documents that these buildings were at first constructed somewhat after the plan of a Roman house, or rather of a Roman villa or country-house. Records of abbeys as early as the 7th century show that the arrangements were similar then to those of the 12th century. There was, however, one entirely new element — viz. the church. This was the largest and most important building, and regulated the position of all the rest. In N. climates the cloister was usually situated on the S. side of the church, for the sake of the sunshine and warmth. It was composed of an open courtyard, square or oblong in shape, surrounded by an open arcade, or covered way. The church formed the N. side, and on the E. side was situated the chapter house, with the monks' dormitory over it. The latter was thus in immediate communication with the church, and conveniently placed for the monks' attendance at the services during the night. The chapter house in the Cistercian monasteries was usually divided into three compartments by the pillars bearing the arches. The abbot's seat was opposite the entrance door, and a stone seat all round accommodated the monks. The doorway was not closed, and together with an open arch or window on each side of it allowed those in the cloister to hear the discussions in the interior. The sacristy is placed on the N. side of the chapter house, with a door from the church. A similar cell or "parlor" occupies the S. side; then comes a passage or "slype" leading from the cloister to the gardens, etc. Beyond this is the fratry or day room

of the monks, a long vaulted apartment running S., having a row of columns in the center and open windows.

The S. side of the cloisters generally gave access to the refectory, a large, rather ornamental chamber, usually with an open wooden roof. It was sometimes placed parallel and sometimes at right angles to the cloister. Opposite the door to the refectory and in a vaulted recess stood a fountain or basin where the monks might wash. Adjoining the refectory were the kitchen and offices. The former was frequently a detached building with a large number of hearths, each having a separate chimney in the roof. Along the W. side of the cloister, and sometimes extending much farther, lay the hospitium or guest-house, where all travelers were received, and the lay room above, where they were lodged. A very important room in the monastery was the scriptorium or library, in which the MSS. were written and illuminated; this was situated on the second floor of the chapter house. The abbot's lodge formed a separate edifice, as also did the infirmary. The whole establishment was surrounded by a wall, and provided with proper gates and defenses. The outer gate gave access to the outer court, in which were situated the workshops of the various tradesmen connected with the abbey, and the buildings required in connection with the agricultural employments of the lay brethren.

Such were the arrangements of the Cistercian abbey in the 12th and 13th centuries. In later times the simplicity of the plan was broken in on. The monks, desirous of more comfortable quarters, divided the dormitory and made it into cells. The open windows were glazed, and even the arches of the cloisters were sometimes inclosed. The early simplicity of the architectural style was also departed from, and the monastic buildings of the 15th century are as rich in decoration as the cathedrals and parish churches. The arrangements of the monasteries of the other orders were, generally speaking, similar to those of the Cistercian, except in the case of the Carthusians. In their convents, where absolute solitude and silence were required, each monk had a small house and garden to himself. These were arranged round the cloister, which, when the number of monks was large, was greatly extended in dimensions.

Monastic Vows, the solemn promises made to God by the monks. They are three in number: poverty, chastity, and obedience. The vow of poverty prevents the monks from holding any property individually. Monasteries, however, professing merely the "high" degree of poverty may possess real estate, yet not more than enough for their support, as the Carmelites and Augustines. In the "higher" degree a monastery may hold only personal property, as books, dresses, supplies of food and drink, rents, etc., as the Dominicians. The "highest" degree absolutely forbids both real and personal property, as is the case with the Franciscans, and especially the Capuchins. The vow of chastity requires an entire abstinence from familiar intercourse with the other sex; and that of obedience entire compliance witth the rules of the order and the commands of the superior.

Monastir (mō-näs-ter'), or **Bitolia,** the second town in Turkish Macedonia; in a broad mountain valley, 90 miles N. W. of Salonica. It manufactures carpets and silver filigree, and trades in corn and agricultural products. The Turks, recognizing its strategic importance, have made it the headquarters of an army corps. Under its ancient name of Pelagonia it gives title to a Greek archbishop. Here the Albanian beys were massacred in 1833. Pop. about 45,000.

Monboddo, James Burnett, Lord, a Scotch jurist; born in Monboddo House, Fordoun parish, Kincardineshire, in 1714. He was educated at Marischal College, Aberdeen, and Edinburgh University, afterward studying law for three years at Gröningen, in Holland. In 1737 he was called to the Scotch bar, was connected with the celebrated Douglas case, as counsel for Mr. Douglas; in 1764 became sheriff of Kincardineshire; and in 1767 was raised to the bench by the title of Lord Monboddo. He wrote: "Origin and Progress of Language" (6 vols. 1773–1792), the evolution theory in which the assertion of a close relation between man and the orang-outang, seem less laughable now than they did to Monboddo's contemporaries. Also "Ancient Metaphysics" (6 vols. 1779–1799). He died in Edinburgh, Scotland, May 26, 1799.

Moncton, a town and port of entry of New Brunswick, on the Petitcodiac river, 89 miles N. E. of St. John. It is at the head of navigation on the river, has a fine harbor, and contains many important manufactories, and the general offices and principal shops of the Inter-Colonial railway, etc. Pop. (1901) 9,026.

Monday (that is, moon-day; Anglo-Saxon, Monandæg; German, Montag), the second day of our week, formerly sacred to the moon.

Mondo, an African spirit that favors the hunt.

Mondovi (mōn-dō-vē'), a cathedral city of Italy, 58 miles S. of Turin. Here April 22, 1796, the Sardinians were totally defeated by Napoleon. Pop. (1901) 18,982.

Monera (-nē′rä), a class of Protozoa proposed by Haeckel to include the very lowest organisms, supposed to be destitute of a nucleus. As this structure has been shown to exist in forms where it was formerly denied, the title is now being abandoned. See PROTOZOA.

Moneta (-nē′tä), a surname of Juno at Rome, as goddess of coined money.

Monetary Convention, an international agreement for the regulation of coinage. See BIMETALLISM.

Money. Money is a means of making payments. More precise definitions differ, according to the views of different economists, whether money should include all forms of currency or only standard coin. In the latter case, the definition of money is limited to a commodity of intrinsic value acceptable in exchanges; under broader definitions it extends to bank notes and other forms of paper currency, and even to promises by a bank in the form of deposit entries to pay currency on demand.

The word money is derived from the fact that at Rome the first regular mint was established in the Capitol, in the neighborhood of the temple of the goddess Juno Moneta, who was so called from the Latin *moneta* (a warning), because the goddess there revealed to Manlius (*q. v.*) the assault of the Gauls. Money originated in the need for a common measure in which the value of other things might be expressed. The measure thus adopted included in early times such objects as kettles, cattle, tobacco, or shells, in nearly every case conforming to the conditions that the articles should be widely distributed and generally acceptable either for use or ornament. With progress in civilization, the metals gradually emerged from other articles as the most acceptable form of money, because they were easily transportable without sensible deterioration; because they could be separated and combined into smaller and larger amounts without loss of value (which would not be the case with such articles as diamonds, pictures or living animals); because they were homogeneous, each fraction being of the same quality and value in proportion to magnitude as every other fraction; because their value was not impaired by time, as in the case of fresh fruit or fish; and because when coinage was introduced, they were of a character conveniently to receive and retain the impressions stamped upon them. The metals, when first used as money, passed by weight, and most of the names of coins which prevail even to-day are derived from measures of weight, *e. g.*, the English shilling, the French *livre* (from the Latin *libra*), and the German *Mark*. In China silver still passes by weight. Coinage was a gradual evolution, originating in some of the states of Asia Minor about the fifth century, B. C. The privilege was only recently regarded as exclusively a function of government, coinage by individuals at private mints having prevailed as recently as the middle of the nineteenth century in California. Even when the stamping of coins is exclusively under government control, the control of the quantity issued remains, as in the case of issues of notes by banks, in the hands of the public where the government coins bullion on presentation and at charges not materially in excess of the cost of coinage. This policy, which is pursued by most modern states in respect to the metal which constitutes their standard of value, is called *free coinage*.

The various systems of money which have acquired the widest use have been monometallism, bimetallism, the gold exchange standard, fiduciary or representative money in the form of bank notes and government notes, and token money. Monometallism means that a single metal is the standard of value. Where monometallism prevails, the mints are usually open to the free coinage of the standard metal. Bimetallism (*q. v.*) involves the coinage of two metals upon substantially equal terms. As usually interpreted, it means that the mints shall be open to the free coinage of both gold and silver without discrimination against either. Fiduciary or representative money usually consists of paper promises to pay gold or silver coin. Where such promises are issued by banks, fiduciary currency consists of bank notes; where issued by a government, it consists of government notes, whose acceptance is usually made compulsory (or *legal tender*) in payment of debt. Where such notes are paid by the issuer in coin of their full face value on demand, they are known as redeemable or convertible notes; where they are not so paid, they are known as irredeemable or inconvertible notes. In the latter case, where they are legal tender, they are known as forced legal tender (*cours forcé*) or "fiat" money. Token currency is money (usually consisting of silver, nickel or copper coins) which is not intrinsically of full face value, but circulates at such value by limitation of quantity and by the government stamp. Such money is usually issued by governments in compliance with certain rules which keep the amount within commercial demand, but is not subject to free coinage.

Foreign exchange consists fundamentally in determining the difference in value between moneys of different countries, with the object of transmitting money from one country to another. The cost of shipment, the loss of interest during shipment, the rates of interest charged for money or cap-

ital in different markets, and the prices of securities enter into the determination of rates of foreign exchange; but the range of fluctuation between two countries on the gold standard, where gold can be freely obtained, cannot be greater than the cost and time required for shipping gold from one country to the other. Thus exchange on London at New York may range between $4.84 and $4.90 for the pound sterling, the difference representing the cost of shipping gold in both directions. Where the standards of two countries differ as to the metal employed (whether gold or silver), and where one or both are on a paper basis, the range of fluctuations in exchange may be much wider.

Prior to the middle of the nineteenth century, monetary systems among civilized nations were complex and very divergent, and were sometimes not based upon any clearly defined and intelligent system. This diversity was somewhat diminished by the adoption of a uniform coinage unit by the countries of the Latin Union—France, Switzerland, Italy, Belgium, and Greece—and by the unification of the German Empire in 1873. About the latter date, also, the movement became pronounced towards the single gold standard, until by the adoption of this standard by Russia and Japan about 1897, and by its reaffirmation by the United States in 1900, gold became the standard in nearly all advanced commercial nations. The difficulties of exchange caused between gold and silver countries by changes in the gold value of silver led to the wide adoption among the previous silver-using countries of the gold exchange standard. This system of currency is based upon government coinage in such amounts as will meet the demands of trade and maintain the coins at their face value in gold by exchanging them in some manner for gold or gold obligations when the supply becomes excessive. This system was adopted in the Philippine Islands in 1903, in Panama in 1904, and in Mexico in 1905, bringing these countries to a practical gold standard without providing for the large use of gold coin. The total stock of money in the world, as estimated by the United States Director of the Mint for Jan. 1, 1909, was $14,847,800,000, of which $7,014,600,000 was in gold, $3,530,700,000 in silver and $4,302,500,000 in paper in excess of metallic reserves.

The value of the coinage unit in United States gold of the principal foreign countries is as follows: Great Britain, pound sterling, $4.8665; France, Belgium and Switzerland, franc, 0.193; Germany, mark, 0.238; Russia, ruble, 0.515; Austria-Hungary, crown, 0.203; The Netherlands, florin, 0.402; Spain, peseta, 0.193; Italy, lira, 0.193; Sweden, Norway and Denmark, crown, 0.268; Australia, pound sterling, $4.8665; Canada, dollar, $1.00; Mexico, peso, 0.50; Philippine Islands, peso, 0.50; Panama, balboa, $1.00.

BIBLIOGRAPHY: Jevons, "Money and the Mechanism of Exchange" (1894); Walker, "Money" (1878); Scott, "Money and Banking" (1903); Kinley, "Money: A Study of Economic Theory" (1903); White, "Money and Banking" (2nd ed., 1902); Conant, "The Principles of Money and Banking" (1905); Carlile, "The Evolution of Modern Money" (1901); Chevalier, "La Monnaie" (1872); Babelon, "Les Origines de la Monnaie" (1897).

See also BANKS AND BANKING IN THE UNITED STATES; BIMETALLISM; COINAGE; CURRENCY; LATIN UNION, THE.

CHARLES A. CONANT.

Money Bill, a bill in the English Parliament for granting aids and supplies to the crown. Money bills must originate in the House of Commons, and are rarely altered in the House of Lords, except by verbal alterations, which do not affect the sense. In the United States Congress all bills for raising revenue must originate in the House of Representatives, but the Senate may propose or concur with amendments as in other bills.

Monge, Gaspard (môngzh), a French mathematician; born in Beaune, France, May 10, 1746. He taught physics and mathematics at the military school of Mézières; became a member of the Academy of Sciences in 1780; was made minister of the marine in 1792; and was one of the founders of the Polytechnic School. In 1796 he was commissioned to go to Italy, and collect the treasures of art and science from the countries conquered by the French; and, in 1798, he accompanied Bonaparte to Egypt, where he was chosen president of the Institute of Cairo. Napoleon, when emperor, made him a senator, created him Count of Pelusium, and gave him an estate in Westphalia, accompanied by a present of $40,000. On the return of the Bourbons he was deprived of all his offices and emoluments. His principal works on geometry, which are among the clearest and best in the French language, are, "Descriptive Geometry;" "The Application of Analysis to the Geometry of Surfaces;" and "Treatise on Statics." He died in Paris, July 18, 1818.

Monghyr (mon-gēr′), a picturesque city of Bengal, India, on the right bank of the Ganges, 80 miles E. by S. of Patna; it consists of the fort, a rocky crag projecting into the river, and the native quarters. From the 12th century onward it was a place of considerable strength; in the 18th century Mir Kasim made it his headquarters. He established an arsenal, and its armorers are still famed. Pop. (1901) 35,883.

Mongolia (-gō'li-ä), a vast region of the N. E. of Asia, belonging to the Chinese empire, situated between China proper and Asiatic Russia; area, 1,367,600 square miles; pop. est. 2,600,000. A great part of it is occupied by the Desert of Gobi or Shamo, and on or near its borders are lofty mountain chains, the principal of which are the Altai, the Sayansk, the Khinghan, and the Inshan. The inhabitants lead a nomadic life. They possess large herds of cattle, sheep, and horses. The climate is intensely hot in summer and bitterly cold in winter.

Mongolian, in philology, an epithet sometimes applied to the whole class of Turanian tongues; sometimes specifically applied to that group spoken by the Kalmucks and other tribes from Tibet to China. In ethnology, one of the five great races of the world discriminated and named by Blumenbach, and adopted by Cuvier when he reduced Blumenbach's five to three. The head is square; the face flattish, nearly as broad as long, the parts not well distinguished from each other; the eyelids narrow, obliquely turned up at their outer angle ;the space between the eyes flat and broad, the nose flat, the cheeks projecting, the chin somewhat prominent. The hair is straight, the color black, that of the face and body yellowish (sometimes inaccurately called olive, which implies an admixture of green). It includes not merely the natives of Mongolia properly so called, but the Tartars, the Chinese, the Japanese, the Samoeides, the Cochin Chinese, the Burmese, the Tamuls, the Turks, the Hungarians, and the Finns. The early history of the Mongols is obscure. In the 13th century they spread their conquests and devastations from the depths of Northern Asia over Russia and other parts of Europe. They came from the regions which they now in part inhabit, Mongolia, N. of the Great Wall of China. See GENGHIS KHAN.

Mongoose. See MUNGOOS.

Monica, St., the mother of St. Augustine; born of Christian parents, in Africa, A. D. 332. She married a pagan, Patricius of Sebaste, whom she converted to Christianity. The unbelief and irregular life of Augustine caused her much sorrow, but at last, chiefly through her own influence, he turned from the error of his ways and embraced the faith to which she herself was consecrated. After his baptism at Milan, she set out with him and his brother for Africa, which she was not to reach. She died in Ostia, Italy, in May, 387.

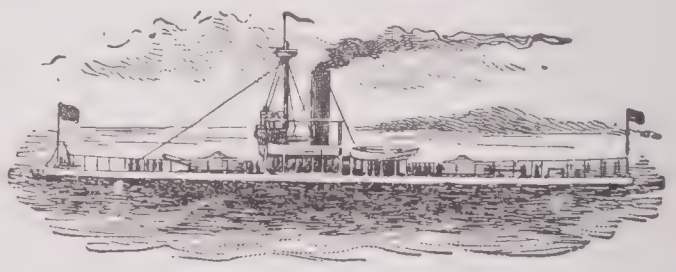
Monier-Williams, Sir Monier, an English Orientalist; born in Bombay, India, Nov. 12, 1819. His father, Col. Monier-Williams, held the post of surveyor-general at Bombay. He was educated at King's College, London, and at Oxford. He was Professor of Sanskrit at Haileybury 1844–1858, and in 1860 became Boden Sanskrit Professor at Oxford. He wrote a Sanskrit grammar, a Sanskirt dictionary, "Hinduism," "Modern India," "Religious Thought and Life in India," etc. He traveled extensively in India, and was knighted in 1886. He died in Cannes, France, April 11, 1899.

Monism, a philosophical theory that all being may ultimately be referred to one category. Thus idealism, pantheism, materialism are monisms, as opposed to the DUALISM (*q. v.*) of matter and spirit. See PHILOSOPHY.

Moniteur (mo-ni-tur'), **Le,** a French journal, started by the publisher Panckoucke, May 5, 1789, under the title of the "National Gazette, or Universal Monitor." During the Revolution its reports, etc., were of very great importance, and its value was immensely increased when, in 1800, it was made the official organ of the government. It retained the privilege (without the first title, "National Gazette," which was dropped in 1811) down to 1869, when it was supplanted by the "Official Journal." Afterward it was issued as an Orleanist or private Conservative paper.

Monitor, the type of a family of lizards (*Varanidæ*). They are the largest of the lizard order, some species, such as the *V. Niloticus* of the Nile and Egypt, attaining a length of six feet. They generally inhabit the neighborhood of rivers and lakes, and feed upon the eggs of crocodiles, turtles, and those of aquatic birds. The name is owing to the belief formerly entertained that these lizards gave warning of the approach of crocodiles.

Monitor, the popular name for a class of very shallow, heavily-armed iron-clad steam vessels, designed by Ericsson, carrying on their open decks one or two revolving turrets (the invention of Theodore R. Timby), with one or more guns, and combining the maximum of gun-power with the minimum of exposure. Monitors are so called from the name of the first vessel of the kind, built during the American Civil War, which proved its superiority in a famous engagement with the "Merrimac" in 1862, at Hampton Roads, at the mouth of James river, Va. The Confederate iron-clad ram



MONITOR.

"Merrimac," or "Virginia" accompanied by several gunboats, came out from Norfolk, and on March 8, attacked the Union fleet. The "Merrimac" steamed directly for the United States frigates "Cumberland" and "Congress." The fire from the "Cumberland" had no effect on her adversary. She was struck amidships by the ram, her sides laid open, and she immediately sank. The ram started for the "Congress," which surrendered, and was burned. The "Minnesota," in endeavoring to escape the ram, got aground, and the gunboats "Oregon" and "Zouave," were badly damaged. The Confederate ships then returned to Elizabeth river, but again appeared the next morning, to continue operations. The United States iron-clad "Monitor," had arrived from New York, at 10 P. M. the previous day, and was immediately sent to aid the "Minnesota." The fight between the "Monitor" and the "Merrimac" was a terrific one, and lasted nearly four hours, the two vessels touching each other part of the time. The "Merrimac" at last gave up the contest, badly damaged, and so much disabled as to require the aid of tugs to get her away. The "Monitor" was uninjured. As the first encounter of iron-clad vessels, this contest created much interest in all maritime nations, and was the direct cause of many modifications in the construction of warships in the navies of Europe, though nowhere except in the United States navy was the monitor adopted as a distinct type of warship. The construction of monitors is thought to have led to that of torpedo boats.

Monitorial System, or **Mutual Instruction,** the system of making use of the more advanced boys in the school to instruct the younger pupils. These youthful teachers were called monitors. The method first occurred to Dr. Andrew Bell, when superintendent of the Orphan Hospital, Madras, in 1795, and was eagerly adopted by Joseph Lancaster, who in the first years of the 19th century did so much for the extension of popular education; and, from him and the originator, the system was called indifferently the Madras and the Lancastrian as well as the Monitorial or Mutual System. The monitorial system is not, as is commonly supposed, a method of teaching; it is simply a method of organizing schools, and of providing the necessary teaching power.

Monk, a male religious living in community (except the Chartreux and Camaldoli, who are strictly solitary), bound by rule and practising the counsels of perfection. The name was in universal use till the rise of the friars in the 13th century, and belongs properly to none but members of the Benedictine Order and its offshoots, though it is often loosely applied to any male religious.

Monk, George, Duke of Albemarle, an English military commander; born in Potheridge, Devonshire, England, Dec. 6, 1608. Being a younger son, he entered the army as a volunteer, and served under his relation Sir Richard Grenville, in an expedition to Spain, and afterward served for some years in the Netherlands. On the breaking out of the war between Charles I. and the Scots, in 1639, he obtained a colonel's commission, and attended the king in both his expeditions, to the N. When the Irish rebellion began in 1641, his services there were so very important, that the lords-justices appointed him governor of Dublin. On his return to England he was sent to relieve Nantwich, where he was taken prisoner by the army of the Parliament, and sent to

GENERAL MONK.

the Tower, where he remained till 1646. The royal cause being ruined, he obtained his liberty on condition of taking a command in Ireland, concluded a peace with the rebels, which displeased Parliament, and had a vote of censure passed on him for it. Cromwell, however, who thought highly of his military talents, made him Lieutenant-General, and gave him the chief command in Scotland. Monk distinguished himself at the battle of Dunbar, and afterward in the war with the Dutch. He resumed his command in Scotland. But the sagacious Protector had strong suspicions of Monk's sincerity. On the decease of the Protector, the resignation of power by his son, and the contest of parties which subsequently took place, he availed himself of the commanding situation which he occupied, to crush the republicans, and promote the recall and restoration of the

Stuart family to the throne, in the person of Charles II. As the reward of his loyalty, he was created Duke of Albemarle, with a pension of $5,000 a year, made a privy-councillor, and invested with the order of the Garter. In 1664 he was appointed admiral of the fleet in conjunction with Prince Rupert, and in 1666 obtained a great victory over the Dutch, in a battle which lasted three days. He died Jan. 3, 1670, and was buried in Westminster Abbey.

Monk, Maria, a woman who pretended in 1835 to have escaped from the Hôtel Dieu nunnery at Montreal; born about 1817. Coming to New York she found a good many credulous adherents, and published "Awful Disclosures" and "Further Disclosures," which had an enormous sale. She died about 1850.

Monkey, in forging, a vertical hammer, consisting of a long bar of iron, running loosely through an eye, several feet above the anvil, and terminating at the foot of a mass of iron, called the ram. The shaft is raised by a chain and drum driven by the engine and has an automatic releasing apparatus, which is regulated to drop the monkey at the required height, say with a range of from 2 to 5 feet. The monkey has a horizontal range of about 20 inches, and is made to drop on the spot required by means of guy-rods in the hands of two workmen. In pile-driving, the weight of a pile or post driver, which is raised by a grapple and chain, and, being detached, is allowed to fall in its guides onto the head of the pile. The weight is attached to the chain by a dog, which is caused to relax its grip by a trigger, or by coming in contact with a stop placed at the required height. In zoölogy (1) A popular name for any one of the quadrumanous mammals having a well developed tail, those wanting tails being called apes. (2) A quadrumanous mammal having a tail and callosities, but no cheek pouches, as distinguished from a baboon, which has both, and an ape, which, besides being tailless, has neither. The Capuchin monkey is the genus *Cebus;* the Diana monkey, *Cercopithecus diana;* the howling monkey is the genus *Mycetes;* the proboscis monkey is *Semnopithecus larvatus;* the sacred monkey, *S. entellus* (see HUNUMAN); the silver-haired monkey, *Lagothrix humboldtii;* and the spider monkeys. the genus *Ateles.* (3) Plural: The mammalian order QUADRUMANA (*q. v.*). The strepsirhine monkeys are the lemurs, the platyrhine monkeys are confined to America, and the catarhine monkeys are found only in the Old World.

Monkey Pot, the name given to the fruit of *Lecythis ollaria,* a large Brazilian forest tree. It consists of a hard capsule furnished with a lid, and containing seeds of which monkeys are fond.

Monkhouse, William Cosmo, an English author; born March 18, 1840. Among his works are: "A Dream of Idleness" (1865), verse; "A Question of Honor" (1868), a novel; "Masterpieces of English Art" (1868); "Turner" (1879, in the "Great Artists" series); "Italian Pre-Raphaelites" (1887); "In the National Gallery" (1895); etc. He died July 20, 1901.

Monkir and Nekir, in Mahometan mythology, two angels who interrogate the dead immediately after they are buried. The first two questions they ask are, "Who is your Lord?" and "Who is your prophet?" Their voices are like thunder, their aspects hideous, and those not approved of they lash in perdition with whips half iron and half flame.

Monmouth, a city and county-seat of Warren co., Ill.; on the Chicago, Rock Island and St. Louis, the Iowa Central, and the Burlington Route railroads; 179 miles S. W. of Chicago. It contains Monmouth College (Unit. Presb.), the Warren County Library, a business college, high school, waterworks, gas and electric lights, street railroads, daily and weekly newspapers, and several National banks. It has manufactories of sewer pipe, cigars, soap, agricultural implements, foundry and machine products, and one of the most extensive crockery-ware plants in the United States. Pop. (1900) 7,460; (1910) 9,128.

Monmouth, the county town of Monmouthshire, England; girt by wooded hills at the influx of the Monnow to the Wye, 26 miles W. S. W. of Gloucester. Its chief features are the ruined castle of John of Gaunt, in which Henry V. was born; the parish church, dating from the 14th century, and restored in 1882, with a graceful spire 200 feet high; the bridge over the Monnow (1272), with its "Welsh gate," and near it a small Norman chapel; a fragment of a Benedictine priory, with "Geoffrey of Monmouth's study"; the new town hall, built in 1888, and a grammar school (1614). In the neighbrhood are the temple-crowned Kymin (800 feet), commanding a glorious view; the Buckstone, a rocking-stone, displaced by tourists in 1885, but since repoised; and 7 miles S. W. the superb ruins of Raglan Castle, defended for 10 weeks in 1646 against Fairfax by the old Marquis of Worcester.

Monmouth, Battle of, an engagement between the American forces under General Washington, and the British under Sir Henry Clinton, near Freehold, Monmouth co., N. J., June 28, 1778. General Washington, having overtaken the British forces which had previously evacuated Philadelphia for the purpose of embarking at Sandy Hook, ordered the advance, under Gen.

Charles Lee, to attack the enemy. The Americans were at first successful, but from some unknown cause they were seized with a panic, in which General Lee participated, and fell back to the main body. General Washington, with the latter, succeeded in rallying the fugitives, and repulsed the British. The approach of night and the exhaustion of the men prevented a pursuit, and the British succeeded in embarking under cover of the darkness. The American loss was 69 killed and 160 wounded; that of the British, nearly 300 killed and 100 prisoners, including the wounded.

Monmouth, James Fitzroy, Duke of, a natural son of Charles II. of England; born in Rotterdam, April 9, 1649. He was distinguished by his personal attraction, his affable address, and thoughtless generosity; hence he became very popular. But he was weak-minded and pliant; and had he not resigned himself to the guidance of the restless and ambitious Shaftesbury, who flattered him with the hopes of succeeding the crown, his popularity would never have become dangerous. At the age of 14 he was created Duke of Monmouth, and two years later was made Master of the Horse. He was concerned in various plots which had for their object the exclusion of the Duke of York from the crown; and he was, in consequence, ordered by Charles to quit the kingdom. On the accession of James II., being urged to the act by some of his partisans, he left Holland and landed at Lyme, with scarcely 100 followers (June, 1685), but their numbers were soon increased, and he assumed at Taunton the title of king, and asserted the legitimacy of his birth. The royal forces were sent against him, and an engagement took place at Sedgmoor, near Bridgewater, July 6. The rebels were defeated, and the duke himself was made prisoner, being found in the disguise of a peasant, lying at the bottom of a ditch overcome with hunger, fatigue, and anxiety. He nobly refused to betray his accomplices, and conducted himself with much firmness on the scaffold, where his head was severed from his body, after four unsuccessful blows, July 15, 1685. The people, of whom he was still the favorite, believed that the person executed was not Monmouth; and it was probably this belief which has led some to conjecture that the famous "IRON MASK" (*q. v.*) was the Duke of Monmouth.

Monmouth College, a coeducational institution in Monmouth, Ill.; founded in 1856 under the auspices of the United Presbyterian Church; has grounds and buildings valued at over $200,000; endowment, $275,000; volumes in the library, about 6,000; scientific apparatus, etc., $16,000; ordinary income, about $50,000; average number of faculty, 25; average students, 450; graduates, over 1,400.

Monnier, Marc (mo-nyā′), a French writer; born in Florence, Italy, Dec. 7, 1827. He was Professor of Comparative Literature at Geneva. Among his works were: "Is Italy the Land of the Dead?" (1830), which made a sensation; "Permitted Loves" (1861), a novel; "Figaro's Ancestors" (1868), an essay in dramatic history; "Plays for Marionettes" (1871); "Geneva and Its Poets" (1874); "Popular Tales in Italy" (1880); "History of Modern Literature" (2 vols. 1884–1885); and in verse "Lucioles" (1863), "Poems" (1872). He died in Geneva, April 18, 1885.

Monochord, in music, an ancient instrument with one string which was played as a guitar; it grew into a manichord, in which numerous strings were played by quills. Also a single string stretched across a board or soundboard, under which a movable bridge can be moved at pleasure. By placing under the string a diagram of the proportionate lengths of string required for the production of just intervals, the ear can be trained and experiments can be made. It was also called, or rather the results obtained from it were called, the harmonical canon. It is said to have been invented by Pythagoras.

Monochrome, a painting executed in a single color, but relieved by light and shade. A drawing in chiaro-oscuro is a monochrome, whether in black and white, or in any color and white. Many of the ancient painters were monochromists, as for instance Zeuxis; the sciagram or silhouette is not a monochrome, though executed in a single color.

Monoclinic System, in mineralogy and crystallography, having two of the axial intersections rectangular and one oblique; having the lateral axes at right angles to one another, one of them, moreover, being oblique to the vertical axis and the other at right angles to it.

Monocotyledones (-kot″i-lē′don-ēz), **or Monocotyledoneæ** (-dō′ne-ē). The first form was used by Jussieu, and the second by De Candolle to designate the vegetable sub-kingdom called also Endogens. See ENDOGEN.

Monod, Adolphe (mō-nō′), a French theologian; born in Copenhagen, Jan. 21, 1802. He was the son of a preacher, himself a native of Geneva. He studied at Geneva, and labored as a preacher at Naples and Lyons, as a professor at Montauban, and again as a preacher in Paris till his death, April 6, 1856. He published sermons and many religious works which were widely popular.

Monod, Frédéric, a French clergyman, brother of A. Monod; born in Monnaz, Vaud, France, May 17, 1794. He was for 30 years a prominent pastor in Paris, and founded in 1849, together with Count Gasparin, the Free Reformed Church of France. He edited the "Archives of Christianity." He died in Paris, Dec. 30, 1863.

Monod, Gabriel Jacques Jean, a French historian; born in Ingouville, near Havre, France, May 7, 1844. From 1880 he was a lecturer at the Normal School, Paris. Chiefly noted for his researches in mediæval history, he published: "Germans and French" (1872); "Jules Michelet" (1875); "Critical Studies on the Sources of Merovingian History" (1872–1885); the school text-books, "Short Universal History" (1883), with M. G. Dhombre, and "History of France to Louis XI." (1884), with P. Boudois; "Bibliography of the History of France" (1888), indispensable to the student; a translation of J. R. Green's "History of the English People" (with his brother, A. M. Monod); articles in French and English reviews; etc.

Monœcious (mo-nē'shius), a term introduced by Linnæus to describe those plants which have the stamens and pistil in different flowers, but on the same plant — *e. g.*, hop, birch, beech, alder, oak, hazel. Such plants formed one of the classes (Monœcia) of the Linnean system, but were obviously a specially artificial alliance, since that partial or complete separation of the sexes to which we apply the terms monœcious or diœcious respectively arises continually among the most unrelated plants or animals.

Monogram, a character or cipher composed of one, two, or more letters interwoven, and used as a sign or abbreviation of

MONOGRAMS OF PAINTERS.

a name or word. The use of monograms was common among the Grecks and Romans, and the art of combining and contorting letters and words flourished universally in the Middle Ages. The term is now applied to conjoined initials of a personal name on seals, trinkets, letter paper, and envelopes, etc., or employed by printers, painters, engravers, etc., as a means of distinguishing their work.

Monograph, a work in which a particular subject in any science is treated by itself, and forms the whole subject of the work — "an all-sided and exhaustive study of a special or limited subject," as it has been called. Monographs have contributed much to our knowledge, especially in the department of the natural sciences. The term, however, is often loosely used for a small book on miscellaneous topics.

Mono Lake, a "sink," or lake, of Mono co., Cal., on the E. slope of the Sierra Nevada, about 12 miles S. W. of Aurora; nearly circular in outline; area about 200 square miles. It receives several large streams, but has no apparent outlet. The waters are strongly alkaline, and contain no fish; but a species of insect deposit their ova on the surface in such immense quantities that they sometimes appear like small islands. These insects and their ova are said to be collected by the Digger Indians of the vicinity, dried, and devoured as a choice delicacy.

Monolith (mon'-), a column or block formed of a single stone; the term is applied to such erections as the obelisks of Egypt.

Monomania (-mā'ni-ä), madness or derangement of the mind with regard to one subject only. The monomaniac often takes up a wrong principle, but reasons logically from it. Thus, believing himself to be made of glass, he takes every prudent precaution against falling and being broken.

Monometallism, the fact or principle of having only one metal as a standard for coinage; belief in the advantages of a single metallic standard. See BIMETALLISM.

Monongahela (-hē'lä), a river which rises in West Virginia and flows N. to Pittsburg, where it unites with the Alleghany to form the Ohio.

Monongahela City, a city in Washington co., Pa., on the Monongahela river, and on the Pittsburg and Lake Erie, and the Pennsylvania railroads; 21 miles S. of Pittsburg. It is in a coal, natural gas, and petroleum region, and has electric lights, daily and weekly newspapers, and several private banks. It was the first city in the United States to engage in the manufacture of carborundum. Other industries include foundry and machine shop products, paper, flour, and planing mills, etc. The assessed property valuation exceeds $1,500,000. Pop. (1900) 5,173; (1910) 7,598.

Monopetalous (-pet'ā-lus), in botany, having the petals united together into one

piece by their edges; otherwise called gamopetalous.

Monophysites (-nof'i-sitz), in Church history, those who with Eutyches believed that there was only one nature in Christ, namely, that of the Word, who became incarnate, and that the divine and human elements in that one nature were blended as the body and soul in man. In the 6th century, when the Monophysites were in considerable adversity, their prosperity was restored by the eloquence and zeal of a certain monk, Jacobus or James, surnamed Baradæus or Zanzalus. He died in Edessa in A. D. 578. From him the Monophysites are often called Jacobites. They established two bishops or patriarchs, one at Alexandria, with jurisdiction over Egypt and Abyssinia; and the other at Antioch, with jurisdiction over Syria and Armenia. When the Mohammedans were struggling for power, it was their policy to protect all heretical sects with the view of making them thorns in the sides of the Church. They did so at first to the Monophysites, but afterward oppressed them. In the 7th century the Monophysites originated the Monothelite controversy (see MONOTHELITISM). The Egyptians and the Abyssinians are still Monophysites.

Monopoli (mō-nop'ō-lē), a town of Southern Italy, on the Adriatic, 43 miles N. W. of Brindisi, with a cathedral, ancient walls, and a castle built in 1552 by Charles V. Pop. about 13,000.

Monopoly, an exclusive trading right over; the exclusive right or privilege of production, sale, or purchase of any commodity; the sole right or power of selling any commodity; the exclusive right or privilege of trading in any community, or with any country; license from the proper authority to any person or company to make, sell, export, import, buy, or otherwise deal in any commodity or number of commodities. Thus, a patent for an invention gives the patentee the exclusive right of making or dealing in the article patented. Also that which is the subject of a monopoly; as, Opium is a government monopoly in India; the Standard Oil Company have a monopoly. Also the assuming or claiming right to or possession of anything to the exclusion of others; as, He claims a monopoly of the conversation.

In law, the only monopolies that the laws of the United States and the individual States look on with favor consist of the Postoffice, which is a government monopoly, and the rights granted to individuals under the Patent and Copyright laws; a patent covering a period of 17 years with no renewal except by a special act of Congress, and a copyright 28 years with a renewal of 14 years if certain conditions are complied with. Monopolies commonly known as trusts are looked on with odium, and various States have enacted laws making a trust an illegal combination of individuals. Some of the early English sovereigns assumed to themselves the right of granting to certain favored subjects the monopoly, or sole right of selling and dealing in particular commodities. This pretended prerogative was carried to a most injurious length in the reign of Queen Elizabeth, and led to the passing of the Statute of Monopolies, 21 Jac. I., c. 3; which, while declaring the illegality of such grants of exclusive trading in general; contained an exception in favor of new and original inventions in manufacture; and enacted that the declaration against monopolies should not extend to letters-patent and grants of privilege, for the term of 14 years or under, of the sole working of any manner of new manufactures within the realm, to the true and first inventor thereof, provided such manufactures were not in use by others at the time of granting the letters-patent. On this exception, which, to a certain extent, recognizes the royal prerogative, the modern English law of patents for inventions in manufactures may be considered to rest.

Monosepalous (-sep'a-lus), in botany, having the sepals united together into one piece by their edges; otherwise called gamosepalous.

Monotheism (mon'ō-thē-izm), the term usually employed to denote a belief in the unity of the Godhead, or belief in and worship of one God. It is thus the opposite of polytheism. The doctrine of the Trinity is thought by some (*e. g.* the Unitarians) to be incompatible with the monotheism taught by Jesus Christ, and is therefore rejected as no part of His teaching. Mohammedans and Jews, of course, reject with vehemence the least approach to a Trinitarian conception of the Diety.

Monothelitism (-noth'e-līt-izm), the doctrine of the Monothelites, that Christ had but one will in His two natures. The Greek emperor Heraclius, having consulted Sergius, Patriarch of Constantinople, a Syrian, descended from Monophysite parents, as to how that sect could be reconciled to the Church, the prelate gave it as his opinion that it might be held, without prejudice to the truth or to the authority of the Council of Chalcedon, which had condemned the Monophysites, that, after the union of the two natures in Christ there was but one will and one operation of will. In 630 Heraclius issued an edict requiring the acceptance of this tenet, and for a while he seemed successful; but in 633 Sophronius, a monk of Palestine, opposed Monothelitism at the Council of Alexandria, and the following year, being made Patriarch of Jerusalem, he assembled a council and condemned it. Sergius of Constantinople still

maintained his old opinion, and in 639 drew up, in the name of the emperor, an Ecthesis, or formula of faith. The same year Pope John IV., in a council held at Rome, rejected the Ecthesis and condemned the Monothelites. They were again condemned in the 6th Œcumenical Council (Constantinople), held 680–681. The Maronites of Lebanon embraced Monothelitism, but were reconciled to the Church in 1182.

Monotremata (-trēm′a-tä), an order or sub-class of mammals called by Professor Huxley *Prototheria*. They have only one aperture for the urinary, genital, and intestinal canals. The nictitating membrane, or third eyelid, is well developed, as are the mammary glands; there are no nipples. Teeth, if present, consisting of four horny plates. There is an outer clavicular bone, and the coracoid bones are extended to the anterior end of the sternum. In various respects they approach birds. They to a certain extent connect mammals with reptiles. Darwin believes that the earliest mammals in some respects resembled *Monotremata*. It contains two genera, *Ornithorhynchus* (duck-mole), and *Echidna* (porcupine anteater), both Australian forms.

Monotype, a machine for type setting and casting, used principally in large newspaper offices. The work is first done by a kind of typewriter, on a roll of paper which, instead of receiving the impression of letters, is assailed by a series of punches which drive neat little holes through it. The roll of paper steadily revolves and, unwinding itself, passes through the district of the punches and then winds itself on another spool. When this is full it is fastened in another small machine, a lever is pressed and almost instantly a glistening type appears and is followed by others, till a line of type is formed as long as the width of an ordinary galley which stands close by. A metal arm picks up this line and places it in the galley, and when the latter is filled it is ready for the printer. Each type is made on the spot. When the perforation in the ribbon of paper reaches a particular place, a portion of molten metal is forced into a mold, then molded into type, cooled, picked out and set on end. The machine produces automatically a perfect justification, or spacing, and one operator can attend to 10 machines, each doing the work of three compositors.

Monreale (mon-rā-ä′le), a city of Sicily, 5 miles S. W. of Palermo. The "royal mount," from which it gets its name, is 1,231 feet high, and on it stands the famous cruciform Norman cathedral (1176), which measures 333 by 132 feet, and within is entirely covered with mosaics. Pop. (1901) 23,778.

Monro, Alexander, a British surgeon, founder of the medical school of Edinburgh, styled primus to distinguish him from his son and successor; born in London, England, Sept. 8, 1697. He studied at London under Hawksbee, Whiston, and Cheselden, at Paris under Bouquet, and at Leyden under Boerhaave, and after 1719 lectured at Edinburgh on anatomy and surgery. His lectures, with those of Alston on botany, led to the founding of the medical school, when Monro was appointed Professor of Anatomy in 1721. He was received into the university in 1725. For 40 years he lectured regularly on anatomy and surgery. Of the establishment of the Royal Infirmary of Edinburgh he was one of the two principal promoters, and he there delivered clinical lectures. In 1759 he resigned the anatomical chair to his youngest son, Dr. Alexander Monro, but continued his clinical lectures at the Infirmary. He wrote "Osteology" (1726); "Essay on Comparative Anatomy" (1744); "Observations Anatomical and Physiological" (1758); and "Account of the Success of Inoculation of Smallpox in Scotland" (1765). He died in Edinburgh, Scotland, July 10, 1767. His son and grandson also were distinguished surgeons.

Monroe, a city and county-seat of Monroe co., Mich.; on the Raisin river, and on the Lake Shore and Michigan Southern, the Michigan, the Ann Arbor, and the Flint and Père Marquette railroads; 40 miles S. W. of Detroit. In contains a public library, high school, St. Mary's Academy, electric lights, National and other banks, and several weekly newspapers. There is a large trade in glass-sand and grain. The city has foundries, machine shops, extensive nurseries, and tanneries, and large interests in lumber, grist, paper, woolen goods, plaster, etc. Here, after the battle of Raisin River, in 1813, between an American force and the English and Indians, several hundred American prisoners were massacred. Pop. (1900) 5,043; (1910) 6,893.

Monroe, Fort, the most extensive work of a defensive character in the United States, formerly known as Fortress Monroe. It is situated at the end of the peninsula of Old Point Comfort, Va., between the York and the James rivers. The position of the fort commanding the waters of Hampton Roads and the approach to Norfolk makes it a vital point in the line of coast defense. The work was begun in 1817 (the year of the election of President Monroe for whom it was named) and the original intention was to construct a fortress of European type. The design was never carried out, and, though bastioned, the fort is unaccompanied by the outworks usual in the class of defensive works called fortresses. At the outbreak of the Civil War, it covered an area of 65 acres; the garrison consisted of 300 men, and the ordnance comprised 400

great guns. It was known that the Confederates had designs upon the fort, and Gen. B. F. Butler, commander of the Department of Virginia, was directed to make it his headquarters and to reinforce the garrison. The Nationals continued in possession of the fort till the close of the war. Since then an important artillery school has been located here. In 1902 it was understood that the government had planned to render impregnable this guard of the naval approach to the National capital at a cost of about $10,000,000, by means of extension, fortification, and other improvements, at the same time increasing its military educational facilities. Pop. village (1910) 1,804.

Monroe, James, an American statesman and 5th President of the United States; born in Westmoreland co., Va., April 28,

JAMES MONROE.

1758. He enjoyed the advantages of a classical school and of William and Mary College, which he left, in 1776, after two years' study to join the Continental army. He was wounded at the battle of Trenton, took active part in the battles of Brandywine, Germantown, and Monmouth, rising to the rank of colonel. In 1782 he was elected to the Assembly of Virginia, and in 1783 became a delegate to the Continental Congress. In 1785 he moved a resolution in Congress empowering that body to regulate interstate trade, and the discussion and adoption of this resolution led to further efforts toward the formation of a national government, that culminated in 1787 in the framing of the Constitution. While serving in Congress he married Miss Kortright. On leaving Congress after three years of service he returned to law practice, but was immediately elected to the Virginia Legislature, and the next year, 1788, became a delegate to the Virginia convention that ratified the Constitution in which he opposed its adoption. As United States Senator he acted with the Republican party, in company with Jefferson and Madison, and denounced Washington's neutrality proclamation relative to the European conflict, advocating the cause of France as that of America's natural ally, to whom the United States owed a debt of gratitude. Nevertheless, Washington appointed him minister to France in 1794. On his return, in 1799, he was elected governor of Virginia. In 1802 he was sent to France as envoy extraordinary by Jefferson to negotiate the LOUISIANA PURCHASE (*q. v*). He was minister to Great Britain in 1803–1808, where he negotiated a treaty that proved so unacceptable to the people and Congress of the United States that he was for a time extremely unpopular. He retired to Virginia, but was again elected governor in 1811, and the same year appointed Secretary of State under Madison, combining in his duties also the functions of Secretary of War. In 1817 he succeeded Madison as President, and was reëlected to a second term. His administrations were uneventful, the chief features of note being the purchase of Florida from Spain, the adoption of the Missouri Compromise, and the enunciation of the MONROE DOCTRINE (*q. v.*). In 1825 he retired to private life in Virginia. In 1830 he took up his residence with his son-in-law in New York, where he died, July 4, 1831.

Monroe Doctrine, a policy of the United States, first definitely announced by President James Monroe, that is intended to prevent interference by European powers in the affairs of the several American States. President Monroe's annual message to Congress in 1823 contained the following sentences: "We owe it to candor and to the amicable relations existing between the United States and the allied powers, to declare that we should consider any attempt on their part to extend their system to any portion of this hemisphere as dangerous to our peace and safety. With the existing colonies or dependencies of any European power we have not interfered, and shall not interfere; but with the governments which have declared their independence and maintained it, and whose independence we have, on great consideration and just principles, acknowledged, we could not view an interposition for oppressing them, or controlling in any other manner their destiny, by any European power, in any other light than as a manifestation of an unfriendly disposition toward the United States." Also, "The American continents should no longer be subjects for any new European colonial settlement." These expressions embody what is known as the Monroe doctrine. President Monroe's mention of these subjects was occasioned by the formation in Europe, a few years previously, of what was called the "holy alliance"—an alli-

ance between Russia, France, Austria, and Prussia to maintain the monarchical system of government in Europe. It was supposed that they desired to extend their operations to the New World also, especially with reference to the colonies of Spain, some of which had asserted, and obtained from the United States the recognition of, their independence. England sided with the United States on this question, and the result was that the allies did not carry out their project. As popularly understood, the Monroe doctrine meant a political protection and a guaranty of freedom from European interference to all states of North and South America. See NICARAGUA CANAL.

Mons (mô*ng*s) (Bergen), the capital of the Belgian province of Hainault, on the Trouille, 38 miles S. S. W. of Brussels. Its fortifications, renewed and strengthened since 1818, were demolished in 1862; but the country around can be laid under water. The Canal de Condé connects Mons with the Scheldt. The church of St. Waddru (1450–1589) is a masterpiece of Gothic; and there are a town hall (1458), a belfry (1662) 275 feet high, a good library, etc. The manufactures include woolen and cotton goods, cutlery, and sugar; while the vicinity forms an extensive coal field. Mons, occupying the site of one of Cæsar's camps, was made the capital of Hainault by Charlemagne in 804. France, Spain, and Austria often contended for its possession. Pop. (1900) 25,483.

Mons Albanus. See MONTAUBAN.

Mons Mensa. See MENSA.

Mons Serratus, See MONTSERRET.

Monsell, James Samuel Bewley, an English hymnologist; born in St. Columb's, Derry, Ireland, March 2, 1811. Among his popular publications of devotional poetry were: "Parish Musings" (7th ed. 1863); "Hymns of Love and Praise" (2d ed. 1866); "The Passing Bell, and Other Poems" (2d ed. 1869); "Ṣimon the Cyrenian, and Other Poems" (new ed. 1876); "Spiritual Songs" (6th ed. 1887). He died April 9, 1875, in Guilford, England, his final church living.

Monsignore (mōn-sēn-yō′re), a title of honor given to prelates of the Roman Catholic Church. Formerly in France the corresponding title of Monseigneur was allowed to all high dignitaries of the Church, to the princes of the blood royal, to the higher nobles, and to the presidents of the superior law courts. But from the time of Louis XIV. Monseigneur without further addition was appropriated as the title of the dauphin.

Monsieur (mo-syuh′) (abbreviated M.; plural Messieurs, abbreviated MM.), used without any addition, formerly in France designated the king's eldest brother, though in addressing him the title Monseigneur was used. The last prince so called was the Comte d'Artois, brother of Louis XVIII. In common use it answers both to the English sir and Mr., and is also used before titles.

Monsoons (-sönz′), a modification of the trade winds, operative from the Tropic of Cancer to lat. 7° S., and from the coast of Africa through the Indian Ocean and the Bay of Bengal to Japan and the Western Pacific. There are two monsoons, the Southwestern and the Northeastern. The latter prevails from October to April, and the former from April to October. The bursting of the monsoon commences the rainy season in India, the Southwestern bringing that of Bombay and Central India, and the Northeastern that of Madras and other parts of the coast (see RAINY SEASON). The monsoons are caused by the unequal heating of the land and water and of the several land masses themselves in the regions which they affect. Independently of their great use in bringing rain to countries which otherwise would degenerate into deserts, they are useful for navigation. As in the case of the trade winds, navigators can so plan their voyages as to take advantage of the monsoons, though powerful steamships can now achieve the feat of running in the teeth of the moonson, but not without some discomfort to those on board. Also any similar wind blowing half the year in one direction and half in the other.

Monstrance, in the Roman Catholic ritual, a vessel in which the Host is exposed to the adoration of the people during the Forty Hours' Adoration, or in which it is inclosed for Benedictions. Prior to the institution of the feast of Corpus Christi (1264), the Host was exposed for adoration in a PYX (*q. v.*). The chief part of the monstrance is formed by two disks of crystal, set vertically, between which the Host is placed. These disks are surrounded by rays of metal, emblematic of glory, and the whole is mounted on a stand.

Monstrosity, a character appearing in an individual animal or plant, which is very rare in the species to which it belongs. It is abnormal in the sense of being exceptional, but not in the sense of being produced as a mere sport of nature independent of law. "By a monstrosity," says Mr. Darwin, "I presume is meant some considerable deviation of structure, generally injurious or not useful to the species." They arise in man, in the inferior animals, and in plants. Idiocy, hermaphroditism, albinoism, the possession of an unusual number of fingers or toes, more teats than two, heads, or no head at all, physical union by

flesh, cartilage, or bone to any other individual, etc., are cases of human monstrosity. Monstrosities which graduate into slight variations are so similar in man and the lower animals, that the same classifications and the same terms as has been shown by Isidore Geoffroy-St. Hilaire, can be used for both. Among some of the many monstrosities of the lower animals may be mentioned that discoidal shells occasionally become spiral, and fossil periwinkles from the Norwich Crag are often distorted. All cases of monstrosity are to be accounted for by law. In most cases they are caused by arrest of development, in some by reversion to the character of a remote ancestor, in others by hypertrophy of a particular part.

Montagnards (mông-tä-nyär′), or simply **Montagne** (mông-tä-nyuh′) ("the Mountain"), the name given to the extreme democratic politicians in the first French Revolution, because they seated themselves on the highest benches of the hall in which the National Convention met. The body included both Jacobins and Cordeliers; its principal members were Danton, Marat, Robespierre, St. Just, and Collot d'Herbois, the men of "the Reign of Terror." The antagonistic party were "the Plain" the GIRONDISTS (*q. v.*), who sat on the lowest benches, on the floor of the house. After the overthrow of the Girondists this part of the house was styled "the Marsh or Swamp," and included all the members whose votes were under the control of "the Mountain." In 1848 the extreme party in the National Assembly, composed of revolutionary democrats and communists, sometimes flattered itself by assuming the title of "the Mountain."

Montagu, an illustrious English family which sprang from DROGO DE MONTACUTE, who came from Normandy with the conqueror. SIR EDWARD MONTAGU, Speaker of the House of Commons and afterward Lord Chief-Justice, died in 1557. The third son of Baron Edward Montagu of Boughton was SIR HENRY MONTAGU, the famous lawyer and orator, who was Lord Chief-Justice, and created Lord Montagu of Kimbolton, and afterward Earl of Manchester. His son (2d earl) was a general in the parliamentary army, who gained distinction by his victory over Prince Rupert at Marston Moor, but subsequently gave in his adhesion to Charles II. on his restoration. The 4th Earl of Manchester was an enthusiastic follower of William III., fighting with him at the battle of the Boyne, and taking part in the siege of Limerick; he was eventually created Duke of Manchester in 1719 by George I. His descendant, the 8th duke, succeeded in 1890 (see MANCHESTER). The sixth son of Baron Edward Montagu of Boughton was SIR SYDNEY MONTAGU, whose son, EDWARD, was a considerable mathematician, and serving first in the army, then in the navy, became the first sole commander of the English navy, and was created by Charles II. Lord Montagu of St. Neots, Viscount Hinchinbroke, and Earl of Sandwich. His descendant, the 8th earl, succeeded in 1884.

Montagu, Mrs. (Elizabeth Robinson), an English social leader; born in York, England, Oct. 2, 1720. She married Edward Montagu, grandson of the 5th Earl of Sandwich. She gave every year a famous dinner to the London chimney sweeps. Her residence in Portman Square was the meeting place of the celebrated "Blue-Stocking Club" (origin of this famous term). Among her visitors and associates were Lord Lyttleton, Burke, Garrick, Sir Joshua Reynolds, Hannah More, Fanny Burney, etc. She wrote three of the dialogues in Lord Lyttelton's "Dialogues of the Dead" (4th ed. 1765); "The Genius of Shakespeare" (1769), an essay; "Letters" (4 vols. 1809), her best known work. She died in London, Aug. 25, 1800.

Montagu, Lady Mary Wortley, an English author; the eldest daughter of Evelyn, Duke of Kingston; born in Thoresby, Not-

LADY MARY MONTAGU.

tinghamshire, England, about 1689. In 1712 she married Edward Wortley Montagu, whom she accompanied in 1716 on his embassy to Constantinople, from which place she wrote "Letters" to Pope, Addison, and other eminent literati of the time, which are very interesting and contain many curious facts respecting the manners of the Turks. She also first introduced the practice of inoculation into her native country. Her collected works have been published in six volumes; and her "Letters" certainly place her at the head of female epistolary writers in Great Britain. She died in England, Aug. 21, 1762.

Montague, Charles Howard, an American journalist; born in Greenfield, Mass., Oct. 16, 1858. He was one of the editors of the Boston "Globe." He wrote: "Romance of the Lilies" (1886); "The Face of Rosenfel" (1888); "Countess Muta"; etc. He died in Boston, Mass., Nov. 19, 1889.

Montaigne (môn*g*-täny'), **Michel, Seigneur de,** a French essayist; born in Château of Montaigne, Dordogne, France, Feb. 28, 1533. He was taught Latin from his cradle, and till he was six years of age was not permitted to hear any other language. He was then sent to the college of Guienne, at Bordeaux, where he remained seven years, having in that time gone through the whole college course. In 1554 he was appointed a judge in the Parliament of Bordeaux, and about the time he gained the esteem of the Chancellor L'Hôspital, and the warm friendship of Etienne Boétie, a fellow-judge. In 1569 he married. He had several children, who died in infancy, and one daughter Leonora, who survived him. During the civil wars which desolated his country he lived in retirement on his own estate, profoundly afflicted by the general suffering, and especially by the massacre of St. Bartholomew. In 1580–1581 he traveled in Germany, Switzerland, and Italy, visited Rome, and was presented to the Pope. While at Venice he was elected mayor of Bordeaux; and he held that office four years. The pestilence and the war of the League drove him from his château in 1586; and he did not return for two years. It was during this period that his friendship with Marie de Gournay began. She was attracted to him by his writings, and visited him at Paris with her mother. A mutual attachment was the result, and Montaigne called her his adopted daughter. The high esteem in which Montaigne was held is shown particularly in his being chosen when at Blois in 1588 to negotiate an arrangement between Henry of Navarre and the Duke of Guise. Montaigne has described himself in his celebrated "Essays." He had few of what are commonly called friends, but he loved to converse on familiar terms with educated men, and he was also fond of the society of handsome and intelligent women.

Montaigne had many ideas on education which have been revived in our times without his receiving the credit of them. His views on legislation and the administration of justice enlightened his own age and have been useful to ours. His moral system was in general indulgent, but on some points strict. Speculative philosophy he rejected, devoting himself to the lessons of experience. Equally removed from a general skepticism and from dogmatism he was accustomed to suggest possibilities instead of making assertions and to throw light on his subject from every point. His motto was *Que sais-je?* His great work, his "Essays" (1580), contains a treasure of wisdom. The essays embrace a great variety of topics touched upon in a lively entertaining manner, with all the raciness of good sense, careless of system or regularity. They are not written in formal style on any particular subject. Sentences and anecdotes from the ancients are interspersed at random. During the last few years of his life he suffered from most painful diseases, but he would have nothing to do with doctors or drugs. He died while mass was being said in his bedroom, and in the attitude of prayer, Sept. 13, 1592. He was buried at Bordeaux, where his wife and daughter erected a monument to his memory.

Montalambert (môn*g*-tä-lo*n*g-bār'), **Charles Forbes René, Comte de,** a French publicist; born in London, England, May 29, 1810. His father was a French émigré, afterward a peer of France under the Restoration; his mother was English. Till 1819 Montalambert's education was carried on in England; but it was concluded in Paris. At the age of 20 he enthusiastically supported Lamennais and Lacordaire in their movement to promote liberty within the Church; but when "L'Avenir," (The Future) the organ of the movement, was condemned by an encyclical letter from the Pope in August, 1832, he turned his attention elsewhere. In 1835 he took his seat in the chamber of peers, and his eloquence, sincerity, and ability soon made him one of the most influential orators in the chamber. After the revolution of 1848 he was elected a member of the National Assembly. He was at first inclined to support Napoleon III., but was soon alienated by the policy of that emperor. Failing to be elected in 1857 he spent the remainder of his life in writing and traveling. Of his numerous writings the chief are: "Monks of the West" (1869–1868); "Life of Saint Elizabeth of Hungary" (1836); and "Political Future of England" (1855). He died in Paris, France, March 13, 1870.

Montalván, Juan Pérez de (mōn-täl-vän'), a Spanish dramatist; born in Madrid, Spain, in 1602. He was a priest at Madrid, and notary of the Inquisition. His best play, "Teruel's Lovers," one of the most popular of Spanish dramas, holds the stage at the present day. Among his works were: "Model Novels" (1624); "Life and Purgatory of St. Patrick" (1627); "El Para-Todos" (1632), a collection of diverting stories, anecdotes, and plays, etc. The best of his dramas can be seen in vol. xiv. of Rivadeneyra's "Library of Spanish Authors" (Madrid, 1881). He died June 25, 1638.

Montalvo, Garcia Ordoñez de (mōntäl'vō), a Spanish romancer; lived at the

end of the 15th century; was governor of the city of Medina del Campo, and was the author of the earliest Spanish version of the famous "Amadis of Gaul."

Montana, a State in the Western Division of the North American Union, bounded by British Columbia, Alberta, Assiniboia, North Dakota, South Dakota, Wyoming, and Idaho, admitted to the Union, Nov. 8, 1889; number of counties, 26; area, 145,310 square miles; pop. (1900) 243,329; (1910) 376,053; capital, Helena.

Topography.— The surface of the State is highly diversified. In the W. it is extremely mountainous. The Bitter Root Mountains form the W. boundary line, and E. of this the main chain of the Rocky Mountains crosses the State. Between these ranges is a great basin, forming one-fifth of the entire area. E. of the Rocky Mountains is a rolling tableland, traversed by several large rivers. In the S. near the Yellowstone river the mountains reach an altitude of 10,000 feet and the peaks are perpetually covered with snow. Besides the prominent mountain ranges there are many spurs, detached ridges, and smooth, sloping buttes. The mountains are intersected by numerous valleys and cañons, through which flow most beautiful rivers. The highest point in the State, Emigrant Peak, is 10,969 feet high, and Mount Powell is 10,500 feet high. The principal river systems in Montana are the Shoshone, the Missouri, and the Yellowstone. The Shoshone rises in the Rocky Mountains in the S. part of the State, and after flowing W. turns N. and forms portion of the Idaho boundary. The Missouri river, formed by the Jefferson, Madison and Gallatin rivers crosses the N. E. part of the State and enters North Dakota. The Yellowstone, a tributary of the Missouri, rises in the Yellowstone Park in Wyoming, flows N. E. across the State, through grand cañons and gorges, and enters the Missouri, a few miles E. of the North Dakota boundary.

Geology.— The geological formations are separated into five distinct belts. In the extreme W. the Eozoic period predominates; this is followed by the Silurian, Jurassic, Cretaceous, and Tertiary extending E. in the order named. The Rocky Mountains are principally of igneous origin, and are made up of granite, basalt and metamorphic rocks, and at the base of the mountains are strata of Jurassic and Carboniferous rocks. Near the Missouri river fossil remains of sea serpents, snakes, snails, and petrified tree trunks abound.

Mineralogy.— The State is exceedingly rich in minerals, though the resources are but partially developed. Gold, silver, lead, copper, and coal are found in large quantities. In 1899 Montana ranked first in the United States in the output of copper with 1,496,451 pounds. In the production of gold and silver she holds second place, with an output of gold, 320,270 fine ounces, valued at $4,760,000; and silver, 16,096,000 fine ounces, valued at $20,810,000. The production of lead was 10,227 short tons; coal, 1,496,451 short tons, valued at $2,347,757; and coke, valued at $356,190. The building stones were granite, valued at $9,950; sandstone, $26,160; and limestone, $113,718.

Soil and Productions.— The soil under proper irrigation, excepting in the mountain district, becomes quite fertile, and useful for agricultural purposes. The mountains are well covered with forests of willow, cottonwood poplar, pine, spruce, fir, cedar, and balsam. There is little or no hardwood timber in the State. The valleys afford excellent grazing facilities and the "bunch grass," which covers the hillsides and plains, makes excellent fodder for cattle. Much advance has been made in agriculture since 1885 by the introduction of improved irrigating appliances. The principal farm crops are hay, oats, wheat, and potatoes.

Manufactures.— In 1900 there were reported by the United States census, 1,080 manufacturing establishments, employing $40,945,846 capital and 10,117 persons; paying $7,969,886 in wages, and $32,702,650 for raw materials; and having an annual output valued at $57,075,824. The principal industries were the refining and smelting of copper and lead, slaughtering and meat packing, and the manufactures of foundry and machine shop products, lumber and timber, malt liquors, flour and grist mills, masonry, railroad cars, plumbing, saddlery and harness, clothing, tobacco, and cigars.

Banking.— On Oct. 31, 1901, there were reported 22 National banks in operation with $2,430,000 capital, $1,139,646 in outstanding circulation, and $1,027,250 in United States bonds. There were also 18 State banks, with $1,190,000 capital, and $215,168 surplus; 18 private banks with $1,005,500 capital, and $50,996,000 surplus; and 1 trust and loan company, with $100,000 capital and $15,000 surplus. The exchanges for the year ending Sept. 3, 1900, at the United States clearing house at Helena amounted to $34,585,558, an increase over those of the preceding year of $2,340,281.

Churches.— The strongest denominations in the State are the Roman Catholic, Methodist Episcopal, Presbyterian, North; Protestant Episcopal; Disciples of Christ; Regular Baptist, North; Methodist Episcopal, South. In 1899 there were 270 Evangelical Sunday-schools with 1,765 officers and teachers, and 14,634 scholars.

Postoffices and Periodicals.—In 1901 there were 497 postoffices of all grades; and 95 periodicals of which 12 were daily, 2 tri-weekly, 2 semi-weekly, 74 weekly, 1 semi-monthly, and 4 monthly.

Railroads.—The total length of railroads within the State on Jan. 1, 1901, was 3,076 miles, of which 81 miles were completed during the previous year.

Finances.—The registered warrants outstanding Dec. 1, 1900, amounted to $243,970 and the State institutions had a warrant indebtedness of $105,432. The State has no bonded debt, and is not liable for these loans. The permanent school fund held cash and securities amounting to $340,495. In 1900 the assessed valuation of real estate was $75,039,256; personal property, $63,373,706; railroads, $15,000,000; total, $153,413,062; and the tax rate was $2.50 per $1,000.

State Government.—The governor is elected for a term of four years, and receives a salary of $5,000 per annum. Legislative sessions are held biennially, beginning on the first Monday of January, and are limited to 60 days each. The Legislature has 26 members in the Senate and 72 in the House, each of whom receives $6.00 per day and mileage. There is one representative in Congress. The State government in 1901 was Democratic.

History.—Montana was partly included in the Louisiana Purchase, and partly in the Oregon country, acquired by the treaty with Great Britain in 1846. Till the discovery of gold in 1862 this region was but little visited, excepting by hunters, fur companies, explorers and missionaries. In 1864 the Territory of Montana was organized from parts of Idaho and Montana, and in 1875 Helena was made the capital. In August, 1873, several battles occurred between the United States troops and the Sioux Indians, on the Yellowstone river, and in May, 1876, in an attack on the Confederated Sioux tribes, under Sitting Bull, in Rosebud river valley, General Custer and his entire force were massacred. This was followed by the removal of the Sioux and the opening of the country to settlement. In February, 1889, Congress passed the "Omnibus Bill" providing for the admission of Montana, Washington, and the Dakotas. A constitution was adopted in July, and on Nov. 8, 1889, Montana was admitted to the Union. JOSEPH K. TOOLE.

Montana, University of, a coeducational non-sectarian institution in Missoula, Mont.; opened in 1895; has grounds and buildings valued at $270,000; aggregate endowment funds, $850,000; volumes in the library, about 18,000; scientific apparatus, etc., $50,000; average number of faculty, 30; average student attendance, 185; ordinary annual income, $120,000.

Montanism (mon'-) the religious system of Montanus, an inhabitant of a Phrygian village called Pepuza, who, about A. D. 171, proclaimed himself the Paraclete or Comforter promised by Jesus (see PARACLETE), and he was professed to utter prophecies. Among others he was supported by two ladies, Prisca, or Priscilla, and Maximilla, who also claimed the gift of prophecy. He multiplied fasts, forbade second marriages, did not permit churches to give absolution to those who had fallen into great sin, forbade all female ornaments, required virgins to be veiled, and would not sanction flight in persecution. He was ultimately expelled from the Church. Tertullian, in the year 204, joined the Montanists, but did not forfeit the respect of the Church catholic, as the Montanists held the fundamental doctrine of Christianity, and differed from others more in their rigid practice than in their faith. Jerome wrote against the Montanists, who continued till about the 6th century.

Montargis (môn*g*-tär-zhē'), a town in the French department of Loiret, 47 miles E. by N. of Orleans. Here in 1371 is said have occurred the famous judicial combat between the "dog of Montargis" and Macaire, its master's murderer. The dog not only showed the spot in the forest of Bondy where its dead master was buried, but singled out the murderer, and when Charles VI. granted the ordeal of battle to test his guilt, the dog flew at his throat and so proved its charge upon his body.

Montauban (môn*g*-tō-bon*g*') (the ancient Mons Albanus), capital of the department of Tarn-et-Garonne, France, on the Tarn, 29 miles N. by W. of Toulouse; has a seminary with the only Protestant faculty of theology in France; a suffragan bishopric of Toulouse; a cathedral of the 18th century; raw silk spinning and manufactures of wool, bolting-cloths, etc. Montauban owes its origin to the abbey of St. Théodard, or Montauriol, built in the 8th century. It became in the 16th century a stronghold of the Protestants, the inhabitants formed a republic, and the town was ineffectually besieged in 1562 and 1624, but surrendered in 1629, and its fortifications were demolished. It was the birthplace (1781) of the painter Ingres. Pop. (1901) 30,603.

Montauk (-tâk') **Point,** the extreme E. point of Long Island, N. Y. On it is a stone lighthouse (visible 19 miles), in 41° 4′ N., 71° 51′ W. Here, in 1898, the War Department established Camp Wikoff, for sick, wounded, and convalescent soldiers who had served in the Santiago campaign.

Montbéliard (môn*g*-bā-lyār') (German Mömpelgard), a town in the French department of Doubs, 48 miles N. E. of Besançon.

MONTANA

SCALE OF MILES

10 5 0 10 20 30 40 50

Military Reservations

Indian Reservations

State Capital ⊛ County Seats ⊙

Size of type indicates relative importance of places

G H J K L M
109° 108° 107° 106° 105° 104°
O F C A N A D A
49°
48°
47°
46°
45°
44°
1
2
3
4
5
NORTH DAKOTA
S. DAK.
Avery
Woody Island Cr.
Whitewater Cr.
White Cr.
Frenchmans Cr.
Barr
West Branch
East Fork
Quaking Asp Cr.
Big Muddy Cr.
Cherry Cr.
Plentywood
Scobey
Poplar R.
Sand Butte
Brocton
Calais
Blair
Culbertson
Lenark
Kilva
Snowdon
Assinniboine
Milk R.
Ada
Cleveland
Lloyd
Maddux
Riedel
Warrick
Snake Butte
FT. BELKNAP IND. RES.
Sandcliffs
Hays
St. Pauls
Landusky
Phillips
Brookside
Alkali Flat
Baeth
Bowdoin
Vandalia
Hinsdale
Unger
Tampico
Paisley
Glasgow
Whately
Nashua
Milk River
Kinlyre
Fraser
Oswego
Wolfpoint
Macon
Chelsea
Poplar
FORT PECK INDIAN RES.
Lismas
Blackman
Three Buttes
FORT BUFORD MIL. RES.
Old Ft. Gilbert
Ridgelawn
Sidney
Newlon
Enid
Tokna
Reeta
Round Buttes
Missouri
Big Dry Cr.
Trenton
Church Butte
Piny Buttes
Leedy
Judith
Delos
Christina
Armells Cr.
Crooked Cr.
Kismet
Squaw Cr.
Big Timber Cr.
Jordan
East Br.
Roy
Armells
Valentine
Fergus
Maiden
New Year
Gilt Edge
Ft. Macinnis
Black Butte
Alpine
Grassrange
Edgewater
Elder Cr.
Sanford
Black Butte
Smoke Butte
Mountain Sheep Bluffs
Glendive Buttes
Glendive
Bryants Buttes
Allard
Boice
Beaver Hill
Colgate
Hoyt
Hodges
Yates P.
Lewistown
McDonald Cr.
Cottonwood
Rogers
Pinegrove
Flatwillow
Flatwillow Cr.
Weede
Melston
Japan
Musselshell
Little Porcupine Cr.
Sunday Cr.
Lookout Butte
Coal Cr.
Cartersville
Thurlow
Calabar
Lock
Paragon
Mc Millan
Fallon
Conlin
Cedar
Calypso
Sheridan Buttes
Saugus
Bonfield
Madeline
Terry
Blatchford
Bluff Port
Whitney
Mildred
Carlysle
Shirley
Tusler
Miles City
Ft. Keogh
FT. KEOGH MIL. RES.
Boyle
Mizpah
Whitney
Ismay
Lacomb
Westmore
Plevna
Tonquin
Knowlton
Dragseth
Baker
Bearhorn Butte
Teedee
Dodge
Montline
Kingmont
Preston
Long Clara
Irene
Halbert
Folsom
Roundup
Gage
Fattig
Summit
Big Snowy Mts.
Big Coulee
Fish Cr.
Winnecook
Big Horn
Sanders
Hysham
Rosebud
Forsyth
Dewey
Rosebud Butte
Sabra
Etna
Garland
Beebe
Dama
Hockett
Brandenberg
Pumpkin Cr.
Mizpah R.
Powder R.
Ekalaka
Powderville
Midland
Blue Mud Hills
Excie
Capitol
Ericson
Gladys
Big Box Elder Cr.
Billings
Pompeys Pillar
Anita
Corinth
Toluca
Peritsa
Coburn
Marin
Mason
Silesia
Rockvale
Edgar
Chicopee
Fromberg
Oswald
Bridger
Crockett
Bowler
Riverview
Scribner
Ewing
Frannie
Lodge
Mc Carthy
Berwind
Chance
Absarokee
Fishtail
Roberts
Merritt Sta.
Luther
Carbon
Coalville
Joliet
Wilsey Sta.
Keiser
Pryor
Pryors Mts.
Big Horn Canyon
Custer
Dunmore
Crow Agency
FT. CUSTER MIL. RES.
Muddy
NORTHERN CHEYENNE IND. RES.
Garry Owen
NATL. CEM. MIL. RES.
Ionia
Lodge Grass
Little Horn
Kirby
Wyola
Aberdeen
LIMESTONE MIL. RES.
Grass Ledge Cr.
Lee
Lamedeer
Ashland
Tongue R.
Otter Cr.
Otter
Birney
Moorhead
Selway
Broadus
Turret Butte
Graham
High Plateau
Ridge
Fivemile
Alzada
Missouri R.
Little Powder R.
Powder R.
Decker
Alger
Fort Mackenzie
Sheridan
Verona
Ulm
Arvada
Croton
Sparta
Minturn
Wessex
Como
Little Powder R.
Belle Fourche R.
Powder R.
Grey Bull R.
Big Horn R.
Basin
Hyattville
Cody
Garland
BIG HORN FOREST RESERVE
Y O M I N G
Hammond's 8 x 11 Map of Montana.
Copyright, 1908, by C.S. Hammond & Co., N.Y.
G Green. 109° H 108° J 107° K 106° L 105° M

It lies in a valley between the Vosges and Jura Mountains, is surmounted by an old château (now a prison), and carries on manufactures of watch springs, watchmaking tools, and cotton. A possession of the House of Würtemberg from 1397, it was a Protestant center from 1525, was formally ceded to France in 1801, and suffered much in the Franco-German War. Cuvier was a native; and there is a statue of him, as also of Colonel Denfert, the heroic defender of Belfort.

Mont Blanc (môn*g* blo*ng*), the highest mountain in Europe (if the Caucasus be regarded as Asiatic); 15,782 feet above sea-level; situated in France, close to the Italian frontier, 40 miles S. of the Lake of Geneva. The waters which spring from its W. slopes are drained off to the Rhone, those which originate on the E. side to the Po. It rises into several sharp peaks (*aiguilles*) and forms great glaciers — the Glacier du Géant, Mer de Glace, etc. A practicable route to the summit was gained, in June, 1786, by Balmat and Paccard, guides. Mont Blanc has been most conspicuous for accidents to climbers of all Alpine peaks. There is an observatory (1890) at a height of 14,470 feet.

Montcalm (môn*g*-kälm′), **Louis Joseph Saint Veran, Marquis de,** a French general; born near Nîmes, France, Feb. 29, 1712. Having entered the army he distinguished himself in several campaigns in Europe, and in 1756 was appointed to the chief command of the French troops in Canada. Here he took Fort Ontario (Oswego) and Fort William Henry (on Lake George), and occupied Ticonderoga (1758); but at Quebec, Sept. 14, 1759, was completely defeated by General Wolfe on the Heights of Abraham, both commanders being mortally wounded.

Mont Cenis (môn*g* suh-nē′), or **Monte Cenisio** (mon′te chā-nē′sē-ō), an Alpine peak and pass between Savoy and Piedmont; height of the mountain, 11,792 feet; of the pass, 6,884 feet. Over the pass a road was constructed (1802–1810) by Fabbroni, under Napoleon's orders, at an expense of $1,500,000. Thirteen miles W. of the pass a railway tunnel, 7½ miles long, was begun in 1857 on the Italian side, and in 1863 on the French, and was finished in 1870 at a cost of $15,000,000. Through this tunnel passes one of the main continental overland routes from London *viâ* Paris to Brindisi, for Asia, Australia, and East Africa.

Mont Cervin. See Matterhorn.

Montchrestien, Antoine de (môn*g*-krā-tya*ng*′), a French political economist; born in Falaise, Normandy, France, about 1570. His life was adventurous and romantic. He wrote a work on political economy (he is said to have been the first to introduce the term into French); several poems, and several tragedies possessing merit. ("Dramatic Works," Rouen, last ed. 1607.) He died near Domfront, October, 1621.

Montclair, a town in Essex co., N. J., on the New York and Greenwood Lake and the Lackawanna railroads; 6 miles N. by W. of Newark. It is situated on the first range of the Orange Mountains; is principally a residential place, being the home of many New York business men; and has a hospital, military academy, public library, high school, State and savings banks, weekly newspapers, many handsome residences, and an assessed property valuation of $9,500,000. Pop. (1890) 8,656; (1900) 13,962; (1910) 21,550.

Mont de Piété (môn*g* duh pē-ā-tā′), a public benevolent institution, existing in Italy, France, Spain, etc., and said to have been first established at Perugia in the latter half of the 15th century by Father Barnabas of Terni, and to have taken its name from the hill on which it was situated. The object was to deliver the needy from the usurious Jewish money lenders, by lending money on pledges at a very moderate rate of interest, so as barely to cover the necessary expenses. Popes Leo X. and Paul III. issued bulls approving of these institutions, which were soon established in other towns, of Italy, as well as in Spain, the Netherlands, and other countries. There are at present, besides those in Italy, about 50 monts de piété in France, upward of 100 in Holland, about 20 in Belguim, and some in Germany. The mont de piété of Paris advances to the value of about two-thirds of the pledges, charging interest at the rate of 4½ per cent. per annum, besides ¾ per cent. per month for the expenses of the establishment. Its annual receipts and expenditure amount respectively to about $8,000,000. The *monti frumentarii* are granaries established in different parts of Italy to supply the needy with grain on the same principle as the montes de piété.

In 1894, the Rev. David H. Greer, D. D., rector of St. Bartholomew's Protestant Episcopal Church, New York city, inaugurated a similar system of temporary assistance for people who would otherwise be at the mercy of regular pawn-brokers.

Mont Dore. See Dor.

Mont=Dore=les=Bains (môn*g* - dōr - lā-ba*ng*′), a village of Auvergne, France; in the department of Puy de Dôme, 26 miles S. S. W. of Clermont-Ferrand; 3,412 feet above the sea-level, in a picturesque valley, through which the river Dordogne flows, and which is bordered on both sides by rugged volcanic hills, and closed toward the S. by a semicircle of jagged mountains, the highest point of which, the Pic de Sancy (6,188

feet), is the loftiest mountain in Central France. The Mont Dore mineral springs, which were used by the Romans, are of great value in affections of the throat and most diseases of the respiratory organs, as also in the earlier stages of rheumatism. There are eight powerful springs in full operation, seven of these having a temperature which varies between 102° and 114°, while La Source Sainte Marguerite is comparatively cold. The water contains bicarbonates of soda, iron, and arsenic. The baths are thronged during the short season (July to September) with visitors.

Montebello Casteggio (mon-te-bel'lō kä-ted'jō), a village of Northern Italy, 14 miles S. by W. of Pavia, where the Austrians were defeated by a French army under General Lannes (afterward Duke of Montebello), after a desperate conflict, June 9, 1800. In May, 1859, the Austrians were again defeated here by the united French and Piedmontese army.

Monte Carlo (mon'te kär'lō), the casino in Monaco (*q. v.*). The first stone was laid in 1858. To Prince Albert of Monaco more than $300,000 is paid annually for the concession to play. The "Association of the Watering-Place and Strangers' Club of Monaco, whose capital is $6,000,000 in 60,000 shares, holds a contract, which was made with the late Prince Charles, and expires in 1947. It has practically to bear the cost of spiritual and temporal government for the principality, and in addition pays Prince Albert of Monaco $350,000 annually for the concession, increasing the amount every 10 years from 1907 by $50,000.

Monte-Casino (kä-sē-nō), a celebrated Benedictine abbey of Naples, province of Terra di Lavoro, on a mountain near the San Germano. The Saracens destroyed it in 883. It was restored and greatly extended in 1065. Markwald besieged it for eight days in 1198, when it was delivered, according to monkish legends, by a miracle. Milman terms it "that great model republic, which gave its laws to almost the whole of the western monasticism." Gregory VII. took refuge here in 1083. Its library was spared on the suppression of monastic institutions in Italy in 1866.

Monte Catini (kä-tē'nē), a watering place of Italy, 30 miles N. W. of Florence, and 19 E. of Lucca. Its mineral springs are saline, range between 82° and 86° F., and are efficacious for abdominal complaints, scrofula, and dysentery. The season lasts from May to September. Near here the Florentines were defeated by the Pisans in 1315.

Monte Cenisio. See Mont Cenis.

Monte Corno. See Great Rock of Italy.

Monte Cristo (krēs'tō), a small island 6 miles in circumference belonging to Italy, 25 miles S. of Elba, the seat of a penal colony. Dumas has given the name of this isle to the hero of one of his most popular romances.

Montecuculi (mon-te-kö'kö-lē), **Raymond, Count de,** an Austrian military officer; born in Modena, in 1608. He entered early into the army, under his uncle, who commanded the artillery of the emperor. The first action in which he distinguished himself was in 1638, when, at the head of 2,000 men, he surprised nearly 10,000 Swedes, who were engaged in besieging Numslau, in Silesia, and whom he compelled to abandon their baggage and artillery, but was subsequently taken prisoner by General Bannier. He did not regain his liberty till two years after; but he employed that time to great advantage in study. On returning to his profession, he defeated the Swedes in Bohemia. After the peace of Westphalia, he traveled in different countries. In 1657 he was appointed Field-Marshal, and sent to the relief of John Casimir, King of Poland, who was attacked by Sweden and the Prince of Transylvania. After defeating the latter, he took Cracow from the Swedes, and gained several splendid actions, which produced a peace. He next served against the Turks, and drove them out of Transylvania, for which he was made president of the imperial council. On the breaking out of war between the empire and France he was placed at the head of the imperial troops, and checked the progress of Louis XIV. in spite of Turenne and Condé. The next year the chief command was taken from him, but was restored in 1675 that he might make head against Turenne on the Rhine. They spent four months in following and observing each other, and were on the point of risking a battle when the French general was killed by a cannon ball. The Prince of Condé was at first worsted, but finally succeeded in making head against the imperial commander, who considered this campaign as the most glorious of his life — not because he conquered, but because he was not conquered. Montecuculi passed the remainder of his life at the imperial court, the patron of learning and science. He was created Duke of Melfi and died in Linz Oct. 16, 1680.

Montefiore, Sir Moses (mon-te-fē-ō'-re), a Jewish philanthropist, descendant of a wealthy family of bankers; born in Leghorn, Italy, Oct. 24, 1784. His grandparents had emigrated from Leghorn to London in 1750. In 1812 he married Judith Cohen (1784–1862), a lady who went hand in hand with him in all his many schemes of philanthropy. As a stock-broker he soon achieved great success. In 1818 he was

elected president of the Spanish and Portuguese community. From 1829 onward he took a prominent part in the struggle for removing the civil disabilities of English Jews (see JEWS). In 1835 he was one of the parties to the contract for the $75,000,000 given as compensation to the slave-owners. He was for a time High Sheriff of Kent, and, after long exclusion and repeated reëlection, was legally admitted as Sheriff of London in 1837. In that year he was knighted, and in 1846 was raised to a baronetcy in recognition of his meritorious public services. He distinguished himself by his practical sympathy with his oppressed countrymen in various parts of the East, chiefly in Poland, Russia, Rumania, and Damascus. He made seven journeys to the East, the first being in 1827, and the latest in 1874, chiefly for the amelioration of the condition of his countrymen. At Bucharest, during an anti-Jewish ferment, he boldly faced the mob at the risk of his iife. He was presented with the freedom of the City of London in 1873, and an address in 1883. In memory of his wife he endowed a Jewish college at Ramsgate in 1865. In his 100th year he was still hale and well, but died in Ramsgate, England, July 29, 1885.

Montégut, Emile (mo*ng*-tā-gü′), a French critic; born in Limoges, France, June 24, 1826. He early made a reputation by a series of brilliant studies on English literature. He contributed to the "Revue des Deux Mondes" (Review of Two Worlds) and other journals, and published books of travel, a study of Marshal Davoût, and translations of Shakespeare, Macaulay, and Emerson, and a work on the Duke and and Duchess of Newcastle. Chief works: "Poets and Artists of Italy" (1881); "Literary Types and Æsthetic Fancies" (1882); "Essays on English Literature" (1883); "Modern Writers of England"; "Books and Souls of the Orient"; "Dramaturgists and Romances" (1890). He died Dec. 18, 1895.

Montemayor, Jorge de (mōn-tā-mäyōr′), a Spanish romance-writer and poet; born in Montemayor, Portugal, about 1520. When a young man he was in the army; afterward, being a skillful musician, was attached to the traveling chapel of the Prince of Spain (later Philip II.), visiting several countries, particularly Italy and Flanders. His principal work was the famous "Diana Enamorada" ("Diana in Love," 1542; latest ed. Madrid, 1795), the most popular Spanish pastoral romance since "Amadis of Gaul." It furnished the model for Sir Philip Sidney's "Arcadia." ("Works," Antwerp, 1554; several editions since.) He died in Turin, Feb. 26, 1561.

Montenegro (native Tzrnagora, meaning Black Mountain), a former principality in Europe, became a kingdom in 1910, in the N. W. of Turkey; bounded by Herzegovina, Albania, the Adriatic, and Dalmatia; area, about 3,630 square miles; pop. (1910) 250,000. The surface is everywhere mountainous, being covered by an extension of the Dinaric Alps, rising to the height of 8,850 feet. There are, however, a few beautiful and verdant plains and valleys, in which the soil is tolerably fertile. The principal river is the Moratcha. About half of the Lake of Scutari, besides several smaller lakes, lies within the Montenegrin boundary. The climate is healthy. Forests of beech, pine, chestnut, and other valuable timber cover many of the mountain sides. Fruit trees of all kinds abound, especially in the sheltered valleys, where even almonds, vines, and pomegranates ripen. Agriculture is in a very rude and inefficient state, though every cultivable piece of land is planted with Indian corn, potatoes, tobacco, rye, wheat, cabbages, or some other useful plant. Sheep, cattle, and goats are reared in great numbers. Manufactures, with exception of a coarse woolen stuff, are unknown. The chief occupations of the Montenegrins are agriculture and fishing, trade being altogether left to foreigners. The exports are sheep and cattle, mutton-hams, sumach, honey, hides, cheese, butter, and other agricultural produce. The chief towns (in reality little more than villages) are Cettinje (4,500 inhabitants), the capital; Podgoritza (10,000 inhabitants); Niksich; and the seaports Dulcigno and Antivari. The Montenegrins are pure Serbs and speak a Serbian dialect. They are generally of tall stature and well proportioned. The men go at all times fully armed, whatever be the occupation in which they are engaged, and all between 14 and 50 years of age (estimated at 29,000) are liable to military service. In religion they are of the Greek Church. Education, though once neglected, is free and compulsory. Montenegro is nominally a constitutional monarchy, with a state council of eight members, but the prince is practically absolute. In 1879, the country was divided into 80 districts and 8 military commands. In 1899, the revenue and expenditures were about $500,000 each; debt, $1,000,000; imports, $350,000; exports, $250,000.

Montenegro, first appearing as a principality under the name of Zeta in the 4th century, was subject to the great Servian kingdom till about 1389. In 1516 the secular prince abdicated in favor of the Archbishop Vavil, who then formed Montenegro into a theocratic state, under an autocratic vladika or celibate prince-bishop. The dignity was inherited through brothers and nephews, and after 1697 became hereditary

in the family of Petrovitch Njegos. The history of Montenegro for many years is a record of deadly struggle with the Turks, and of a slowly-growing civilization among its inhabitants. In 1852 Danilo became *vladika*, but in 1855 he married, threw off his ecclesiastical character, assuming the title of hospodar or prince, and transformed his land into a secular principality, the independence of which was soon recognized by Russia. Danilo was assassinated in 1860, and the present prince, Nicholas I., was proclaimed his successor, Aug. 14, of that year. In 1861-1862 he engaged in a not altogether successful war against Turkey; but in 1876 he joined Servia and in 1877-1878 Russia against his hereditary foe, with the result that 1,900 square miles were added to his territory by the treaty of Berlin.

Montenotte (mon-te-not'te), a small village of Northern Italy, 26 miles W. of Genoa, where Napoleon won his first victory over the Austrians, April 12, 1796.

Montépin, Xavier Aymon de (mô*ng*-tā-pa*ng*), a French novelist; born in Apremont, Haute-Saône, France, March 18, 1824. His works abound in sensational incidents and situations. He wrote nearly 100 novels, which have been translated into almost every language, the first being "The Knights of Lansquenet" (1847); and, alone or with collaborators, about 30 plays.

Montepulciano (mon-te-pöl-chä'nō), a town of Italy, a bishop's see, situated on a high hill, 43 miles S. E. of Siena. It was the birthplace of Politian and Bellarmine, and is famous for its red wine.

Montereau (mo*ng*t-rō'), a town in the French department of Seine-et-Marne, at the confluence of the Seine and Yonne, 49 miles S. E. of Paris. At the bridge here, in 1419, Jean-sans-Peur, Duke of Burgundy, was assassinated in the presence of the young Dauphin, afterward Charles VII.; and in the immediate vicinity Napoleon, on Feb. 18, 1814, gained his last victory over the Allies.

Monterey (mon-tā-rā), a city and capital of the State of Nuevo Leon, Mexico; is in a fertile plateau-valley, 670 miles N. of Mexico city. It is a well-built town, with a thriving trade, and contains a cathedral, seminary, and schools of law and medicine. Founded in 1599, it was taken by the American army under General Taylor in 1846. Pop. (1900), 62,266.

Monterey, a city in the county of the same name, California; situated on the S. side of Monterey Bay, opening on the Pacific, and 120 miles S. by E. of San Francisco. In 1770 the locality was selected by Father Junipero Serra for a mission, and that of San Carlos Borromeo of Monterey was here established. It had been visited by Spaniards as early as 1660. From 1840 to 1845 Monterey was the capital of the Mexican Province; and in 1842 Commodore Jones, U. S. N., captured and held it for a day, wrongly thinking that war had been declared by the United States. In 1846, when the Mexican War was really in progress, Commodore Sloat took possession of the place, on July 7, and it was the capital of the Military Government of California during the next year. It was there that the convention met in 1849 to frame the State Constitution, under which the State was admitted to the Union in 1850. The removal of the capital to San Francisco took away most of the American life of that time, although there still remained a distinct flavor of the old Spanish days.

The interest attaching to Monterey of late years is that of its balmy climate, its attractive surroundings, its bathing facilities, in the beautiful sandy beach, and the other elements of a favorite health resort. There are some local industries, as of fishing and farming, but the place is of no commercial import. There remain some picturesque examples of the old Spanish buildings; the one-time residence of Robert Louis Stevenson is pointed out; there are a good local academy (the San Carlos) and public and parochial schools; also a public library. The Southern Pacific railroad gives convenient land communication. Pop. (1900), 1,748; (1910) 4,923.

Monte Rosa. See ROSA, MONTE.

Monte Silvio. See MATTERHORN.

Montespan (mōng-tuh-spo*ng*), **Françoise Athénaïs, Marquise de,** mistress of Louis XIV.; born in 1641. She was the daughter of Gabriel de Rochechouart, Duc de Mortemart, married in 1663 the Marquis de Montespan, and became attached to the household of the queen. Her beauty and wit captivated the heart of the king, and about 1668 she became his mistress, without, however, as yet supplanting La Vallière. The marquis was flung into the Bastille, next banished to his estates, and finally in 1676 his marriage was formally annulled. Montespan reigned till 1682, and bore the king eight children, who were legitimized, but at last her influence paled before the rising star of the astute widow of Scarron, afterward Madame de Maintenon, whom she had engaged as governess to her children. Gradually she lost all hold over the king, and in 1687 left the court, in 1691 Paris itself. Later, like so many women of her class, she found relief in devotion, and died in Bourbon-l'Archambault, May 27, 1707. Her "Memoirs" were published in 1829.

Montesquieu (mō*ng*-tuh-skyuh'), **Charles de Secondat, Baron de,** a famous French writer; born in the castle of La Brède, near Bordeaux, France, Jan. 18, 1689. In 1716 he became president of the Parliament of Bordeaux. The publication of the "Persian Letters" first made him famous as an author. It is a vigorous yet delicate picture of the manners, follies, and

vices of his countrymen, interspersed with luminous passages on graver matters, and enjoyed an immense popularity. In 1728 he was admitted to the French Academy, on which occasion he delivered an eloquent discourse. Having given up his civil employment he began to travel through Europe, to collect materials for his long meditated work on politics and jurisprudence. After his return he retired to his estate, and there completed his work "On the Causes of the Grandeur and Declension of the Romans," which was published in 1734. His greatest work, however, is the "Spirit of Laws," which occupied him 20 years, was published in 1748, and secured to him a very high place among writers on political science.

Though he was economical by nature, he could be generous, as in the well-known instance of his bounty at Marseilles, where he gave his purse to a young boatman, and secretly appropriated a considerable sum to release the father of the unhappy man from the hands of the Barbary corsairs. It was discovered after Montesquieu's death that he was the liberator of the captive. It has given occasion to the drama "Le Bienfait Anonyme." In his 26th year Montesquieu married, and the fruits of this marriage were one son and two daughters. The first published a curious little romance in 1783, "Arsace and Isménie," which was probably written by Montesquieu in his younger years, and perhaps intended originally, as Grimm suggests, to form an episode in the brilliant and amusing "Lettres Persanes." His other works are the "Temple of Cnides," a piece called "Lysimachus," and an "Essay on Taste." He died in Paris, Feb. 10, 1755.

Montevideo (mōn-tā-vē-*th*ā′ō), capital of Uruguay, on a small peninsula on the N. coast of the estuary of the La Plata, 130 miles E. S. E. of Buenos Ayres. It is one of the best built towns in South America, and enjoys one of the finest climates; the principal buildings are the cathedral, town house, Solis opera house, custom house, exchange, etc.; there is a university with (1897) 89 professors and 681 students. The commercial development of Montevideo was much retarded by the shallowness of its harbor; but this has been greatly improved, and extensive dry docks have been constructed. The chief exports are wool, hides, tallow, dried beef, and extracts of flesh; chief imports, cottons, woolens, hardware, and other manufactured articles. Montevideo sends out above half the whole exports of Uruguay, and receives all but a small fraction of the imports. Pop. (1908) 306,000.

Montez, Lola, the stage name of Marie Dolores Eliza Rosanna Gilbert, an Irish adventuress; born in Limerick, Ireland, in 1818. Her father was an Ensign Gilbert, her mother of Spanish descent. Taken out to India, she there lost her father by cholera; and, her mother having remarried, Dolores (or "Lola") was sent home in 1826 to Europe, and brought up at Montrose, in Paris, and at Bath. To escape the match, arranged by her mother, with a gouty old judge, she eloped with a Captain James, whom in July, 1837, she married at Neath; but the marriage ended in a separation and in her return from India (1842). She then turned dancer, coming out at Her Majesty's theater; and after visits to Dresden, Berlin, Warsaw, St. Petersburg, and Paris, she went toward the close of 1846 to Munich. There she soon won an ascendency over the eccentric artist-king, Louis I., who created her Countess of Landsfield, and allowed her $25,000 a year. For more than a year she was all-powerful, her power directed in favor of Liberalism and against the Jesuits; but the revolution of 1848 sent her once more adrift on the world. Again she married (this time a Lieutenant Heald), a marriage as unlucky as the first; and, after touring (1851–1856) through the United States and Australia, and after two more "marriages" in California, in 1858 she delivered in New York a series of lectures written for her by Chauncey Burr. She died, a penitent, in Astoria, L. I., on Jan. 17, 1861, her last four months devoted to ministering in a Magdalen asylum near New York.

Montezuma (mon-tē-zö′mä) **II.,** surnamed Xocojotzin, or "The Younger," 9th King of Mexico; born about 1476. He was elected on the death of his grandfather, in 1502. He had distinguished himself as a general, and at the time of his election held the office of high priest. He dropped the mask of moderation and humility, was crowned with more than usual pomp, and had an extraordinary number of human victims, prisoners taken in war for the purpose, sacrificed on the occasion. He dismissed from his court and palace all plebeians, and gave their employments to persons of noble birth, alienating by this and other arrogant measures the affections of his subjects. He carried on almost continual wars with the neighboring provinces, suffering occasionally reverses. But his health was undermined and his character enervated by his excessive sensual indulgences, and he became timid and superstitious. The apparition of a comet caused great alarm in his kingdom about 1512, and the astrologers could not interpret its meaning. A neighboring king, skilled in divination, affirmed that it foreboded disasters from the arrival of foreigners — a warning soon confirmed. Montezuma, however, still extended his empire, and at the

same time increased the number of disaffected subjects. In 1519, Cortez and the Spaniards invaded the empire and approached the capital. Montezuma sent presents and complimentary messages to them, but was in the utmost terror. He at length went with a magnificent cortege to meet Cortez, and conducted him into the city, where, after eight days of ceremonious civilities, Cortez made Montezuma his prisoner, and had irons put on his legs. They were, however, soon removed, and the captive king professed himself the vassal of Charles V. He remained inflexible in the matter of religion. Left by Cortez, in 1520, in charge of Alvarado, and a small body of Spaniards, severe conflicts took place in the city, which were renewed on the return of Cortez. The Mexicans assaulted the city on June 27, and Montezuma, while standing on the walls in his royal robes, exhorting his subjects to submit to their enemies, was wounded by Mexican arrows, and by the blow of a stone, before the Spaniards could cover him with shields. He refused all food and attendance to his wounds, and died June 30, 1520.

Montfaucon, Bernard de (môn*g*-fō-kôn*g*′), a French critic and antiquary; born in the castle of Soulage, Languedoc, France, Jan. 18, 1655. He became a Benedictine monk, after having engaged in the military service; settled at Paris in 1687; visited Rome, where he was received with distinction by Pope Innocent XII., and was admitted to the Academy of Inscriptions in 1719. The most important of his works, all of which abound in learning, is that treasure of classical archæology, entitled "Antiquity Explained and Represented by Figures," forming 15 volumes, in folio. He died in Paris, Dec. 21, 1741.

Montferrat (môn*g*-fer-rä′), formerly an independent duchy of Italy, between Piedmont, Milan, and Genoa, now forming part of the kingdom of Italy. It consisted of two separate portions, both lying between the Maritime Alps and the Po, and having a united area of over 1,300 square miles. The capital was Casale. After the downfall of the Frankish empire, Montferrat was ruled by its own marquises till the beginning of the 14th century. This house sent its most illustrious sons to take part in the Crusades, especially Conrad, the defender of Tyre against Saladin, and the competitor with Guy de Lusignan for the crown of Jerusalem; and Boniface, who became ruler of Thessalia. Iolande or Irene, sister and heiress of the last male of the house, was Empress of Constantinople; her second son became the founder of the family of Montferrat-Palæologus, which became extinct in 1533, and Montferrat then passed to the Gonzagas of Mantua. In 1631 the Dukes of Savoy obtained a portion of Montferrat, and in 1703 the remaining portion.

Montfort, Simon de (môn*g*-fōr′), a French crusader, descended from the lords of Montfort, near Paris. His career dates from 1199, when he went to the Holy Land, companion-in-arms of Thibault, Count of Champagne; but it becomes of more historical importance in 1208, when he was appointed chief of the barbarous crusade against the Albigenses, then protected by Raymond, Count of Toulouse. In 1213 he obtained a great victory at Muret over the confederated armies of that prince, of his brother-in-law, Peter, King of Arragon, and the nobles who had united with them, and was then appointed by the Pope sovereign of all the countries conquered from the alleged heretics. He was killed while besieging Toulouse, June 25, 1218.

Montfort, Simon de, an English general and statesman, younger son of the preceding; born about 1208. He quitted France either in 1231 or 1236, in consequence of a dispute with Queen Blanche, mother of St. Louis. He was the heir of estates in England, which had been held by his family in the reign of King John, and on coming to settle here, received possession of them with the title of Earl of Leicester. Henry III., in fact, received him into great favor, permitted him to marry his sister, the Countess Dowager of Pembroke, and appointed him lieutenant-general, or seneschal, of Gascony. From this time the interest of English history turns on the disputes between this turbulent subject at the head of a confederacy of the barons and the crown, the first incident in it being Montfort's recall from his government. In 1258 Henry had convoked a Parliament, to procure supplies for the conquest of Sicily. The occasion was seized by Montfort and the barons, to make an armed protest against his government, the end of which was the appointment of 24 of their number, with Montfort as president, to administer the affairs of the kingdom. Such a truce could not, in the very nature of things, be of long duration. The king and his son, Prince Edward, endeavoring to reconquer the royal authority by force of arms, were defeated at the battle of Lewes, 1264, an event which transferred the government, in reality, to Simon de Montfort, though he acknowledged the Bishop of Chicester and the Earl of Gloucester as his associates. In the year following, in January, 1265, De Montfort convened a Parliament, in which representatives were sent from the boroughs for the first time on record and thus originated the House of Commons. He was now the leader of the popular party, and was obliged to take the field by the disaffection of the Earl of Gloucester who soon after, with many other of

the barons, joined Prince Edward, previously a captive with his father in the camp of Montfort. The battle of Evesham, Aug. 5, 1265, decided the contest. Simon de Montfort, overpowered by numbers, fell in the midst of his friends, and the ruin of his family succeeded, as a matter of course.

Montgolfier (môn*g*-gol-fyā′), **Joseph Michel** (1740–1810) and **Jacques Etienne** (1745–1799), joint-inventors of the balloon, were born in Vidalon-lès-Annonay, in the department of Ardéche, in France. Their first balloon inflated with rarefied atmospheric air, ascended from Annonay in 1782, and the invention soon brought them fame and honors. Joseph was also the inventor of the water-ram. See BALLOON.

Montgomerie, Alexander, a Scotch poet; born probably in Hessilhead Castle, near Beith, Ayrshire, Scotland, about 1545. He was related to the noble House of Eglinton. He traveled in France, Flanders, and Spain, was small in stature, given to drinking, and unhappy in his amours. He became devout in his later years. His fame rests securely on the "Cherrie and the Slae," which at once leaped into popularity. He died before 1615.

Montgomery, a city, county-seat of Montgomery co., and capital of the State of Alabama; on the Alabama river, and on the Louisville and Nashville, the Western of Alabama, the Plant System, the Central of Georgia, and the Georgia and Alabama railroads; 95 miles S. E. of Birmingham. Here are the United States Government Building, Masonic Temple, city infirmary, an orphanage, large cotton storage warehouses, electric lights, electric street railways, National banks, and several daily and weekly newspapers. It has manufactories of ice, fertilizers, candy, wagons, carriages, cigars, vinegar, soap, crackers, paper boxes, etc.; large interests in cotton, oil machinery, marble, etc.; and an assessed property valuation of nearly $20,000,000. Montgomery was founded in 1817, and named in honor of General Montgomery, who was killed in the action at Quebec. It received its charter in 1837, and was made the State capital in 1847. It was also the capital of the Confederate States in 1861–1862. Pop. (1900) 38,415; (1910) 38,136.

Montgomery, the name of a noble family, sprung from ROGER DE MONTGOMERY, a companion-in-arms of William the Conqueror. The son of Roger was banished the kingdom in the reign of Henry I., and one of his descendants was created Earl of Eglinton by James IV. of Scotland, 1502. GABRIEL DE MONTGOMERY, a member of this family, had the misfortune to wound Henry II. in a tournament, of which the king died, 1559. He afterward distinguished himself in the religious wars of France, and was beheaded by order of the Catholic queen, Catherine de Medici, in 1576.

Montgomery, Florence, an English novelist; born in County Donegal, Ireland, in 1843. She wrote: "A Very Simple Story" (1867); "Misunderstood" (1869); "Thrown Together" (1872); "The Town Crier" (1874); "Seaforth" (1878); "Peggy, and Other Tales" (1880); "The Blue Veil" (1883); "Colonel Norton" (1895); "Tony" (1897); etc.

Montgomery, James, a Scotch poet; born in Irvine, Ayrshire, Scotland, Nov. 4, 1771. In 1792 he became clerk to the editor of the Radical Sheffield "Register." In 1804 he started a weekly paper of his own, the Sheffield "Iris"; and this he continued to edit till 1825. By 1832 he had become a moderate Conservative; and in 1835 he accepted from Peel a government pension of $750. He died in Sheffield, England, April 30, 1854. Ten at least of his hymns keep their place in the hymnals.

Montgomery, Jemima. See TAUTPHŒUS, BARONESS VON.

Montgomery, Richard, an American military officer; born in Swords, Ireland, Dec. 2, 1737. He entered the army of Great Britain and was with Wolfe at the taking of Quebec in 1759. On his return to England he resigned his commission and emigrated to America. On the breaking out of the Revolutionary War, the command of the Continental forces in the N. department was bestowed on him. He reduced Fort Cherokee and took Montreal. He fell Dec. 31, 1775, in an attempt on Quebec, being struck by a ball from the only gun fired by the enemy. A monument was erected to his memory in front of St. Paul's Church, New York city.

Montgomery, The, a twin-screw, steel unprotected cruiser of the United States navy; 2,079 tons displacement; length, 257 feet; breadth, 37 feet; mean draft, 14 feet, 6¼ inches; main battery, nine 5-inch rapid-fire guns; secondary battery, six 6-pounder rapid-fire guns, two 1-pounder rapid-fire cannons, and two Gatlings; speed, 19.5 knots; crew, 20 officers and 254 men; cost, $612,500.

Month, in astronomy, properly the time in which the moon makes one complete revolution round the earth, or appears to return to precisely the same point in the heavens from which it started. This may be from change to change, from full moon to full moon, or in an indefinite number of other ways. The time of the revolution now described is properly 29 days, 12 hours, 44 minutes, and 3 seconds. Twelve periods, called lunar months, fall short of a year by about 11 days. Lunar months were used by the ancient Jews, as they still are

by their modern successors and by the Mohammedans. Also a solar month; the period for the passage of the sun through one of the signs of the zodiac. Twelve of these periods constitute a year. In the calendar, any one of the calendar months, called also usual, natural, civil, or political, though the first is by far the most common term. As an aid to memory with respect to the number of days in each month, the following rude rhymes have been employed at least from A. D. 1606.

"Thirty days hath September,
April, June, and November,
All the rest have thirty-one,
But February twenty-eight alone,
Except in leap year once in four,
When February has one day more."

In law, formerly the word month in a statute meant a lunar month, but it was made to signify calendar months unless otherwise expressly designated. Anomalistic month, the time taken by the moon in passing from one perigee to the next, viz., 27 days, 13 hours, 18 minutes, and 37.4 seconds. Nodical month, the time taken by the moon in revolving from one node to the same node again, viz., 27 days, 5 hours, 5 minutes, and 36 seconds. Sacred month:

"Among the other expedients that had been suggested in this convention [of Chartist Delegates held in London in August, 1838], was that of observing what was called a sacred month, during which the working classes throughout the whole kingdom were to abstain from every kind of labor, in the hope of compelling the governing classes to concede the Charter." — Molesworth, "Hist. Eng." ii. 281.

Sidereal month, the time taken by the moon in passing from one star to the same star again, viz., 27 days, 7 hours, 43 minutes, 11.5 seconds. Tropical or periodic month, the time taken by the moon in passing from any point of the ecliptic to the same point again, viz., 27 days, 7 hours, 43 minutes, 4.7 seconds.

Montholon, Count Charles Tristan de (mô*ng*-tō-lô*ng*′), a French military officer; born in Paris, France, July 21, 1783. Having served in the navy, he entered the army, and was severely wounded at Wagram. Napoleon made him his chamberlain in 1809. During the Hundred Days Montholon was Napoleon's adjutant-general. He accompanied his master to St. Helena, and along with Gourgaud published "History of France under Napoleon," dictated by Napoleon (8 vols. 1822–1825). As chief of the staff to Louis Napoleon in 1840, he was condemned to 20 years' imprisonment; he regained his freedom in 1848, having published in 1846 "Account of the Captivity of Napoleon" (2 vols.). He died Aug. 24, 1853.

Monti, Luigi (mon′tē), an American writer; born in Palermo, Sicily, in 1830. Being exiled, he went to Boston, Mass., in 1850. Besides contributions to magazines, he published "The Adventures of an American Consul Abroad" (1878); and "Leone," a novel in the "Round Robin" series. Longfellow introduced him in his "Tales of a Wayside Inn" as the young Sicilian.

Monti, Vincenzo, an Italian poet; born near Ravenna, Italy, Feb. 19, 1754. He became as notorious for the versatility of his political principles as for his poetic talents. He commenced his career as secretary to Luigi Braschi, nephew of Pope Pius VI., and was then a violent enemy of the French; he afterward became a republican, next a panegyrist of Napoleon, and ended by eulogizing the Emperor of Austria. His "Bassvillianca," written on the murder of Hugo Basseville, the French ambassador at Rome, is in form a close imitation of Dante, and gained him high reputation. His other chief works were an unfinished eulogy of Napoleon; "Cantica," another political poem; and a translation of Homer's "Iliad"; and his dramatic writings are the tragedies of "Galeotto Manfredi," "Aristodemus," and "Caius Gracchus." He was successively appointed Professor of Belles-Lettres at Milan, and of Rhetoric in the University of Pavia, and historiographer of the kingdom of Italy; and was fortunate enough to preserve his place and pension under the new government. He died in Milan, Oct. 13, 1828.

Montiano y Luyando, Agustin de (mōn-ti-ä′nō ē lö-i-än′dō), a Spanish dramatist; born in Valladolid, Spain, March 1, 1697. He was director of the Academy of History, Madrid. He wrote "The Rape of Diana" and "The Lyre of Orpheus," poems; "Virginia" (1750); and "Athaulpho" (1753), tragedies aiming at a reform of the Spanish drama by bringing it into conformity with the rules of the French stage; and other works. He died in Madrid, Nov. 1, 1764.

Monticello, the former residence of Thomas Jefferson, in Albermarle co., Va., near Charlottesville. The great statesman is buried in a small private graveyard adjoining the road leading to the house.

Montjoie St. Denis (mô*ng*-zhwä′ sa*ng* duh-nē′), the French war-cry, old at least as Wace's day (12th century), from the hill near Paris on which St. Denis (*q. v.*) underwent the joy of martyrdom.

Montmartre (mô*ng*-märtr′), formerly a village of France, department of Seine, now a part of Paris, on a conical hill commanding an extensive view of the metropolis. This plain is celebrated for its quarries of gypsum, which, from immemorial time, supply the whole of Paris with plaster. The name is derived by some from Mons Martis, the site of a temple to Mars; and by others from Mons Martyrum, because it

was the scene of the martyrdom of St. Denis and his three companions. The Northmen pillaged it in 887, and Louis VI., "the Fat" (1108–1137), formed a Benedictine abbey, which was suppressed in 1789. Combats between the allied armies and the French took place on the heights, of which Blücher gained possession, March 30, 1814.

Montmorency, a river of Quebec, a tributary of the St. Lawrence, famous for its beautiful falls, 8 miles N. E. of Quebec. Here the stream is 100 feet wide, and the falls have a sheer descent of 250 feet.

Montmorency (mo*ng*-mō-ro*ng*-sē′), the name of one of the oldest and most illustrious of French families, the founder of which was BOUCHARD, one of the great feudatories of the 10th century. Of its members distinguished in succeeding ages are: MATHIEU, grand constable 1130, regent during the crusade 1147, died in 1160. MATHIEU, grandson of the latter, called the "Great Constable," served in the crusade against the Albigenses, and under the regency of Blanche, during the minority of her son, Louis IX., died in 1230. CHARLES, Marshal of France, and Governor of Normandy, died in 1381. ANNE, Constable of France, born in 1493, companion-in-arms and in captivity of Francis I., 1525–1526, gained the battle of Dreux against the Calvinists 1562, and that of St. Denis, where he fell gloriously, covered with wounds, in 1567. HENRI I., second son of Anne,, born 1544, fought with his father, and was created Marshal of France in Piedmont, 1566. He was one of the first to recognize Henry IV., who made him constable, 1593; died in 1614. HENRI II., son of the latter, born in 1595, was named admiral by Louis XII. as early as 1612, and greatly distinguished himself against the Calvinists. He was beheaded, after vainly opposing himself to the ambition of Richelieu, in 1632. He was the last of the first ducal branch of this house. His sister, CHARLOTTE MARGUERITE, became wife of the second Henri, Prince de Condé and mother of the great Condé; died in 1650.

Montojo, Patricio, a Spanish naval officer; born about 1833; commanded the fleet of Spain in the battle of Manila Bay, May 1, 1898. His flagship, the "Reina Christina," was engaged in turn by the "Olympia," the "Baltimore," the "Raleigh," and the "Boston" of the American fleet. The flagship having received 70 shots that killed 52 men and wounded 150, and having taken fire, the admiral transferred his flag to a gunboat. His fleet was entirely destroyed or sunk (see MANILA BAY, BATTLE OF). During September of the following year, Admiral Montojo was tried by court-martial in Madrid, and was condemned to retirement without the right of promotion. In his defense, he contended that the responsibility of the defeat at Manila Bay rested on the Spanish government, which had failed to put the fleet and harbor in a defensive condition.

Mont Pelée See MARTINIQUE: ST. PIERRE.

Montpelier, a city, county-seat of Washington co., and capital of the State of Vermont, on the Winooski river, and on the Wells River, the Central Vermont, and the Montpelier railroads; 40 miles S. E. of Burlington. It contains the Montpelier public library, Wood Art Gallery, Kellogg-Hubbard Library, Heaton Hospital, Washington Methodist Seminary; United States Government Building, waterworks, electric light and street railway plants, National banks, and daily newspapers. It has industries in granite, hardware, saddlery, cotton goods, and sawmill machinery, and an assessed property valuation of $5,000,000. Montpelier was made the State capital in 1805, and received its charter as a city in 1895. Pop. (1900) 6,266; (1910) 7,856.

Montpellier (mô*ng*-pel-lyā′), chief town of the department of Hérault, in France; on the Lez; about 6 miles N. of the Mediterranean, and 80 miles W. N. W. of Marseilles. It is one of the handsomest towns of the S. of France. Among its noteworthy features are the Peyrou, a splendid promenade, on which is the so-called Château d'Eau, at the termination of a noble aqueduct; the citadel; the cathedral; the Palais de Justice and the Porte de Peyrou, a triumphal arch of the Doric order. Montpellier is well equipped with educational and other institutions, and since the 12th century has been famous for its school of medicine, said to have beeen founded by Arab physicians driven out of Spain. There are also "faculties" of law, science, and literature, and a public library of 100,000 volumes. The botanical garden, begun under Henri IV., is the oldest in France. Montpellier manufactures cottons, candles, soap, verdigris, chemicals, etc. It carries on an active trade, Cette serving as its harbor. Montpellier was a stronghold of the Huguenots, and suffered much in the religious wars. The edict of Montpellier (Oct. 20, 1622) granted the free exercise of their religion to Protestants, and confirmed the Edict of Nantes. Pop. (1906) 77,114.

Montpensier (mô*ng*-po*ng*-syā′), **Anne Marie Louise, Duchesse de,** the daughter of Gaston, Duke d'Orleans, brother of Louis XIII., generally called "Mademoiselle"; born in Paris, France, May 29, 1627. She embraced the cause of Condé in the civil wars. She caused the cannon of the Bastille to be fired on the French troops, and showed, on many occasions, a most impetuous spirit. After trying in vain to espouse several sov-

ereign princes, among the rest Charles II. of England, she is said to have secretly married the Count de Lauzun (see LAUZUN). Mademoiselle passed her last years in devotion, and wrote her memoirs, which are very curious, and full of anecdotes relative to the court of Louis XIV. and the Fronde leaders. She died in Paris, March 5, 1693.

Montpensier, Antoine Marie Philippe Louis D'Orléans, Duc de, 5th son of Louis Philippe, king of the French; born in Paris, July 31, 1824. He was educated at the college of Henry IV., and after a special examination was appointed lieutenant of artillery in 1842. Montpensier was sent to Algeria in 1844, where he participated in the expedition against Biskara, and was wounded during the campaign of Ziban. His services were rewarded with the cross of the Legion of Honor, and promotion to the rank of chef d'escadron. After visiting England in 1845, the duke rejoined the army in Africa, and distinguished himself against the Kabyles, after which he undertook a tour of the East. On his return he married, at Madrid, in 1846, the Infanta Maria Louisa, sister of Queen Isabella II. of Spain. This alliance, regarded as a master stroke of policy by the crafty Louis Philippe, nearly led to a rupture between France and Great Britain. After the revolution of 1848, the duke, with the rest of his family, took refuge in England, and having remained a short time in that country, went thence to Holland, where he embarked for Spain, in which country he afterward resided, at Seville. Montpensier, after receiving the title of Infant of Spain, was made captain-general of the Spanish army in 1859. His eldest daughter, Princess Maria, was married in 1864, to her cousin, the Count of Paris, heir-male of the royal house of Orleans. After the flight of Isabella II. from Spain in 1868, the duke was proposed as a candidate for the crown. In 1870 Montpensier killed in a duel, Don Enrique de Bourbon. In 1878, his third daughter, Mercedes, became the wife of King Alfonso XII. of Spain. She died in June of the same year. Montpensier died near Seville, Spain, Feb. 4, 1890.

Montpensier, Catherine Marie de Lorraine, Duchess de, daughter of the Duke of Guise, and wife of the second Louis, Duc de Montpensier; born in 1552. She was noted for her animosity against Henry III., during the wars of the League. She died in 1596.

Montreal, a city in the province of Quebec, Canada, the chief city of the Dominion. It is situated on the S. E. side of the island of Montreal, in the St. Lawrence river, at the head of ocean and the beginning of inland navigation, in N. lat. 45° 30′ 17″ and W. lon. 73° 34′ 38″. The city is 112 miles E. of Ottawa, 160 miles S. W. of Quebec, and 325 miles N. of New York, 420 miles by rail. It is about 625 miles from tide-water by the course of the St. Lawrence, and about 1,000 miles from the Straits of Belle Isle. It is the chief railway center of Canada, being the headquarters of the Canadian Pacific and Grand Trunk, a divisional point of the Great Northern of Canada, the W. terminus of the Intercolonial, and is entered by the New York Central, the Central Vermont, and the Delaware and Hudson railways. Three magnificent bridges cross the St. Lawrence at or near Montreal. The tubular Victoria Jubilee bridge, nearly two miles long, was opened in 1860 as the Victoria bridge by Edward VII., then Prince of Wales, and rebuilt in 1898 as an open-work steel bridge with double tracks and roadways. It belongs to the Grand Trunk railway, and has cost $20,000,000. The Canadian Pacific railway has a steel bridge crossing the river at the head of the Lachine rapids, 7 miles W. of the city; and the Great Northern railway of Canada has a large steel bridge across the Ottawa, near Montreal. The city harbor has been improved by an immense guard-pier, a huge embankment constructed as a protection against "ice-shores" in the spring; and by a revetment to guard against serious floods, from which the lower part of the city formerly suffered.

Built for nearly 7 miles along the river, the city is situated partly on level ground and partly on gently sloping terraces, terminating in the beautifully wooded Mount Royal, which is 740 feet above the river and 900 feet above the sea. The business and a part of the residential section are on the plain, and the better residential streets are on the slopes. The lower and older part is irregularly laid out, and in many places has narrow and dingy streets; the streets of the more elevated part are broad, well built, and shaded. A fine gray limestone, found in abundance in the vicinity, supplies the material for many public and private buildings, and imparts an appearance of solid comfort and elegance to the city. The chief business thoroughfares are Notre Dame, St. James, St. Paul, Craig, Bleury, McGill, and St. Catherine streets. The E. and W. streets are so designated with reference to St. Lawrence boulevard, the French mainly residing in the E. part of the city. In the N. W., near the slopes of Mount Royal, are many of the fashionable residences. Sherbrooke street is perhaps the handsomest residential street; Drummond street also contains many fine houses.

Buildings.—Among the prominent public buildings are the city hall, post office, court house, and custom house; the large Gothic Church of Notre Dame, noted for its fine organ, and containing one of the heaviest bells in America; St. James Cathedral (Roman Catholic), modeled after St. Peter's at Rome and one-third its size; Christ Church Cathedral (Anglican), a beautiful

INTERIOR CHURCH OF NOTRE DAME

specimen of the decorated Gothic style, and by many considered the finest church, architecturally, in the city; the Jesuit Church, noted for its beautiful frescoes and the music of its choral services; St. James Methodist Church, an imposing structure; the Royal Victoria hospital; the famous Château de Ramezay, an old building rich in historical associations, the headquarters of the American general Montgomery in 1775, and of the American commissioners, Benjamin Franklin, Samuel Chase, and Charles Carroll, when they came on behalf of the Continental Congress to persuade the Canadians to join the Thirteen Colonies in their revolt; the Bank of Montreal; the Drill Hall and the Victoria Rifles' Armory; the Windsor Street railway station; the Y. M. C. A. building; the Art Gallery; the Colonial House on Phillips square; the Hôtel Dieu, the leading French hospital; the general offices of the Grand Trunk railway; and many other buildings, including churches, educational institutions, hospitals, convents, business blocks, hotels, clubs, etc.

Squares, Parks, and Statuary.—Dominion square is by far the handsomest and most prominent. It contains a fine statue of Sir John A. Macdonald, the eminent Canadian statesman, and a monument to those who fell in the South African War. Victoria square has a beautiful bronze statue of Queen Victoria. On Phillips square is situated the Art Gallery. The Place d'Armes, which once contained the homes of Sieur Duluth and La Mothe Cadillac (the former one of the explorers of the Upper Mississippi, and the latter the founder of Detroit), is ornamented with a statue of Maisonneuve, founder of Montreal, a notable work of art. Jacques Cartier square has a statue of Nelson, erected by public subscription in 1809, and on market days presents a characteristic phase of the life of the French habitant or small farmer. The Champ de Mars was the parade ground of the former British garrison, and is now used for a similar purpose by the volunteers. St. Louis square, with a small lake and fine trees, is in a quiet and sheltered position, while Viger square, below the Champ de Mars, is frequented by large crowds, and is very popular with the French residents of the district. There are also several smaller squares and open spaces. The leading parks are the Mount Royal, St. Helen's, and Lafontaine. The first (462 acres) is attractively laid out, and offers a splendid view of the city. St. Helen's park, named after Champlain's wife, lies opposite the city, and is reached by ferry. Lafontaine park (84 acres) lies at the E. end of Sherbrooke street.

Churches and Charities.—Besides the Roman Catholic churches already mentioned, there are the Church of Notre Dame de Bonsecours, built in 1657 to commemorate the escape of the city and colony from destruction by the Iroquois; the Church of Notre Dame de Lourdes, with the most beautiful interior of any church in the city; the Franciscan church on Dorchester street; St. Patrick's, the chief church of the Irish Roman Catholics; St. Jacques, St. Henri, Notre Dame de Nazareth, and many other churches. The Protestant churches of various denominations are very numerous. Besides Christ Church Cathedral, the Anglicans possess the churches of St. George, St. James the Apostle, St. Paul's, St. John the Evangelist, and other churches. The Methodist church on Dominion square is noteworthy. The Presbyterians have over 20 churches, including St. Andrew's, a very fine specimen of Scottish Gothic architecture; St. Gabriel's, built in 1792, said to be the first Protestant church in Canada; the American Presbyterian Church; the Erskine Presbyterian, and several other well-built churches. The Jews have 5 synagogues, one of them a very fine building. The leading hospitals are the Montreal General, Royal Victoria, Western General, Hôtel Dieu, Notre Dame, Grey Nunnery, Alexandra, and St. Paul's, the two latter for infectious diseases among the English-speaking and French-speaking inhabitants respectively. Among other charitable and benevolent institutions are the Protestant House of Refuge, the Nazareth Asylum for blind children, the St. François Xavier Orphan Asylum, and the Reformatory. North of Mount Royal park are the Protestant and Roman Catholic cemeteries, the Catholic one having a "Route de Calvaire," with stations of the cross.

Educational Institutions.—First in importance is McGill University, with faculties of medicine, arts, law, and applied science, and including the Royal Victoria College for women, with a conservatory of music, and the Redpath library and museum. Chief of the Roman Catholic educational institutions is Laval University, with faculties of arts, law, medicine, and theology; there are also the Collège de Montreal, or Petit Séminaire, the junior branch of the Seminary of St. Sulpice,which latter is the theological school of Laval University; St. Mary's College for boys, and Loyola College, conducted by the Jesuits; the Montreal School of Medicine and Surgery (French); Mont St. Louis Institute, and a large Catholic high school. Educational work is carried on in the various convents, which also have the oversight of a large number of charitable institutions. Besides McGill University, the Protestants have the McGill normal school, high schools, and the ordinary schools; and the leading denominations have their theological institutions, the Wesleyan, Diocesan, Congregational, and Presbyterian colleges, which are affiliated to McGill. The Peter Redpath museum

and library respectively contain a good geological collection and a rich collection of scientific and Canadian historical books. The Natural History Museum on Drummond street is rich in collections of Canadian natural history and ethnology. The Château de Ramezay has valuable antiquarian and Indian collections and a free library. The Fraser Institute also has a free public library. The Art Gallery on Phillips square has a fine collection of paintings, bronzes, etc., and fine loan collections are frequently in view.

Newspapers, Clubs, etc. — The leading daily newspapers are the "Gazette," founded in 1777 and published regularly since 1795; the "Herald," "Witness," "Star," "La Patrie," "La Presse," and "Le Canada," besides a large number of weekly, monthly, and quarterly periodicals in both English and French. The principal clubs are the Mount Royal, St. Denis, Canada, Montreal, and Club Canadien de Montreal, besides many sporting organizations such as the Amateur Athletic Association, Forest and Stream Country Club, etc. The leading theaters are His Majesty's, Théâtre des Nouveautés, Academy of Music, Théâtre Français, Théâtre Royal, and the Arena, besides several music and concert halls. There are also a number of large skating rinks and toboggan slides for the winter sports for which Montreal is famous. The hotels include the Windsor, Place Viger, St. Lawrence Hall, Queen's, etc.

Commerce and Industry.—Montreal is the chief port of entry for Canada, and has a large and growing commerce. As the Atlantic terminus of the canal system which leads to Lake Superior, it commands a large part of the freight traffic destined for Europe. Several lines of ocean steamers have their headquarters here. In 1906 the value (provisional) of its imports was $80,821,740; exports, $81,589,542. The chief imports are iron and steel goods, machinery, tea, coffee, wine, glass, woolen and cotton goods, etc. The chief exports are timber, butter and cheese, cattle, grain, flour, apples, phosphates, etc. The manufactures include clothing, woolen and cotton goods, milling and other machinery, boots and shoes, carriages and wagons, paints, electrical appliances, rubber goods, silk, sugar, beer, tobacco, etc. According to the Dominion census of 1906 the value of the manufactured output in 1905 was $99,746,772, as compared with $71,099,750 in 1900, an increase of 40.29 per cent. The total capital invested in manufactures was about $100,000,000, employing about 63,000 wage-earners. The tonnage of ocean-going ships entering the harbor in 1905 was 1,940,056 tons, four-fifths of which was British. Montreal is the financial center of the Dominion, and the Bank of Montreal is one of the leading financial institutions of the continent.

Montreal

Government and Finance.—The government is vested in a mayor, elected for two years, and a council of 35 aldermen, also elected for two years. The fire and police departments are directly under the control of the city. The water supply, obtained from the Ottawa river, is pumped up into two reservoirs on the side of Mount Royal, the main one, 200 feet above the river level, having a capacity of 36,500,000 gallons, and another, 210 feet higher, affording a high-pressure service available for the highest buildings. The management of the harbor is controlled by a board of commissioners. The assessed value of taxable property in 1906 was $182,501,262.

History and Population.—Montreal, originally called Ville Marie, was founded by Maisonneuve in 1642, on the site of a fortified Indian town named Hochelaga (the name now applied to the eastern section of the city), visited by Jacques Cartier in 1535. The site was also visited in 1603 by Champlain, when the town no longer existed; he returned in 1611, and founded a trading station, which he named Place Royale, on the site of the present custom house. Two purposes—conversion of the Indians and the fur trade—animated the early settlers. The first was heroically pursued chiefly by the Jesuit missionaries, and the second by a monopolist company, which did much to thwart the healthy growth of the town. Struggles with the Iroquois Indians, the relentless foes of the Algonquin allies of the French, took up a large share of the life of Montreal, culminating in the terrible massacre at Lachine, in 1689, in which about 400 of the inhabitants perished. But great progress had been made in the fur trade, and in 1672 Montreal had become the entrepôt of that trade, and many expeditions of exploration and conquest were organized here. The city was not the immediate object of British hostility in the long war between France and England for the possession of Canada; and it did not surrender to the British until Sept. 8, 1760, nearly a year after the fall of Quebec. The Quebec Act, by which the French were guaranteed in the possession of their civil and religious privileges, won the support of the inhabitants of the city and colony, so that when the American commissioners came under the instructions of the Continental Congress to secure the coöperation of Canada in the Revolutionary War, they met with failure. The city was occupied by General Montgomery in 1775, but his troops were soon withdrawn. In 1809 the second steamer built in America began regular trips from Montreal to Quebec. The city became in 1844 the capital of Canada under the legislative union of 1841, but after the destruction of the Parliament buildings in 1849 by a mob, the seat of government was in 1850 removed to Toronto. The British garrison

was removed in 1870. The opening of the Lachine canal in 1825, and of the Grand Trunk railway in 1852; the establishment of the Allan line of steamers in 1856, which made the city an important ocean port; and the opening of the Victoria tubular bridge in 1860, were the leading events in the commercial development of Montreal. In 1905 the small municipality of Ste. Cunégonde, to the S. of Montreal, was annexed, and in 1906 the city of St. Henri, lying to the S. of Ste. Cunégonde, with an area of 344 acres and a population in 1905 of 26.000. Pop. (1844) 44.093; (1851) 37,715; (1861) 90,-323; (1871) 107,225; (1881) 140,747; (1891) 216,644; (1901) 267,730. These are the figures of the Dominion census, but in 1910 the population, with suburbs, was estimated at 500,000. More than half of the total is of French descent; one-sixth is Irish, one-seventh English, and one-thirteenth Scotch.

Montreal, an island of Canada, in the St. Lawrence river, at the confluence of Ottawa river, 32 miles long, and 10½ broad, containing the city of Montreal. The surface is generally level (with the exception of Mount Royal), and the soil is for the most part fertile and well cultivated.

Montrésor, Frances Frederica, an English novelist; born near Walmer, Kent, England. She wrote: "Into the Highways and Hedges" (1895); "False Coin or True" (1896); "Worth While" (1896); "At the Cross Roads" (1897); etc.

Montreux (môn*g*-truh′), a group of villages on the N. shore of the Lake of Geneva, 15 miles S. E. of Lausanne. The name properly belongs to one small hamlet, but is popularly extended so as to include the adjoining villages of Clarens, Vernex, Veytaux, etc. The beautiful situation and mild climate of "the Swiss Nice" attracts many invalids to the place, which abounds with hotels and boarding-houses. Near it is the castle of Chillon.

Montrose, a seaport of Forfarshire, Scotland, 76 miles N. N. E. of Edinburgh and 42 S. S. W. of Aberdeen, on a level peninsula between Montrose Basin (a tidal loch, 2 by 1¾ miles, but almost dry at low water) and the mouth of the river South Esk. A fine suspension bridge (1829), 432 feet long, leads to Inchbrayock or Rossie Island, in the Esk's channel, and is continued thence by a drawbridge; and there is also a railway viaduct (1883). Montrose has a plain town hall (1763–1819); a large parish church (1791–1834), with a steeple 200 feet high; an academy (1820); a lunatic asylum (1868), 2 miles N. N. W.; good links; and a wet dock (1840). The foreign trade (timber its staple), is chiefly with the Baltic and Canada; and the average tonnage of ships entering the port exceeds 90,000 tons per annum. Flax spinning is the principal industry; and ropes, canvas, soap, etc., are also manufactured. Montrose was the birthplace of Robert Brown, botanist; Joseph Hume; Sir Alexander Burnes; and Paul Chalmers. It has memories, too, of Edward I., the two Melvilles, the Great Marquis, the Old Pretender, Dr. Johnson, and Lola Montez. Pop. (1901) 12,427.

Montrose, James Graham, Marquis of, a Scotch noble, and a distinguished royalist leader under Charles I., known, in

MARQUIS OF MONTROSE.

English history, as the "Great Marquis"; born in Edinburgh, Scotland, in 1613. He received an excellent education, which was improved by a residence in France, where he held a commission in the Scots Guards. On his return home he experienced such neglect through the jealousy of the Marquis of Hamilton, as induced him to join the Covenanters; but he afterward took a very active part on the side of the king, was created a marquis, and in a few months gained the battles of Perth, Aberdeen, and Inverlochy. In 1645 his fortune changed; and after suffering a defeat from Lesley, at Philiphaugh, near Selkirk, he was obliged to leave the kingdom; in 1648 he landed in Orkney with a few followers, but was soon overpowered, conveyed to Edinburgh, and there decapitated and quartered May 21, 1650.

Montserrat (mont-se-rat′) (Latin Mons Serratus, so named from its saw-like outline), a mountain of Catalonia, in N. E. Spain, 30 miles N. W. of Barcelona. Its height is 4,055 feet; and "its outline," says Ford, "is most fantastic, consisting of cones, pyramids, buttresses, ninepins, sugar-loaves." The pious Catalonians aver that it was thus shattered at the Crucifixion. Every rift and gorge is filled with box trees,

ivy, and other evergreens. From the topmost height the eye wanders over all Catalonia. The mountain, however, owes its celebrity to the Benedictine abbey built halfway up it, with its wonder-working image of the Virgin, and to the 13 hermitages formerly perched like eagles' nests on almost inaccessible pinnacles. In 1811 the French, under Suchet, plundered the abbey, burned the library, shot the hermits, and hanged the monks (who had given shelter to their emigrant brethren at the Revolution). The place suffered still more in 1827, when it became the stronghold of the Carlist insurrection.

Montserrat, one of the Lesser Antilles, belonging to Great Britain; 27 miles S. W. of Antigua; length about 11 miles, breadth 7 miles; area 32 square miles; pop. (1901) 12,215. The surface is very mountainous (3,000 feet), and heavily timbered. Sugar and limes and lime juice are the principal products. The island, ruled by a president and a legislative council, is the healthiest in the West Indies. The imports average nearly $125,000, and the exports $105,500. The island was discovered in 1493, and colonized by the British in 1632. It has remained in their hands ever since, except for two short intervals (1664–1668 and 1782–1784), when it was in the possession of France. Chief town, Plymouth.

Mont St. Michel (mông *sang* mē-shel′), a steep, fortified, isolated rock, in Mont St. Michel Bay, off the coast of the department of Manche, France, 15 miles S. S. E. of Granville. On its summit is an irregular town, with an abbey and a church dating from the 11th century. Its ancient castle, formerly a prison, has been restored. Its solid ramparts date from the 13th, 14th, and 15th centuries; in 1880 it was connected by a dyke with the mainland. The whole bay, 15 miles wide at the mouth, 8 miles N. to S., is nearly dry at low water.

Montyon (mông-tyông′) **Prizes,** rewards for signal instances of disinterested goodness discovered throughout the year, awarded by the French Academy, according to the will of Jean-Baptiste-Robert Auger, Baron de Montyon (1733–1820), who bequeathed $600,000 to public hospitals, and the remainder of his fortune to give sums of money to poor patients on leaving Paris hospitals, and to found the prizes since connected with his name. Already in 1782 he had originated the prize of virtue, but on his return to France in 1815 he arranged the scheme in its final form. The Academy of Sciences awards annually a prize of $2,000 to the individual who has discovered the means of making any mechanical occupation more healthy, another of equal value for improvements in medicine and surgery; while the Forty themselves award the prize of virtue, and another to the writer of the work likely to have the greatest beneficial influence on morality — both alike of $2,000 a year. The last are usually divided among several recipients, and for these there seems to be a somewhat liberal standard of interpretation. In 1885 the Academy accepted a legacy of $2,000 to recompense particularly filial piety. A society was formed in 1833 to publish cheap lives and portraits of all men to be regarded as benefactors to their species. A medal bearing the heads of Montyon and Franklin was struck at its foundation, and a gold medal is given every year.

Monumental City, Baltimore, Md. It contains the Washington, Battle, and many other monuments, whence its title.

Monza (mōn′zä) (ancient Modœtia), a town of Italy, on the river Lambro, 9 miles N. N. E. of Milan; it has an interesting town hall (1293), a royal palace (1777), and manufactures of cottons, hats, leather, etc. The ancient capital of the Lombard sovereigns, Monza owed much of its early importance, and its chief public edifices, to Theodelinda; and in the Middle Ages, in spite of 32 sieges, it was conspicuous for the wealth of its numerous citizens and nobles, and the extent of its cloth trade. The cathedral, founded in 595 by Theodelinda, contains many interesting relics of this queen. The famous Iron Crown, removed to Vienna in 1859, was restored in 1866. King Humbert was assassinated here in 1900. Pop. (1909) 42,599.

Moodie, Susanna, a Canadian poet, sister of Agnes Strickland; born in Reydon Hall, Suffolk, England, Dec. 6, 1803. She wrote: "Enthusiasm and Other Poems" (1829); "Roughing it in the Bush, or Life in Canada" (2 vols. 1852); "Matrimonial Speculations" (1854); and "The Monctons" (2 vols. 1856). She died in Toronto, Canada, April 8, 1885.

Moodkee. See Mudki.

Moody, Dwight Lyman, an American evangelist; born in Northfield, Mass., Feb. 5, 1837; received a common school education; united with the Mount Vernon Congregational Church in Boston in 1850; settled in Chicago, Ill., in 1856, and there built up a mission Sunday-school with more than 1,000 pupils. He subsequently built a church in Chicago, which was destroyed in the great fire in 1871, but was afterward rebuilt under the name of the Chicago Tabernacle. In 1873 he began, with Ira D. Sankey, the evangelistic work which soon made him famous. He met with unparalleled success both in the United States and Great Britain. In 1879 he founded a school for poor girls at Northfield, Mass., which later grew into the celebrated Northfield and Mount Hermon institutions. It is said that during his ministry, Mr. Moody addressed over 50,000,000 people. His publi-

cations include "The Second Coming of Christ" (1877); "Secret Power, or the Secret of Success in Christian Life and Work" (1881); "The Way to God, and How to Find It" (1884); etc. He died in Northfield, Mass., Dec. 22, 1899.

Moody, William Henry, an American jurist; born in Newbury, Mass., Dec. 23, 1853; was graduated at Harvard in 1876; Member of Congress in 1895-1902; Secretary of the Navy in 1902-1904; United States Attorney-General in 1904-1906; became an Associate Justice of the United States Supreme Court Dec. 17, 1906; resigned Oct. 4, 1910.

Mooltan. See MULTAN.

Moon, the single satellite attendant on the earth. Its diameter is 2,160 miles, that of the earth (which is 7,918) being

A MOON LANDSCAPE.

nearly four times as great. Its superficial extent is about a 13th part of the earth's surface; its bulk is $\frac{1}{49}$ that of the earth, but as the earth is relatively heavier, its weight is about 80 times that of the moon. As the moon revolves around the earth it manifests phases. After absence for a few nights it reappears as a delicate crescent of white light in the W. sky after sunset. Night after night it moves farther to the E., the illuminated portion of its disk continually increasing till the moon becomes full and rises about sunset. When the light of the moon has again so diminished that it is in its last quarter, it is seen high in the heavens in the morning. When it becomes full, the sun and the earth are so nearly in a straight line that the moon narrowly escapes being eclipsed; when new moon is again reached, the sun is nearly undergoing similar obscuration (see ECLIPSE). The moon shines only by the light of the sun reflected from its surface. To equal the brilliance of the sun 600,000 full moons would be required. The moon appears at all times nearly of the same size, showing that its orbit cannot be far from circular. Its average distance is 240,000 miles, varying at times between 220,000 and 260,000, but the ordinary fluctuations do not exceed 13,000 miles on either side of the mean value. The moon performs a complete revolution around the earth in 27 days, 7 hrs., 23 min., and 11.461 secs. This is called its sidereal period. The lunar month is longer than the sidereal period by 2 days, 5 hrs., 51.41 secs., because of the advance of the earth in the orbit between two successive conjunctions of the moon. As the moon revolves on its own axis nearly in the some time as it completes its orbit round the earth, it presents to us at all times nearly the same side of its surface. No clouds appear on it; apparently there is no water to send them forth or an atmosphere in which they may float. The whole surface is studded with volcanoes, apparently extinct. Their craters are broad, beyond anything existent on the earth. Tycho is 50 miles across, so is Aristotle, Theophilus is 64, and Petavius 78. Some are 16,000 and 17,000 feet deep. From the absence of an atmosphere the moon must be uninhabitable by any life analogous to that with which we are acquainted. Early in 1898, Dr. George Waltemath, a German astronomer, announced the discovery of a small, "dark" moon near the earth, large enough to disturb the moon's motion. The discovery awaits confirmation, but the fact is not improbable. Prof. Richard A. Proctor, in his "Other Worlds Than Ours," expresses the opinion that the earth is attended by several dark moons. Also a satellite of any planet; a month, the period of a revolution of the moon round the earth; anything resembling the moon in shape; a crescent; specifically, in fortification, a crescent-shaped outwork, a half moon. A blue-moon, an expression equivalent to the Greek kalends, never. In the moon; beyond the moon, beyond reach; extravagantly; out of depth. Moon in distance, in nautical language, a phrase denoting that the angle between the moon and the sun, or a star, admits of measurement for lunar observation.

Moon, Mountains of the, a high chain of mountains supposed by Ptolemy and many able geographers to cross the continent of Africa from E. to W. On the earlier charts they were placed behind the fertile regions which line the S. side of the Mediterranean, separating them from the Great Desert; but as explorations have been pushed toward the heart of the "dark continent" the location of the mountains has been gradually changed by geographers southward. Dr. Beke, from his own researches and a minute study of the geography of East Africa, propounded the theory that the so-called Mountains of the Moon run from N. to S. parallel to the coast of Zanzibar, forming, in fact, a continuation of the great Abyssinian table-land, and em-

bracing the snow-capped mountains of Kenia and Kilima-Njaro, which have an altitude of 20,000 feet.

Moon Culminations, the transits of the moon across the meridian of a place. The term derives its special significance from the use made of these transits (observing the difference of right-ascension between the moon and neighboring stars) for the determination of terrestrial longitudes, the moon and the same sets of stars (called moon culminating stars) being observed at different places on the same nights.

Mooney, James, an American ethnologist; born in Richmond, Ind., Feb. 10, 1861. From a boy of 12 his specialty was Indian ethnology. He wrote: "Medical Mythology of Ireland" (1887); "Funeral Customs of Ireland" (1888); "Holiday Customs of Ireland" (1890); "Myths of the Cherokees"; "Siouan Tribes of the East"; "The Messiah Religion and the Ghost-Dance"; "Calendar History of the Kiowa Indians"; "Myths of the Cherokees"; etc.

Moonshiner, a term applied in the Southern and Western States to makers of illicit whisky, and sometimes, but very rarely, to smugglers of whisky that has been legitimately manufactured.

Moonwort (*Botrychium lunaria*), an interesting fern, native of Great Britain, and widely distributed over Northern Europe, penetrating to within the Arctic regions and Asia, and along with the few other species of which the family is composed appearing also in North America. The plant is of simple structure, consisting of a root-stock bearing a single erect stem from three to six inches high. A single pinnate leaf springs from the stem about midway from root to apex, the segments being half-moon shaped, pale green, and of thick consistence. The fructification is developed on a branched spike, pyramidal in outline, from one to two inches long, the branches all turning to one side. *B. virginicum*, the largest growing species, is named the rattlesnake fern, from the circumstance that it generally abounds in places frequented by that reptile.

Moor, a native of the N. coast of Africa, which formed the ancient Mauritania, now represented by the countries of Morocco, Algeria, Tunis, and Tripoli. In 709 the Arabs conquered Mauritania, and converted the people to Mohammedanism. The conquerors and the conquered amalgamated together, and in 711 an army of this mixed population, under Arab leaders, crossed at the Straits of Gibraltar, and began the conquest of the Spanish peninsula. This they speedily effected, with the exception of the mountainous districts of Asturias and Galicia. When almost the whole of the rest of Europe was sunk in ignorance and barbarism, learning and the arts flourished among the Moors in Spain, where some remarkable monuments of their labors are still to be seen. About the middle of the 11th century, many of the local governors threw off their allegiance, and established themselves as independent potentates. The wars that followed so weakened the power of the Moors, that the Christians rose against them under Alfonso, "the battler," and took Castile, with its capital, Toledo. Their progress was for a time checked; but subsequently they continued to extend their conquests till the power of the Moors was restricted to the kingdom of Granada, and in 1238 the king of that territory became the vassal of Ferdinand III., King of Castile. At length, in 1491, Ferdinand V., King of Castile and Aragon, after a 10 years' war, conquered this also, and put an end to the dominion of the Moors in Spain, after it had lasted nearly 800 years. A portion of the Moors then returned to Africa; but most of them remained in Spain, where they became peaceful and industrious subjects, and adopted generally the external forms of Christianity. Philip II., however, in his hot zeal for Catholicism, resolved on their entire destruction, and by his oppressions and cruelties, drove them into insurrection, in Granada (1571), after the suppression of which, over 100,000 of them were banished. Their expulsion from the country was completed by Philip III.; and this has been regarded as one of the leading causes of the subsequent decline of Spain; for they were ingenious and industrious citizens, and, after their departure, agriculture, trade, and manufacture fell into decay. The term Moor is frequently used in a very loose sense, particularly by Spanish writers, denoting sometimes the Mohammedan inhabitants of Northern Africa, and sometimes even the whole Mohammedan or Moslem race. Even the Turks, who, in descent, language, and everything but religion, are foreign and alien to both Moors and Arabs, are sometimes spoken of as Moors.

Moore, Fort, an ancient defensive work near Sand Bar Ferry, on the Savannah river, Ga.

Moore, Charles Leonard, an American poet; born in Philadelphia, Pa., March 16, 1854. A lawyer there, he was consul at San Antonio, Brazil, 1878–1879. He wrote: "Poems, Antique and Modern" (1883); "A Book of Day-Dreams" in verse; and "Banquet of Palacios," a comedy.

Moore, Clement Clarke, an American author; born in New York city, July 15, 1779. He was the compiler of the first Hebrew and Greek lexicon published in America, and the author of a book of "Poems" (1844), in which is included his best-known poem, "A Visit from St. Nicholas" ("'Twas the night before Christmas"). He was the donor of the extensive grounds on which the General Theological Seminary, New

Moore

York city, stands. He died in Newport, R. I., July 10, 1863.

Moore, Edward, an English dramatist; born in Abingdon, England, March 22, 1712. He was editor of "The World" (1753), to which Lyttelton, Pulteney, Chesterfield, Soame Jenyns, Horace Walpole, and others of distinction were contributors. He wrote "Fables for the Female Sex" (1744); "The Foundling" (1748) and "Gil Blas" (1751), comedies; "The Gamester" (1753, with Garrick, often reprinted), a highly successful tragedy; "Poems, Fables, and Plays" (1756). ("Dramatic Works," 1788.) He died in London, March 1, 1757.

Moore, Frank Frankfort, a British dramatist; born in Limerick, Ireland, May 15, 1855. He wrote the following novels and romances: "Sojourners Together"; "Told by the Sea"; "The Fate of the Black Swan"; "Tre, Pol, and Pen"; "Fireflies and Mosquitoes"; "Under Hatches"; "One Fair Daughter"; "His Friend's Infirmities"; "The Slaver of Zanzibar"; "Coral and Cocoanut"; "The Silver Sickle"; "The Ice Prison"; "I Forbid the Banns"; "A Grey Eye or So"; "They Call it Love"; "Phyllis of Philistia"; "The Secret of the Court"; "The Sale of a Soul"; "Two in the Bush"; "Dr. Koomadhi of Ashantee"; "In Our Hours of Ease"; "The Impudent Comedian"; "The Jessamy Bride"; "The Millionaires"; "The Fatal Gift"; "A Whirlwind Harvest"; "Well After All" (1899); "Nell Gwynn" (1900); "The Capture of Coralie" (1900); etc. Also the plays: "Darwin in the Drawing-room"; "A March Hare Hunt"; "Moth and Flame"; "Broken Fetters"; "Forgotten"; "The Queen's Room"; "The Mayflower"; "Oliver Goldsmith"; "The Discoverer"; and "Kitty Clive." In 1876 he joined the staff of the Belfast "News Letter," as literary and art editor, but in 1893 relinquished this post and went to London.

Moore, George, an English author; born in 1859. Among his novels are: "A Modern Lover" (1883); "A Mummer's Wife" (6th ed. 1885); "A Drama in Muslin" (1886); "Confessions of a Young Man" (1888); "Esther Waters" (1894); etc. He wrote also in verse: "Flowers of Passion" (1877); "Pagan Poems" (1881); and the volumes of essays "Impressions and Opinions" (1891), "Modern Painting" (1893).

Moore, George Henry. an American historian; born in Concord, N. H., April 20, 1823. He published: "The Treason of Charles Lee" (1858); "Employment of Negroes in the Revolutionary Army" (1862); "Notes on the History of Slavery in Massachusetts" (1866); and "Washington as an Angler" (1887). He died in New York city, May 5, 1892.

Moore, Horatio Newton, an American dramatist; born in New Jersey in 1814. His first work of importance, "Orlando, or Woman's Virtue," a tragedy, was published at 19; "The Regicide," a five-act drama, at 20. His short novel "Mary Morris" (1840) was very popular. The "Lives of Marion and Wayne" was issued in 1854. He died in Philadelphia, Pa., Aug. 26, 1859.

Moore, John, a Scotch physician and author; born in Stirling, Scotland, in December, 1729. Educated at Glasgow, he there studied medicine, and there began to practise, after spending some time in Holland (as army surgeon), in London, and in Paris. As medical attendant to the young Duke of Hamilton he traveled six years on the Continent, and on his return (1778) settled in London. His "View of Society and Manners in France, Switzerland, Germany, and Italy" (4 vols. 1779–1781) was well received; but the novel "Zeluco" (1789), which suggested Byron's "Childe Harold," is today the least forgotten of his works. These include two other novels, "Medical Sketches," and a couple of books on the French Revolution. He died in Richmond, Jan. 21, 1802.

Moore, Sir John, a British military officer, son of the preceding; born in Glasgow, Scotland, Nov. 13, 1761. Having obtained an ensign's commission in the 51st Regiment, he served at Minorca, in the American war, as Brigadier-General in the West Indies (1795), in Ireland during the rebellion of 1798, in Holland in 1799, and in Egypt in 1801, where he was severely wounded in the battle which cost Sir Ralph Abercrombie his life. Moore was now regarded as the greatest living British general, and in 1805 he was knighted. In 1808 he was appointed commander-in-chief of the British army in Portugal to operate against Napoleon. He advanced to Salamanca in spite of the gravest difficulties, but was finally compelled to retreat to Corunna, a distance of 200 miles, in face of a superior force. This he accomplished in a masterly manner; but the absence of the fleet to receive his army forced him to a battle against Marshal Soult, in which Moore fell, mortally wounded, in the hour of victory, Jan. 16, 1809.

Moore, Thomas, an Irish poet; born in Dublin, Ireland, May 28, 1779. He was the son of a Catholic grocer. From the school where Sheridan had been educated, he passed in 1794 to Trinity College, and thence, after taking his B. A., in 1799, to the Middle Temple, London. His translation of Anacreon, which came out in 1800, was dedicated to the Prince of Wales, his patron then, but the butt from 1813 of his satire. It proved a great hit, and, with his musical talent, procured him admission to the best society. In 1801 followed the "Poetical Works of the late

Thomas Little." In 1803, through Lord Moira's influence, he was appointed registrar of the Admiralty court at Bermuda. He went there to arrange for a deputy, and after a tour in the United States and in Canada, returned in a year to England. For his "Odes and Epistles" (1806) he was sharply taken to task in the "Edinburgh." The bulletless duel with Jeffrey was the consequence, over which Byron made so merry, but which left the non-combatants fast friends for life. In 1811 he married an actress, Bessy Dyke (1793–1865). Meanwhile he had published the earlier of the "Irish Melodies" (10 parts, 1807–1834), and "The Twopenny Post-bag" (1812). Now he became anxious to emulate his brother-poets, who published in quartos. He fixed on an Oriental subject, and in 1817 the long-expected "Lalla Rookh" appeared. After the publication he went with Rogers to Paris, and there wrote "The Fudge Family" (1818). For "Lalla Rookh" the Longmans paid him $15,000; the "Irish Melodies" brought in $2,500 a year; but Moore had "a generous contempt for money"; and about this time his Bermuda deputy embezzled $30,000. Moore's liability was reduced by compromise to $5,000, which he ultimately paid by his pen; but in 1819, to avoid arrest, he went to Italy with Lord John Russell. He spent five days at Venice with Byron (his friend since 1811), went on with Chantrey to Rome, and then with his family fixed his abode in Paris, where he wrote "The Loves of the Angels" (1823) and a prose romance, "The Epicurean" (1827). He returned in 1822 to Sloperton; and here, except for occasional "junketings" to London, Scotland, and elsewhere, he passed his last 30 years. To those years belong the "Memoirs of Captain Rock" (1824), the "History of Ireland" (1827), and the "Lives" of Sheridan (1825), Byron (1830), and Lord Edward Fitzgerald (1831). in 1835 he received a pension of $1,500, but his last days were clouded by sorrow and suffering — the loss of his two sons, and the decay of his mental faculties. He died near Devizes, England, Feb. 25, 1852.

THOMAS MOORE.

Moore's Hill College, a coeducational institution in Moore's Hill, Ind.; founded in 1854 under the auspices of the Methodist Episcopal Church; has grounds and buildings valued at over $115,000; aggregate endowment funds, $25,000; volumes in the library, about 6,000; scientific apparatus, etc., $4,000; average number of faculty, 20; average students, including summer school, 300; ordinary income, $12,000.

Moorish Architecture, that form of Saracenic architecture which was developed by the Moslem conquerors of Spain in building their mosques and palaces. Its main characteristics are — the horseshoe arch, varied by the trefoil, cinquefoil, and other forms of arch; profuse decoration of interiors by elaborately designed arabesques in low relief, enriched by colors and gilding, as well as by geometrical designs worked in mosaics of glazed tiles; the slenderness of the columns in proportion to the supported weight; and the curious stalactitic pendentives by which the transition is effected from the rectangular ground plan to the arched or domed roof. An important specimen of this style is the mosque of Cordova, now the cathedral, which was begun by Caliph Abd-el-Rahman (786), completed by his son, and subsequently much altered. It consisted originally of 11 aisles, and the eight aisles which were afterward added (976–1001) made it one of the largest buildings in Europe, but the effect of its great extent, 420 feet by 375, is marred by its height, which is only about 30 feet to the roof. Another notable specimen of Moorish architecture is the Giralda or cathedral tower of Seville. It is supposed to have been built by Abú Yusúf Yakúb (1171) as a tower of victory, and was used by the Moslems as a minaret or mueddin tower. The base is a square of about 50 feet, from which the tower rises straight for 185 feet, and is now crowned by a belfry added in the 16th century. The lower part of this tower is nearly plain, but from about one-third of its height upward it is enriched by sunk panels filled with ornamentation in relief, which give lightness and grace to the structure without affecting its general massiveness. The most characteristic Moorish palace in existence is the Alhambra in Granada, an immense structure of simple and rather forbidding exterior, but within gorgeous almost beyond description (see ALHAMBRA). In this palace are found to perfection the distinctive characteristics of Moorish architecture.

Mooruk (*Casuarius Bennettii*), a variety of cassowary, inhabiting the island of New Britain, where it is made a great pet with the natives. It is very swift of foot.

Moose Deer. See ELK, MOOSE.

Moplas, a race of Southern India, mainly near the Malabar coast, who as fanatical Mohammedans have caused trouble by out-

breaks. Descended from the old Arab traders, they number about 700,000.

Mopsus, a famous legendary Greek prophet, son of Apollo, and grandson of Tiresias. He vanquished Calchas in prophetic skill, and fell by the hand of the prophet Amphilochus, whom he at the same time slew.

Moqui (mō-kē′) **Indians,** a semi-civilized people living in seven towns in Northern Arizona. The first accounts of them date from the expedition of Coronado in 1540. Their history is strikingly similar to that of the town-building Indians of the Territory of New Mexico, except that after a successful revolt against the Spaniards, in 1680, they remained independent. They are kind-hearted and hospitable, cultivate the soil, raising grain and vegetables, and possessing large flocks of sheep and goats. They weave very fine blankets, an art which they have taught several neighboring tribes. The houses are built of stone, set in mortar, and for security are perched upon the summits of almost inaccessible mesas. They number about 1,600.

Mora, in Scots law, a general term applicable to all undue delays in the prosecution or completion of an inchoate bargain diligence, or the like; the legal effect of which may be to liberate the contracting parties, or to frustrate the object of the diligence. In the United States, England, and Ireland the corresponding word is Lache (*q. v.*).

Mora, a game, played in Italy, between two persons, one of whom raises the right hand, and suddenly throws it down with all or some of the fingers extended, the object of his opponent being to guess the number of these extended fingers.

Moradabad (mō-rä-dä-bäd′), a town of British India, capital of a district, and center of a large trade in country produce; on the Ramganga, 100 miles E. by N. of Delhi. It is noted for its metal-work. Pop. (1901) town, 75,128; dist. 1,191,993.

Moraine (-rān′), in physical geography and geology, the debris of rocks brought into valleys by glaciers. There is always one line of blocks on each edge of the icy stream, and often several in the middle, where they are arranged in long ridges or mounds sometimes many yards high.. The former are called lateral, and the latter, which are considered by Agassiz to have arisen from the confluence of tributary gla-

MOORISH MOSQUE, CAIRO.

ciers, medial moraines. A large portion of these rocky fragments at length reaches the end of the glacier, and here the melting ice leaves it as a huge mound which is known as a terminal moraine.

Moran, Edward (-ran'), an American painter; born in Bolton, England, Aug. 19, 1829. He removed to Philadelphia in 1844; studied art under Hamilton and Weber, and first exhibited in 1853. In 1862 he went to Europe, in 1869 took up his residence in New York, but in 1877 settled in Paris. He was noted as a marine painter, but in later years turned to figure painting. Among his works are "Launch of the Life-boat," "The Lord Staying the Waters," "Outward Bound," and many views of New York bay. He died in New York city June 9, 1901.

Moran, Robert, scarcely yet in middle life, is perhaps the most notable case of individual achievement in the Northwest. Born in New York in 1857, his childhood was hard and toilsome. At the age of 14 he had left home, gone to Cincinnati and was doing a man's heavy work in the great rolling mills. Twelve hours over red-hot iron and before the heat of the blazing furnaces was not enough for this ambitious youth. He studied long hours after others slept. In 1874 he packed his few possessions and went to New York, there to pay his last cent for passage to San Francisco, via Panama. Before he reached San Francisco, an unknown philanthropist discovered that this boy of 17 was "broke" and after urging him to go on to Seattle, where the great city of the Pacific coast was one day to be, paid his fare. When Robert Moran reached Seattle, early in 1875, he had not a penny. His education was such as a boy may gain who has worked in a rolling mill from the day he was old enough to run about. Gaining a job as fireman on a Sound steamer he bought books and a drawing board and when he was not working he studied diligently. He was carried as assistant fireman on the old "Cassiaire" to the Sticksen river and there within a year, by his superior nerve and coolness in times of danger, he was made chief engineer and pilot. Old timers tell how he stood 72 hours at his post, eating such food as was brought to him. The first money he could save went East, and in due time his mother, his sisters and his brothers joined him in Seattle, and within 10 years Moran Brothers had the best machine shop in the Northwest. There were many triumphs during these 10 years, notable among them was his first contract from the government for the construction of great pumps at the then embryonic navy yard at Port Orchard. The officials passed him by, but he sought and impressed them with his force, went home, drafted and designed all night and was on hand the next day with figures that gained him $110,000 worth of work and the admiration of every man he met. Not a figure or design of his was changed and he was on his feet. The great fire of 1889, when $12,000,000 worth of Seattle property went back to the elements, brought out another trait in his character. He had meanwhile been made mayor, and but a few days before he had collected thousands of dollars for the Johnstown sufferers. On June 6, 1889, he stood at his post in the center of the city fighting fire when word came that his own plant could be saved if he would go down there and direct operations. He refused. His duty was in the center of the city and there he remained while everything he owned was in flames. He was everywhere that night. He directed and controlled excited men. He preserved order and closed every saloon. When he was not obeyed he smashed in liquor casks and destroyed bar-rooms. At four o'clock on the morning of June 7, hatless, coatless, looking more like a black than a white man, he stood on the ruins of his dearly loved plant, chewed his cigar and reflected. Within an hour he had men at work building other foundations and at noon was back in the city presiding over a meeting that sent the thousands so sorely needed in Seattle to Johnstown. Without a dollar in the world he managed to rebuild that plant and the brothers had so far prospered in 1896 as to build the torpedo boat "Rowan" and to exceed the speed required. What wonder they succeeded: Nothing could keep them down. The man who reached the Pacific coast, a penniless boy, hardly able to read and write, is today a famous mathematician.

Moran, Thomas, an American painter, brother of E. Moran; born in Bolton, England, Jan. 12, 1837. Coming to the United States, he was apprenticed to an engraver at Philadelphia, and commenced painting water-color landscapes in 1856. He visited Europe in 1861 and studied the paintings of Turner. In 1871 he accompanied Prof. F. V. Hayden's expedition to the Yellowstone river, and in 1873 Major Powell's expedition to the Colorado river. As a result of these journeys he painted "F. V. Hayden's expedition to the Yellowstone," and "The Chasm of the Colorado," now in the capitol at Washington.

Moratin, Nicolas Fernandez de, a Spanish poet; born in Madrid, Spain, July 20, 1737. He was Professor of Poetry in the Imperial College, Madrid. His best work, and one of the best epics in the language, was "The Ships of Cortés Destroyed" (1785). He wrote besides "Diana" (1763), a fine didactic poem; comedy "The Belle" (1762), and the tragedies "Lucrecia," "Hormesinda" (1770), etc. He died in Madrid May 11, 1780.

Morava (mō-rä′vä), the chief river of Moravia, a tributary of the Danube, which it joins after a course of about 200 miles.

Moravia (German, Mähren), a N. W. province or crownland of the Austrian empire; area, 8,583 square miles; pop. (1900) 2,437,706. It is inclosed by the Carpathians and other mountains, and belongs almost entirely to the basin of the March or Morava (from which it takes its name), a tributary of the Danube. The minerals are of considerable importance, and include iron, coal, graphite, and slate. Nearly 97 per cent. of the soil is productive, the chief crops being rye, oats, barley, potatoes, beetroot, and flax. Fruit is very abundant, and large quantities of wine are annually produced. Sheep in great numbers, and cattle, are reared. Moravia is the most important manufacturing province of the empire, after Austria Proper and Bohemia. Its woolen industries are of world-wide fame, and linen and cotton, beet-root sugar, iron and steel goods, machinery, beer, and spirits are also turned out in large quantities. The chief towns are Brünn, Olmütz, Znaim, and Iglau. Moravia possesses a provincial diet with 100 members, and sends 36 deputies to the imperial diets. About 70 per cent. of the inhabitants are Slavonians (Czechs) and nearly 30 per cent. Germans. In 1029 Moravia was united to the kingdom of Bohemia, with which it passed to Austria in 1526.

Moravians, a religious sect, called at first Bohemians, and constituting a branch of the Hussites, who, when the Calixtines came to terms with the Council of Basle, in 1433, refused to subscribe the articles of agreement, and constituted themselves into a distinct body. Their tenets were evangelical. In 1522 they made advances to Luther, who partially recognized them, but they ultimately adopted Calvinistic views as to the Lord's Supper. Their discipline was very strict. They supervised the conduct of their members in their private or secular affairs, as well as in their ecclesiastical relations. They refused to bear arms. Driven by persecution, they scattered abroad, and for a time their chief settlement was at Fulnek in Moravia, whence they were called Moravian Brethren, or Moravians. On May 26, 1700, was born Nicolaus Ludwig, Count von Zinzendorf, son of the chamberlain and state minister of Augustus II., Elector of Saxony and King of Poland. From early life the son was devoted to religion, his piety being of the mystic type. Having met with a Moravian refugee, who told him of the persecutions to which his sect was exposed in Austria, Count Zinzendorf offered him and his co-religionists an asylum on his estate. The man, whose name was David, accepted the offer, and in 1722 settled with three other men, at a place called by Zinzendorf Herrnhut = (the Lord's guard). Under his fostering care, the sect greatly increased in strength, and were often called, from their place of settlement, Herrnhutters. Till his death, on May 9, 1760, he traveled, largely spreading their views. Small Moravian churches arose on the Continent, in England, in Ireland, and in America. Though they have never been numerous, yet in the latter part of the 18th century and the beginning of the 19th, they acquired great reputation from having a larger proportion of their membership engaged in foreign missions than any Christian denomination since apostolic times. Cowper, Dr. Chalmers, and others wrote of them with high admiration. In 1910 there were reported in the United States 137 ministers, 142 churches and 18,343 members. See also UNITED BRETHREN.

Moray, James Stuart, Earl of, Regent of Scotland; born in 1533. He was the natural son of James V. of Scotland. In 1538 he was made prior *in commendam* of St. Andrews, in 1556 joined the Reformers, and almost immediately became the head of the Protestant party in Scotland. In 1561 he was dispatched to France to invite his half-sister, Queen Mary, to return to her kingdom; and on her arrival he acted as her prime minister and chief adviser. In 1562 she created him Earl of Mar; the title of Earl of Moray was in 1564 conferred on him; he in the meanwhile put down the Border banditti, and defeated Huntly at Corrichie. Strongly opposed to the marriage of Mary to Darnley (1565), he is falsely alleged before it to have endeavored to seize the pair near Lochleven; and after it he openly appealed to arms, but was easily put to flight by the queen, and forced to take refuge in England. He did not return to Edinburgh till March 10, 1566, the day after Rizzio's murder, to which he was certainly privy. In April, 1567, he withdrew to France, but in the following August was recalled by the nobles in arms against Mary, and found her a prisoner at Lochleven, and himself appointed regent of the kingdom. On Mary's escape, he defeated her forces at Langside, near Glasgow (May 13, 1568), and afterward was one of the commissioners sent to England to conduct the negotiations against her. After his return to Scotland by his vigor and prudence he succeeded in securing the peace of the realm, and settling the affairs of the Church. He was shot in Linlithgow, Scotland, Jan. 20, 1570.

Moray Firth, an indentation of the German Ocean, on the N. E. coast of Scotland, measuring 21 miles across its entrance from Tarbet Ness, in Ross-shire, to Stotfield Head, near Lossiemouth in Elginshire, and 39 miles thence to the mouth of the

river Beauly. The name is sometimes applied in a wider sense to the whole extent of sea between Kinnaird's Head in Aberdeenshire and Duncansbay Head in Caithness.

Morbihan (mor-bē-*ong'*), a maritime department of France, formed out of ancient Brittany, bounded by the Atlantic on the S. and Finistère on the W.; area, 2,738 square miles; pop. (1906) 573,152. The coast is much indented, and has a multitude of bays, promontories, harbors, and islands. The largest island is BELLE-ISLE (*q. v.*). The department forms a plateau of no great elevation, partly cultivated, partly occupied by extensive tracts of heath and marsh (see BRETAGNE). Morbihan is divided into the four arrondissements of Vannes, L'Orient, Ploermel, and Pontivy. The chief town is Vannes, but the most populous is L'Orient. Many ancient customs still prevail in Morbihan; communal proprietorship survives there, and in some of the islands the priest, assisted by a council of notables, governs the people in a patriarchal fashion.

Mordants, a term applied in dyeing to certain metallic oxides and salts used for fixing colors on fabrics such as cotton and linen, for which they have little or no affinity. Mordants are usually applied to, or printed on the fabric before the color is added, but they are sometimes combined with it, in which case the color is termed a lake. Salts of tin and alumina are commonly employed for bright, and oxide of iron for dark colors. In gilding, a sticky substance to cause gold leaf to adhere to an object.

Mordvins, a Finnic race, now however greatly intermingled with the Russians, who dwell along the middle course of the Volga, from the government of Nijni-Novgorod to that of Samara. They number about 790,000.

More, Hannah, an English author; born in Stapleton, Gloucestershire, England, Feb. 2, 1745. She wrote verses at an early age, and in 1762 she published "The Search after Happiness," a pastoral drama. In 1773 she went on a visit to London, and was introduced to the Garricks, and by them to Dr. Johnson, Burke, Sir Joshua Reynolds, and the best literary society of London. During this period of her life she wrote two tales in verse, and two tragedies, "Percy" and "The Fatal Secret," both of which were acted. After the publication of her "Sacred Dramas," she retired to Cowslip Green, a cottage near Bristol, where she did much to improve the condition of the poor in her neighborhood by establishing schools for their instruction. Her essays on "The Manners of the Great" and "The Religion of the Fashionable World" (a pamphlet on "Village Politics"), her novel "Cœlebs in Search of a Wife," and a tract called "The Shepherd of Salisbury Plain" are some of the most popular of her works. She died in Clifton, England, Sept. 7, 1833.

More, Henry, an English writer; born in Grantham, Lincolnshire, England, Oct. 12, 1614. He was educated at Eton and Cambridge, revolted early against the Calvinism of his parents, and gave himself entirely to philosophy. His "Theological Works" were collected in 1675, his "Philosophical Works" in 1678. He died in Cambridge, Sept. 1, 1687.

More, Paul Elmer, an American author; born in St. Louis, Mo., Dec. 12, 1864. He was instructor in Sanskrit and Greek at Bryn Mawr College, and wrote: "The Great Refusal: Being Letters of a Dreamer in Gotham"; "A Century of Indian Epigrams"; "The Judgment of Socrates"; etc. Editor of "The Nation" since 1909.

More, Sir Thomas, an English statesman; born in London, England, Feb. 7, 1478. He was the only son of Sir John More, a judge of the Court of King's Bench. A portion of his youth was spent in the family of Cardinal Morton, Archbishop of Canterbury, and chancellor; and he was then sent to Oxford, and afterward entered at Lincoln's Inn. He had already formed an intimate and lasting friendship with Erasmus. About 1502 he became a member of Parliament, and immediately made for himself a place in history by upholding the privileges of the House of Commons to treat all questions of supply as their own exclusive business. On the accession of Henry VIII. he was made under-sheriff of London. In 1514 he was envoy to the Low Countries, soon after was made a privy-councillor, and in 1521 was knighted. He appears to have ere this time considerably enriched himself by practice, and with his wife, he kept up a noble hospitality. In 1523 he became speaker of the House of Commons, and in 1529, succeeded Wolsey in the chancellorship. When Henry began his attacks on the papal supremacy More at once took up the position which his conscience

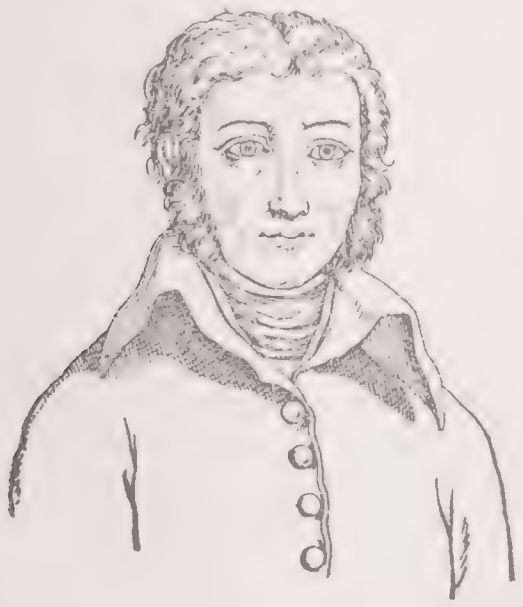
SIR THOMAS MORE.

dictated as a supporter of the old system. Henry marked him out for vengeance as an opponent of his matrimonial views, and More endeavored to shield himself by retiring from office. He was requested to take the oath to maintain the lawfulness of the marriage with Anne Boleyn. His refusal to do so led to his committal to the Tower, trial for misprision of treason, and execution, July 6, 1535. His chief work is the "Utopia" (in Latin), a philosophical romance describing an ideal commonwealth, which evinces an enlightenment of sentiment far beyond that of his time.

Morea. See PELOPONNESUS.

Moréas, Jean (mō-rā-ä′), a French author; born in Athens, April 15, 1856. He was one of the leaders of the school called the "Decadents." He wrote in verse "The Quicksands" (1884); "Cantilenas" (1886); "Iconostasis"; the novel "The Young Ladies" (1887); the romances "The Thin Woman," "Tea at Miranda's" (1887); etc.

Moreau, Jean Victor (mo-rō′), a French general; born in Morlais, France, Aug. 11, 1761. He was educated for the



JEAN V. MOREAU.

law, but he enlisted when he was 17 years old, and thenceforth devoted himself to a military career. He was rapidly promoted during the first campaign of the wars of the French Revolution, and in 1796 he was commander of one of the two French armies that invaded Germany. The other army, which was under General Jourdan, was completely defeated by the Austrians, who then brought their whole force to bear on Moreau. In this emergency, Moreau extricated himself by the retreat through the Black Forest, which is considered a masterpiece of military skill. Napoleon, in 1800, gave Moreau the command of the armies of the Danube and the Rhine; and in the winter of that year Moreau gained the great victory of Hohendinden, the most splendid of his achievements. Moreau was afterward suspected of plotting against Napoleon's government, and was banished from France. He lived in the United States till 1813, when he returned to Europe and joined the armies of the allied sovereigns against the French. He was mortally wounded at the battle of Dresden, Aug. 27, 1813, and died in Laun, Bohemia, Sept. 20.

Morecambe Bay, an inlet of the Irish Sea, separating the main portion of Lancashire, England, from the detached portion of Furness; length 18 miles; average breadth about 10 miles; it receives the Leven, the Kent, and the Lune. The depth of water in the bay is never great except in the channels of the rivers.

Moreen, a woolen or woolen and cotton fabric made in imitation of moiré (that is, having a watered appearance), and used for curtains, dresses, etc.

Morel, or **Morelle** (of the form morel), *Morchella esculenta,* an edible fungus. It has a pale-brown pileus, deeply pitted all over, with raised anastomosing lines between the depressions. It grows in orchards, woods, and forests, especially, according to the common German belief, where fires have taken place. It has an agreeable smell and taste. It is used when fresh stewed or stuffed with forcemeat, or when dry as an ingredient in some sauces. Also (of the two forms): *Solanum nigrum.* Called also petty morel, the great morel being *Atropa belladonna.*

Morelia (mō-rā′lē-ä), a town of Mexico, capital of the state of Michoacan, 125 miles W. N. W. of Mexico City, in a valley surrounded by high mountains; altitude 6,400 feet. It has a fine cathedral, and a magnificent aqueduct, dating from 1788, for the supply of water. It is in one of the chief sugar-growing districts in Mexico and was the birthplace of General Morelos, one of the soldiers of the independence, in memory of whom the town, formerly called Valladolid, founded in 1541, has borne his name since 1828. Pop. (1900) 37,278. See MORELOS, DON, J. M.

Morella (mō-rāl′yä), a town of Spain, 80 miles N. by E. of Valencia. It was the stronghold of Cabrera, the Carlist general, who scaled the castle on Jan. 25, 1839. It was retaken in July, 1840, by Espartero.

Morelli, Giovanni (mo-rel′lē), an Italian art critic; born in Verona, Italy, Feb. 25, 1816. He traveled widely throughout Europe, studying the great collections of paintings. His fame rests principally on the "Critical Art Studies in Italian Painting" (1890–1893), devoted to the Borghese and Doria Pamfili galleries in Rome, the Munich and Dresden galleries, and that of Berlin. He bequeathed his valuable collection of paintings to his native city. In 1895 a monu-

ment was erected to his memory in Milan. He died in Milan, Feb. 28, 1891.

Morello, a fine variety of cherry with fruit that becomes almost black if allowed to hang.

Morelos (mō-rā′los), one of the states of Mexico (since 1869), immediately S. of the highest volcanic region of the Anahuac plateau; area, 2,773 square miles; pop. (1900) 160,115. The country is very broken and covered with forests, and is drained by the Mexcala river.

Morelos, Don José Maria (mō-rā′los), a Mexican patriot; born near Apatzingan, Michoacan, Sept. 30, 1765. He joined the insurgent army under Hidalgo in 1810, and subsequently became leader of a band composed chiefly of negro slaves, with whom he carried on a successful guerilla warfare for a time against the Spaniards. He was made prisoner in 1815, and was executed near Mexico, Sept. 22.

Morel s t c h i c k s, or **Self=Sacrificing Saints,** a sect of fanatics, said to be widely spread in Russia. Their principles are altogether unknown, but their existence is asserted from time to time by acts of savage barbarism, chiefly committed in the N. province of Saratov and in Siberia. It seems that they dig, with strangely fantastic ceremonies, a deep hole in some remote place, around which they pile wood, brush, straw, and other combustibles in great quantity. Then they enter the hole in solemn procession, set fire to those materials, and burn themselves to death, chanting hymns, and without uttering a cry of pain. Others assemble in some house, around which they have packed combustibles up to the very roof. The house, like all Russian "isbas" built of logs, is in a few minutes enveloped in flames, and the fanatics perish in them, undisturbed by the spectators, in what they consider a religious duty. They are thought to be saints who give themselves the baptism of fire. These "saints" are mentioned in the writings of such travelers as Gmelin, Palles, Georgis, and others.

Moreri, Louis, a French clergyman; born in Provence, in 1643. He took orders, and was for five years a noted preacher at Lyons, where in 1674 he published "The Grand Historical Dictionary." In 1675 he went to Paris, and labored at the expansion and improvement of this important work till his death. It was translated into Spanish, Italian, and English, Jeremy Collier adding to this an appendix or supplement filling a folio volume. The biographical part is still valuable. He died in 1680.

Moreton Bay, an inlet of the sea on the E. coast of Queensland, Australia; formed inside the islands of Moreton and Stradbroke, the former 20 miles and the latter 33 miles in length, and both about 5 miles in greatest breadth. The bay is 40 miles long by 17 broad; its S. half is dotted with islands and sandbanks. It receives the six considerable streams, Nerang, Pimpama, Logan, Brisbane, Pine, and Caboolture. The entrance at the N. end is practicable at all times for vessels of the largest size; the entrance between Moreton and Stradbroke Islands is narrow, and less safe.

Moreto y Cabaña, Agustin (mō-rā′tō ē kä-bä′nyä), a Spanish dramatist; born in Madrid, about 1618. He introduced into Spain the comedy of character and manners. "Disdain for Disdain," his chief work, was one of the four classical masterpieces of the old Spanish stage; "The Handsome Don Diego" contained excellent character-drawing; "Snares Ahead" (Trampa Adelante) won high success; and "The Valiant Justiciary" and "The Power of Blood" were good specimens of his more earnest writing. He died in Toledo, Oct. 28, 1669.

Morford, Henry, an American dramatist; born in New Monmouth, N. J., in 1823. Among his plays are "The Merchant's Honor" and "The Bells of Shandon." Two volumes of poems were published by him: "Rhymes of Twenty Years" (1859); and "Rhymes of an Editor" (1873). Among his novels are "Shoulder Straps" (1863); "The Coward" (1864); "Utterly Wrecked" (1866); and "Only a Commoner" (1871). He died in New York city, in 1881.

Morgan, Daniel, an American military officer; born in New Jersey, in 1736. He took a prominent part in the expedition under Arnold against Quebec, 1775–1776; was in command of the riflemen at the battle of Saratoga, in 1777; and defeated the British under Tarleton at the Cowpens, S. C., in 1781. He died in Winchester, Va., July 6, 1802.

Morgan, Edwin Dennison, an American politician; born in Washington, Mass., February 8, 1811. In 1836 he entered the grocery business in New York, and in this trade he became very successful. He was a member of the State Senate from 1849 to 1853, and in 1858 and 1860 was elected governor. It was he who supervised the sending to the front New York's quota of troops for Federal defense. In 1863–69 he was a United States Senator. He was chairman of the Republican national committees in four campaigns. Died Feb. 14, 1883.

Morgan, James Appleton, an American lawyer and author; born in Portland, Me., Oct 2, 1845. Graduated from Racine College (Wis.) in 1867 and from the Columbia Law School in 1869, he began the practice of law in New York in 1871, and became particularly identified with railway interests. In 1885 he founded the Shakespeare Society of New York, of which he has since been continuously president. He edited for the society the "Bankside Shake-

Morgan

speare" (20 vols., 1888–92), in which, as in other works, he endeavored to show that Shakespeare's plays as they now exist are composite in character, developed by numerous authors, of whom Shakespeare was chief. The further volumes in defense of this theory are: "The Shakespearean Myth" (1881); "Some Shakespearean Commentators" (1882); and "Shakespeare in Fact and Criticism" (1887). Others of Morgan's writings are: "Selections of Macaronic Poetry" (1870); "The Law of Literature" (1874), and "The People and the Railways" (1888).

Morgan, John Hunt, an American soldier; born in Huntsville, Ala., June 1, 1826. Having early gone to Kentucky, he became a first lieutenant in Marshall's cavalry during the Mexican War, and subsequently a manufacturer in Lexington. At the outbreak of the Civil War he entered the Confederate service, and was soon made captain and commander of Morgan's squadron, an organization of three companies of cavalry. His skill in dashing and successful raids led to his appointment as Brigadier-General, with command of a cavalry brigade. In June, 1863, he was ordered by Bragg to enter Tennessee with 2,000 picked mounted infantry and 4 guns, in order to destroy the railway by which Rosecrans obtained supplies, capture Louisville, and raze the public works there. With 2,406 men he crossed the Ohio into Indiana, and thence passed to Ohio, pursued by General Hobson, and everywhere opposed, though for the most part ineffectively, by the militia. He attempted to return to Kentucky, but was surrounded on land, while gunboats patroled the river. After his force had been broken up, and a part of it captured he tried to make his way to Pennsylvania to join Lee, but was taken prisoner and placed in the State prison at Columbus. On November 27 he escaped, and eventually he reached the Confederate lines in safety. Having been authorized to organize his cavalry (January, 1864), he was assigned to the department of southwest Virginia, but afterward again assumed his independent command. He was shot and killed at a farm-house in Greenville, Tennessee, on September 4, 1864, while attempting escape from a detachment of Federals which had surrounded the place. "Morgan, the Raider," was an admirable leader of light cavalry in the work of foray and depredation. His exploits were notable, but the cruelties of them have been exaggerated.

Morgan, John Pierpont, an American banker and financier; born in Hartford, Conn., April 17, 1837. Educated at the English High-School, Boston, and the University of Göttingen, he entered the New York banking house of Duncan, Sherman and Company; in 1860 became agent and attorney in America for George Peabody and Company, the London bankers; and in 1864 was made junior partner in the firm of Dabney, Morgan and Company, dealing in investment securities. In 1871 he entered the firm of Drexel, Morgan and Company, bankers, the style of which was subsequently changed to J. P. Morgan and Company. He came to be recognized as not simply a millionaire, but a constructive financier of great ability, being known chiefly for his work in the combination and reorganization of large interests. In 1895 he organized a syndicate which floated the United States government bond-issue for the extension of the gold reserve. In 1901 he obtained in the United States subscriptions of $50,000,000 to the British war loan; and in the same year formed the United States Steel Corporation, centralizing the steel interests of the country, with a capital of $1,100,000,000. He also became the head of the bituminous and anthracite coal trusts. His reputation in foreign financial circles is high, and it is through the interests which he directs that probably the majority of European investments are made in American securities. Not long after the organization of the Peabody Educational Fund, he was made its treasurer and financial consulting expert to its trustees. He has given largely to churches and to charitable and other institutions. As a yachtsman he built the Columbia which defeated Lipton's Shamrock I. and II. in the America's cup races of 1899 and 1900.

Morgan, John Tyler, an American lawyer; born in Tennessee, June 20, 1824. He studied law in Alabama, and was admitted to the bar in 1845; was presidential elector on the Breckenridge ticket in 1860; entered the Confederate service as a private in 1861 and was from time to time promoted for gallant and distinguished services; in November, 1863, was commissioned Brigadier-General, and commanded a division under Gen. Joseph E. Johnston. He was elected to the United States Senate from Alabama in 1877, and was reëlected in 1883, 1889, and 1895. He was recognized as one of the ablest members of the Senate, and won popularity throughout the country by his able and eloquent speeches in behalf of Cuban independence, and for the maintenance of American interests and the promulgation of American principles in all parts of the world. He was appointed one of the commissioners to represent the interests of the United States in the Board of Arbitration to which was submitted the Bering Sea dispute. He died June 11, 1907.

Morgan, Lewis Henry, an American archæologist; born in Aurora, N. Y., Nov. 21, 1818. He was graduated at Union Col-

lege in 1840; became a lawyer at Rochester; served in the State assembly (1861) and senate (1868). His earliest work, "The League of the Iroquois" (1851), was the first account of the organization and government of an Indian tribe; but even more valuable are his "Systems of Consanguinity and Affinity of the Human Family" (1869), and his treatise on "Ancient Society" (1877). He also published "Houses and House-life of the American Aborigines" (1881), and an account of the beaver. He died in Rochester, N. Y., Dec. 17, 1881.

Morgan, Lady (Sydney Owenson), an Irish novelist; born in Dublin, Ireland, about 1783. Her father, a theatrical manager, fell into difficulties; and the clever, bold, lively young woman resolved to support the fortunes of the family, first as governess, afterward as author. In 1812 she married Thomas Charles Morgan, M. D. (1783–1843), whom the lord-lieutenant knighted for the occasion. For the next quarter of a century, excepting two long visits to the Continent, the pair made Dublin their home; but in 1837, Lord Melbourne gave her a pension of $1,500, and next year they removed to London. She wrote "St. Clair" (1804); "The Wild Irish Girl" (1806); "O'Donnel" (1814); "France" (1817); "Italy" (1821); "Memoirs" (2 vols. 1862) edited by Hepworth Dixon. She died in London, England, April 16, 1859.

Morghen, Raphael Sanzio, an Italian engraver; born June 19, 1758. He studied at Rome under Volpato, whom he assisted in engraving the famous pictures by Raphael in the Vatican. He settled in Florence in 1793 as Professor of Engraving in the Academy of Arts, and died in 1833. His works number about 200 in all, many of them of large size. Among the chief are: the engraving of Leonardo da Vinci's "Last Supper"; the "Transfiguration," after Raphael; a "Magdalen," after Murillo; a "Head of the Saviour," after Da Vinci; the "Car of Aurora," after Guido; "The Hours," after Poussin; the "Prize of Diana," after Domenichino; the "Monument of Clement XIII.," after Canova; "Theseus vanquishing the Minotaur"; portraits of Dante, Petrarca, Ariosto, Tasso, etc. He died in Florence, Italy, April 8, 1833.

Moriah (-rī′-), the hill on which the temple of Jerusalem was built. Some authors believe it to be the mount on which Abraham was commanded to sacrifice his son Isaac.

Morier, James, an English novelist; born in 1780. He served 1810–1816 at the court of Persia, first as secretary of legation, subsequently as envoy. He wrote "Travels in Persia, Armenia, and Asia Minor to Constantinople" (1812); "A second Journey through Persia, Armenia, and Asia Minor" (1818); "The Adventures of Hajji Baba of Ispahan" (1824); "Hajji Baba in England" (1828); "Zohrab" (1832); "Ayesha" (1834); "The Mirza" (1841); "Abel Allnut" (1837); "The Banished" (1839); "The Mirza" (1841); and "Mortin Tontrond" (1842). He died in Brighton, England, March 23, 1849.

Mörike, Eduard (me′rē-ke), a German poet (the last and best of the "Suabian school"); born in Ludwigsburg, Württemberg, Sept. 8, 1804. He was a clergyman and teacher, and the greatest German lyrist after Goethe. His best verse can be seen in "Poems" (11th ed. 1895) and "Idylls from the Lake of Constance" (1846). Of his prose writings, famous are: "Nolten the Painter" (3d ed. 1892) and "Mozart on the Way to Prague" (5th ed. 1892). He also made fine translations of Anacreon and Theocritus. ("Works," Stuttgart, 1890.) He died in Stuttgart, June 4, 1875.

EDUARD MÖRIKE.

Morison, James Cotter, an English author; born in London, England, in 1831. He was educated at Highgate grammar school and Oxford. He wrote "The Life and Times of St. Bernard" (1863); "The Service of Man, an Essay towards the Religion of the Future" (1886). He was a Positivist in philosophy and one of the founders and proprietors of the "Fortnightly Review." He died Feb. 26, 1888.

Morison, Robert, a Scotch botanist; born in Aberdeen, Scotland, in 1620. Having borne arms as a royalist in the civil wars, he retired to France when his sovereign's cause collapsed, and took the degree of doctor at Angers (1648). Two years later he became superintendent of the garden formed at Blois by Gaston, Duke of Orleans. After the Restoration he was appointed by Charles II. one of his physicians, "botanist royal," and "Professor" of Botany at Oxford. His chief work is "Oxford Universal History of Plants" (1680). He was knocked down by a coach in London, and died the following day, Nov. 10, 1683.

Morland, George, an English painter; born in London, England, June 26, 1763. He was the eldest son of Henry Morland, crayonist (1712–1797), to whom at 14 he was articled, and who brought him up with extreme rigor. No sooner had he become his own master than he became very wild. His marriage in 1786 had no power to check him; and his whole after life was a downward course of debt and dissipation. Yet he worked hard and rapidly, in the last eight years of his life turning out nearly 900 paintings and more than 1,000 drawings. His strength lay in country subjects (pigs, gipsies, and stable interiors); his sea-pieces, also numerous, are not so good. He died of brain fever in a Holborn sponging house, Oct. 29, 1804.

Morley, Henry, an English writer; born in London, England, Sept. 15, 1822. He was educated at King's College; practised medicine in Shropshire and teaching in Liverpool; and came to London as a journalist in 1851. From 1857 to 1865 he was an English lecturer at King's College; after the latter year he was Professor of English Language and Literature at University Hall. His more important works are connected with the history of English Literature, and include "First Sketch of English Literature," "English Writers," "English Literature in the Reign of Victoria," etc. He edited various series of literary works, besides writing many biographies, two volumes of "Fairy Tales," etc. He died May 14, 1894.

Morley, John, an English statesman and author; born in Blackburn, England, Dec. 24, 1838. He was educated at Cheltenham College, and afterward proceeded to Lincoln College, Oxford, where he graduated B. A. in 1859, M. A. in 1874. In 1873 he was called to the bar at Lincoln's Inn, of which he was appointed a bencher in 1891. He began his literary career as editor of "The Literary Gazette" (afterward renamed "The Parthenon"), and from 1867 till 1883 he edited the "Fortnightly Review." During 1880–1883 he was editor of the "Pall Mall Gazette," and in 1883–1885 of "Macmillan's Magazine." His political career began in 1869, when he successfully contested Blackburn in the Liberal interest. In 1880 he was returned by Westminster and in 1883 by Newcastle-upon-Tyne, for which he sat till his defeat at the general election in 1895. Since 1896 he has represented the Montrose burghs. Mr. Morley was one of the leading supporters of Mr. Gladstone's Home Rule policy, and in 1886 and 1892–1895 he was chief secretary for Ireland in Home Rule administrations. His first separate publication was a volume entitled "Edmund Burke: a Historical Study" (1867), and his subsequent works comprise: "Critical Miscellanies" (1871; 2d series, 1877); "Voltaire" (1871); "The Struggle for National Education" (1873); "Rousseau" (1873); "On Compromise" (1874), a collection of five vigorous essays; "Diderot and the Encyclopædists (2 vols. 1878); "Burke" (1879), in the series of "English Men of Letters," of which he is general editor; "Life of Richard Cobden" (2 vols. 1881); "The Study of Literature" (1887); "Aphorisms" (1888); "Walpole" (1889), "Studies in Literature" (1891); and "Oliver Cromwell" (1900). In 1902 he was engaged on a detailed biography of Mr. Gladstone, based on the deceased statesman's papers. He was created 1st Viscount Morley of Blackburn in 1908.

Morley, Samuel, an English philanthropist; born in Homerton, England, Oct. 15, 1809. He entered his father's hosiery warehouse in London, when 16; becoming sole head of the business in 1854. He was returned to Parliament for Nottingham, in the Liberal interest, in 1865; was unseated on petition; represented Bristol, 1868–1885, and declined a peerage which was offered to him in the latter year. He was identified with many religious and philanthropic movements. He also gave $30,000 toward the erection of a Nonconformist memorial hall, and during 1864–1870 contributed $70,000 toward the erection of Congregational chapels. He died near Tunbridge, Kent, England, Sept. 5, 1886.

Mormon, the last of a pretended line of Hebrew prophets, and the pretended author of "The Book of Mormon," or Golden Bible, written on golden plates.

Mormons, or **Latter Day Saints,** a religious sect in North America, founded by Joseph Smith, Jr., at Fayette, Seneca co., N. Y., in 1830. In 1823, claiming that he was led by the inspiration of an angel who had appeared to him, he claimed to have discovered golden plates on which the records of Mormon were alleged to be inscribed. These though found in 1823, he was not allowed by the angel to take up till 1827. They were inscribed with characters which were said to be reformed Egyptian but which he was unable to read. There was, however, in the box where they were found, so he declared, a marvelous instrument called Urim and Thumin, by which he was enabled to read the mysterious letters and translate them into English. In 1830 Smith published an English translation of the plates under the title "The Book of Mormon," together with certificates of 11 men who claimed to have seen the plates. This book tells in a language which imitates the Scriptures how at the time of King Zedekiah of Jerusalem, a pious Israelite by the name of Lehi, together with his family, migrated from Palestine to America and de-

scribed on these plates the account of his marvelous adventures as well as the revelations which God vouchsafed to him. Many of his sons, like Laman, went out into the wilderness and became the ancestors and chiefs of the North American Indians. The descendants of his son Nephi became good Christians, many centuries before Christ, and among them were preserved the dignity of the priesthood and their sacred plates. To this family also appeared the Christ when He rose from the dead and He chose from the family 12 apostles who within a brief time converted the whole country to Christianity; but when at the beginning of the 4th century the Church, in consequence of wars, became disintegrated, Mormon, a mighty hero and pious Christian, rose and drove out the Lamanites who had in the meantime become red and fallen into barbarism. Nevertheless they returned about the year 400 and the Nephites perished before them. Mormon's son, Moroni, finished the history of his people in 420. The book was published in 1830 and it was at one time claimed that it was a plagarism on a novel, published in 1812 and written by a clergyman several years before; but recently this book has been discovered and compared with that of Mormon and it is found that they are entirely different.

The new prophet immediately began to collect followers about him, and by April 6, 1830, he had organized a church at Fayette, N. Y. The next year the sect numbered several hundred members and moved to Kirtland, O., where they increased in numbers and wealth through the efforts of missionaries who were sent out by the prophet. In 1833 they were driven from Jackson co., Mo., and took refuge in Clay county and the surrounding regions. In 1838, Governor Boggs of Missouri, issued an exterminating order against the Latter Day Saints and they were driven out of that State. They went to Illinois, where by 1840, near Commerce, Hancock county, they had founded the city of Nauvoo, over which Smith had extraordinary civil and military authority. The city flourished, soon numbering more than 2,100 houses and having a beautiful temple built according to plans which Smith claimed he had received in a vision. In 1844 a discontented member of the Church issued a newspaper at Nauvoo assailing the prophet and threatening to expose various immoralities and misdeeds. The city council of Nauvoo passed an ordinance declaring the printing office a nuisance. It was destroyed by the officers of the law. Smith was blamed for this and a warrant was issued for his arrest. Before civil war actually broke out, the governor of the State induced Smith to surrender and go to Carthage. On June 27, 1844, a mob attacked the jail, overpowered the guard, killed Smith and his brother Hiram, and wounded others of the prophet's party.

This did not put an end to Mormonism. Smith was succeeded by Brigham Young, (see YOUNG, BRIGHAM), who early in 1846, left Nauvoo with others. In the spring of 1847 a company of 143 started through the wilderness and on July 24, arrived at the valley of Salt Lake, which he declared was the promised land. It looked far from being the promised land when they got there. Irrigation was absolutely necessary. The first crop they planted was small and the second nearly destroyed by grasshoppers, but they pushed out into the valley, extending their agricultural operations, and made the wilderness blossom like the rose. They made Salt Lake their place of settlement and Young returned to Council Bluffs, where they had set up temporary headquarters, to bring the rest of the saints to Utah. Their new city became an important place on account of its position on the route of wagon trains to and from California, and owing to the wonderful discipline and management of the Mormons and to their system of irrigation, the wilderness, the soil of which was very fertile and needed only water, began to prove most productive, and the city to flourish. Brigham Young on account of his great influence was named governor of the territory and Congress granted him $20,000 for the erection of public buildings and $5,000 for a library, but in 1854 the government appointed Col. Steptoe as governor and in 1857 A. Cumming in Brigham Young's place and sent him with 2,500 men to Utah. The expedition met with difficulties on account of the late season of the year and opposition on the part of the Mormons to having an army sent against them in time of peace as they claimed that they had committed no hostile act against the United States government. A peace commission was sent to Utah and the people who had already commenced to move away from their homes (which they had prepared to burn on the entrance of the army) were induced to return. Young remained governor de facto during the Civil War, 1861–1865. He ruled the community with all the autocratic power of an emperor. Many missionaries were sent out and the number of Mormons increased with great rapidity. He died in 1877 and in 1880 John Taylor was elected president. He had been with Joseph Smith in Nauvoo and was shot and wounded when Smith was killed. He died in 1887 and in the same year was succeeded by Wilfred Woodruff, who was 80 years old, a most remarkable man, who preserved his faculties without impairment even beyond the age of 90. In 1890 he issued his famous manifesto forbidding polygamy. In 1896 Utah became a State and in the fol-

lowing year the 50th anniversary of the entering of the saints into that region, was celebrated. In 1898 President Woodruff died and the apostle Lorenzo Snow succeeded to the presidency of the Church. He also was a very old man, more than 85 years old, a friend of Joseph Smith, and an apostle in Nauvoo since 1849. President Snow died Oct. 10, 1901, and was succeeded by Joseph Fielding Smith, a nephew of Joseph the founder.

The membership of the Mormons is about 250,000 and there are flourishing communities in other countries besides the United States. Mormons express their belief in the Trinity, that men will be punished for their sins, that through the atonement of Christ mankind may be saved by faith, in repentance, in baptism, in the laying on of hands for the gift of the Holy Ghost. They believe in a Church organization comprising apostles, prophets, pastors, teachers and evangelists, in the apostolic gifts of tongues, prophecy, visions, in the power of healing, in the Bible as the word of God, and in the book of Mormon as the further word of God. They believe in the literal gathering of Israel and the restoration of the 12 tribes, who will build Zion on the American continent, and that Christ will come Himself to reign. Supreme authority is vested in the president, who is designated as prophet, seer and revealer and two counsellors chosen by the body of the Church. There are 12 apostles and a hierarchy consisting of the patriarchs, seventies, high priests, elders, bishops, priests, teachers and deacons, the whole forming a pure theocracy. They believe in continuous divine revelation, but that the only authoritative communications from the Lord come through the prophet president. One of the characteristics of the Mormons has been a plurality of wives, which was regarded as a means of grace, the number of a man's wives and children increasing the man's chances of honor and glory in the world to come. In this respect they are wholly Biblical. It is maintained that the revelation sanctioning polygamy was received by the prophet as early as 1831 but was withheld from the body of the Church and from the world till after they had been settled in Utah. After 1852 polygamy was preached and practised and the leading men generally were polygamists. In 1862 the Federal government enacted a law against the practice, but little attention was paid to it and not till 20 years later were severer statutes passed against it. In 1884 the constitutionality of the law was established by the supreme court of the United States and more than 1,000 men were convicted and sent to the penitentiary, while many of the leading polygamists fled or went into hiding. In 1887 the Mormon Church was disincorporated by Congress and its immense property was confiscated with the exception of $50,000. Finally in September, 1890, after the vast property holdings of the Church had been lost, President Woodruff issued his famous proclamation against polygamous marriages. In 1898 Brigham Henry Roberts was nominated for Congress but owing to a charge made against him that he was still living in polygamous relations, his case was submitted to a special committee which recommended that he be not allowed to take his seat in Congress. Salt Lake City, which is still the principal city of the Mormons is remarkable for its tabernacle, a building completed in 1867, 250 feet long, 150 feet wide, 80 feet high, without any supporting pillars, with a total seating capacity of 7,000. Its great organ and choral services, which are given there regularly by a choir of 600 voices are among the most remarkable features of the Mormon service. Another wonderful building in Salt Lake City is the Temple, which was begun in 1852 and dedicated in 1893.

LORENZO SNOW.

Morning Glory, a name given to several climbing plants of the convolvulus family, having handsome purple or white, sometimes pink or blue flowers.

Morningside College, a coeducational institution in Sioux City, Ia.; founded in 1894 under the auspices of the Methodist Church; has grounds and buildings valued at over $230,000; endowment, $400,000; volumes in the library, about 6,000; average number of faculty, 35; average students, including summer school, 730; ordinary annual income, about $125,000.

Morning Star, in astronomy, the planet Venus when it is visible in the morning. Also a weapon used in ancient times. It consisted of a ball with spikes, united by a chain to a staff. Called also holy-water sprinkler.

Morny, Charles Auguste Louis Joseph, Duc de, a French statesman; born in Paris, France, Oct. 23, 1811. He is believed to have been the son of Queen Hortense and of the Comte de Flahault, and consequently half-brother of Louis Napoleon. Adopted by the Comte de Morny, he entered the army in 1832, and served with some distinction in Algeria; but he soon abandoned a military life, and in 1838 made his début in the world of industry as a manufacturer of beet-root sugar. Ever after that time he was mixed up in all sorts of commercial and financial speculations — railway companies, canal companies, French foreign mining companies, credit societies, and various industrial enterprises. Chosen a deputy in 1842, he quickly attained a prominent position on account of his aptitude for dealing with financial questions.

Morocco

After the revolution of 1848 he became attached to the cause of his half-brother, and was the leader of the subtle and treasonable policy of the Elysée. He took a prominent part in the coup d'état, and became minister of the interior. In 1854–1856, and again in 1857–1865, he was president of the Corps Législatif, which he succeeded in reducing to subservience; and was ambassador to Russia during 1856–1857, where he married the rich and handsome Princess Trubetskoi. He died in Paris, March 10, 1865.

Morocco, or **Marocco,** known to the natives as Maghreb-el-Aksa, "the farthest West," is an empire or sultanate which, though at one time comprising a portion of Algeria in one direction, and exercising in the other a modified jurisdiction as far as Timbuktu, is now confined to that part of Northwest Africa bounded on the E. (at the Wad Kiss) by Algeria, and on the S. by Cape Nun and the Wad Draa, though both here and on the Sahara side of the Atlas the limits of the empire are rather indeterminate. Area, about 219,000 square miles; pop. (1900) estimated at 5,000,000. Politically, Morocco comprises at present the old kingdoms of Fez and Morocco and the territories of Tafilet (Tafilalet) and Sus; but the two latter are almost independent, recognizing the Sultan only as the Prince of True Believers, an office which he holds as the most powerful of the Shereefs or descendants of Mohammed. These four principal governments are divided into 17 primary provinces or "amalats," each presided over by a Kaïd or "Bashaw," as the Europeans call him.

Topography.— Morocco is, as a rule, mountainous, the Atlas traversing it in several chains from S. W. to N. E., and by various spurs both to the coast country and to the desert. There are, however, numerous level plains, some of which are of great extent, and very rich, the soil being in many places a deep, black loam, evidently the bed of an ancient lake or of a primeval forest. There are also numerous more or less level plateaus similar to those of Algeria. But with the exception of parts of the Atlas, the forest of Mamora, the date and argan groves of the S., and a few straggling copses around the burial places of saints, Morocco, has in the course of the last thousand years, been almost denuded of timber, the palmetto scrub being about the most common representative of woodland.

Climate.— The climate of Morocco varies much, though the W. slope, being tempered by the sea-breezes and protected from the hot desert winds by the Atlas, is temperate, the thermometer seldom falling below 40° or rising above 90°. But in summer the interior valleys are very hot, and in winter snow often falls in Fez and Mequinez, where ice an inch thick is by no means uncommon. Farther S. extremes of heat and drought are more common, though as a rule the climate is equable. In the Sus country and the region of Tafilet rain is scarce and in places almost unknown. But farther N., and on the Atlantic and Mediterranean slopes, it falls with tolerable regularity every year between October and April.

Agriculture.— Morocco produces crops of the temperate and tropical zones. Wheat and barley are grown largely. Maize forms the chief export of Mazagan. Various gums, oranges, figs, almonds, lemons, and dates are among the other vegetable products. Cotton and hemp are grown for home consumption. Most European fruits grow well, and among other products sugar has been raised. Cattle (under treaty arrangement with Gibraltar) are exported; but no animals can be sent out of the country without an imperial permit.

Commerce.— In 1899 the exports (maize, beans, chick-peas, olive oil, wool, almonds, dates, fowls, eggs, hides, bones, esparto, cattle to Gibraltar, etc.) amounted to $5,570,680, and the imports (cotton goods, cloth, tea, coffee, sugar, candles, hardware, etc.) to $6,984,875.

People.— The inhabitants consist of six principal groups. The (1) Berbers (Braber) or Kabyles, of whom the Amazigh, Shelluh, and Tuareg are only branches, are the aborigines. They inhabit for the most part the mountain regions, and are still only half subdued. (2) The Arabs are descendants of the invaders who came in the 7th century. (3) The Jews were very early settlers, semi-independent colonies still subsisting in the Atlas and the Sus country, though most of them in the towns are refugees driven out of Spain and Portugal. (4) A few thousands of Europeans, chiefly Spaniards, are almost entirely confined to the coast towns. (5) The "Moors," a term vaguely applied to all the Mohammedan inhabitants, are really Arabs with a large admixture of Spanish and other European bloods, and the name ought properly to be restricted to the inhabitants of the cities. (6) The Negroes, of whom there are large numbers, were brought from the Sudan as slaves.

Government.— The Sultan is one of the most perfect specimens of an absolute monarch existing. He receives and disposes of the entire revenue, believed to be about $2,500,000 per annum. Every office is directly or indirectly purchased, small salaries or none are paid, the holders recouping themselves by plunder and oppression, tempered by the fact that at any moment they may be forced to disgorge to the Sultan, or in default be left to rot in the loathsome Moroccan dungeons, or be beaten or tortured to death. All justice is bought and sold.

Yet, owing to the religious fanaticism of the people, and the mutual jealousies of the European powers, whose representatives reside at Tangier, the political equilibrium is preserved. The only European nation which at present has any territory in Morocco is Spain, which maintains a fortress at Ceuta, and four convict settlements, and a fishing station at Ifni. Education is at a low ebb. Few of the people can read or write, a capacity to repeat by heart passages of the Koran or of Al Bekkhari's commentaries upon it, and the traditions being almost the sum of what is taught in the village schools.

Communications.— Morocco is connected with Spain by telegraph, and the telephone is in use in Tangier, Casablanca, and other coast towns. The posts also are confined to the Europeans. Morocco has three capitals or imperial residences, at one of which the Sultan and his army reside at uncertain intervals and for indeterminate periods. These are Fez (pop. 140,000), Makinas or Mequinez (56,000), and Marakesch, better known as the City of Morocco (50,000). Besides these the principal coast towns are Tangier; Tetuan, a little way up the Martil river; Larache (El-Arish); Rabat and Sallee, on opposite sides of the Bu-Ragreb river; Casablanca, or Dar-al-Baida; Mazagan; Saffi; and Mogador.

History.— After being for more than four centuries a part of the Roman empire, and in the latter period of its sway veneered with a corrupt Christianity, Mauritania Tingitana fell (A. D. 429) into the hands of the Vandals, who held it till 533, when Belisarius having defeated them, it became subject once more to the Eastern empire. But in the year 680 the Arab invasion began, and with little intermission the Arabs have ever since been possessors of the country, and the entire population are now the most fanatical adherents of Mohammedanism. At first, with Spain, part of the caliphate of Bagdad, it became divided into several independent nomarchies, and during this period the country enjoyed a prosperity to which it has ever since been a stranger. Morocco has at present, with the exception of the Spanish presidios, no foreign strongholds on its coast, as it had up to the year 1769, when the Portuguese evacuated Mazagan; and since the unsuccessful war with Spain in 1859-60 the country has not been disturbed by foreign invasion, save that of the French (aided by Spaniards) in 1907 for preserving order, by virtue of a treaty with England in 1904. French and German disputes over Morocco were settled at Algeciras (*q. v.*) in 1906. In 1907 outbreaks against foreigners occurred, and after the bombardment of Casablanca by French and Spanish ships a few weeks of bloody warfare between French troops and tribesmen brought the fanatics to submission.

Morocco (Arabian, Marakesch, by which name it is usually known among European residents), the S. capital of the empire of the same name; between 4 and 5 miles from the left bank of the Tensift, at the N. end of an extensive and fertile plain; 1,447 feet above the sea. It is surrounded by a lime and earth wall, more than 5 miles in circumference, between 20 and 30 feet high, and pierced by seven gates. A large portion of the immense space within the walls is occupied by ill-kept gardens, open areas, and "soks," or market-places; the eight large cemeteries are outside the walls. In the bazaar and merchants' quarter a considerable local trade is carried on with the country people, the mountaineers from the neighboring Atlas, and with Sus, Tafilet, Mazagan, Saffi, and Mogador. Morocco possesses many mosques, one of which, the Kutubia, has a tower after the model of the Hassan in Rabat and the Giralda in Seville, 320 feet high. There are several tanning and leather-dyeing establishments of considerable extent, though of late years European goods have been gradually displacing native manufactures. The population varies according to the presence or absence of the Sultan, his court, and army. Morocco was founded in 1072 by the Emir Jusef ben Tachefyn, and reached the summit of its prosperity in the 13th century. In those days it is affirmed to have contained more than 700,000 inhabitants. But for several centuries, owing to civil wars, during which the rebellious Berbers more than once sacked it, the city, like all the interior towns of Morocco, has been rapidly retrograding. However, owing to its excellent situation in sight of the Atlas, from which cool streams are always flowing, its genial healthy climate, and its command of the trade routes across the mountains, the Southern capital is safe to have a great future when Morocco knows other masters than the Moors. Pop. 50,000.

Morocco Leather. See LEATHER.

Moroni, Giovanni Battista (mō-rō′nē), an Italian painter; born in Albino, near Bergamo, about 1510. Of the North Italians, Moroni ranks next to Titian, who greatly admired his portraits. An excellent example of his style is the "Tailor" in the National Gallery, London, where there are also four other portrait-pieces from his brush. Moroni likewise painted sacred subjects of the usual types, now in the Brera at Milan, at Bergamo, at Verona, and other places in North Italy. He died Feb. 5, 1578.

Moroxite, the crystallized form of apatite, occurring in crystals of a brownish or greenish-blue color.

Morpheus (-fūs), in classical mythology, a minister of the god Somnus, who was wonderfully proficient in imitating the grimaces, gestures, words, and manners, of mankind. He is sometimes called the god of sleep, and is generally represented as a slumbering child, of great corpulence, and with wings. He holds a vase in one hand, and in the other some poppies.

Morphine, or **Morphia,** in chemistry, $C_{17}H_{19}NO_3$. Morphinum. The most important of the opium bases, discovered by Sertürner in 1816. It is obtained by decomposing an aqueous extract of opium by chloride of barium, and allowing the chloride of morphia to crystallize out. The crystals, which contain codeine, are dissolved, and the morphine is then precipitated by ammonia, and finally purified by recrystallization. It crystallizes from alcohol in colorless, lustrous, trimetric prisms, soluble in 500 parts of boiling water, easily soluble in alcohol, but insoluble in ether and chloroform. Morphine is also soluble in caustic alkalies, but scarcely at all in ammonia. Solutions of morphia are colored blue with ferric chloride; and iodic acid is reduced by morphine and its salts, free iodine being liberated. By the aid of starch solution this reaction affords a highly delicate test for its detection. Morphine forms well defined salts with mineral and organic acids. The most characteristic and best defined salt is the hydrochloride, which crystallizes in slender, colorless needles, arranged in stellated groups, soluble in 20 parts of cold water, and in its own weight at the boiling heat.

Morphology, that branch of natural science which treats of the laws, form, and arrangement of the structures of animals and plants, treating of their varieties, homologies and metamorphoses; the science of form. Darwin defined it as "The law of form or structure, independent of function," and considered it to be one of the most interesting departments of natural history, and, indeed, almost its very soul. Morphology teaches that most organs of a plant, including the bracts, sepals, petals, stamens, and pistils, are modifications of leaves. With regard to animals, it investigates the tissues of which their structures are composed (see HISTOLOGY), the states through which each animal has to pass before reaching maturity (see EMBRYOLOGY), and the modifications of form which the same organ undergoes in different animals. For instance, the hand of a man, the forefoot of a mole, adapted for digging, the leg of the horse, the paddle of the porpoise, and the wing of the bat, are all only modifications of one type. Darwin accounts for this by the hypothesis of selection by successive slight modifications. Morphology treats also of serial homologies in the same animal, and of what Ray Lancaster calls homogenous and homoplastic homologies of organs. In philology, "Hence it is evident in what sense alone there can be a science of morphology or of the adaptations and readaptations of articulate signs to the uses and changes of thought."

Morphy, Paul Charles, an American chess-player; born in New Orleans, La., June 22, 1837. He was distinguished as being probably the most skillful chess-player that ever lived. He died in New Orleans, July 10, 1884.

Morrill, Anson Peaslee, an American politician; born in Belgrade, Me., June 10, 1803; devoted himself to mercantile pursuits in his native town; in 1833 was elected to the Legislature, and in 1839 was appointed sheriff of Somerset county, and held the office till 1840; in 1850 was appointed land agent by Governor Hubbard; in 1853 ran for governor on the Prohibition and Free-Soil tickets, but was defeated. The following year he was elected as the first Republican governor of Maine, and later was a delegate to the convention which nominated Fremont. In 1860 he was elected to Congress and afterward declined a re-election. He died in Augusta, Me., July 4, 1887.

Morrill, Justin Smith, an American legislator; long popularly known as "The Father of the Senate"; born in Strafford, Vt., April 14, 1810; in early life was a merchant; in 1848 retired from business to take up farming; in 1854 was elected to Congress as a Whig, and was reëlected five times. He prepared the tariff bill named after him, which has been, to a great extent, the model for all protective legislation. He was elected to the United States Senate in 1866 and was continuously a member of that body till his death. The adoption of the law by which every State in the Union has an agricultural college, with an annual revenue from land grants of $25,000, is due chiefly to him. He was regent of the Smithsonian Institute from 1880, and wrote "Self-Consciousness of Noted Persons" (1886). At his death Mr. Morrill was the oldest member of the Senate and had been in continuous congressional service for 43 years. He died in Washington, D. C., Dec. 28, 1898.

Morrill, Lot Myrick, an American politician; born in Belgrade, Me., May 3, 1813; was governor of Maine in 1858–1860; United States Senator from that State in 1861–1876; and Secretary of the Treasury in 1876–1877. He died in Augusta, Me., Jan. 10, 1883.

Morris, Clara, an American actress; born in Toronto, Canada, in 1849; was taken

to Cleveland, O., when an infant. In 1869 she became the leading lady in Wood's Theater, Cincinnati, O., and a year later joined Daly's Fifth Avenue Company, New York. She soon achieved prominence in emotional rôles, and afterward made many tours throughout the United States. Her leading rôles include Camille; Alixe; Mercy Merrick; Miss Multon in "The New Magdalene"; Cora in "L'Article 47"; etc. She is the author of "A Silent Singer"; "Little Jim Crow"; "Autobiography of Clara Morris"; "A Paste-Board Crown"; etc.

Morris, George Pope, an American journalist; born in Philadelphia, Pa., Oct. 10, 1802. In 1846, with N. P. Willis, he founded the "Home Journal." He became famous as a writer of songs, among which is included "Woodman, Spare that Tree." His books are: "Briercliff," a drama; "The Little Frenchman"; and "Poems." He died in New York city, July 6, 1864.

Morris, George Sylvester, an American writer on philosophy; born in Norwich, Vt., in 1840. He published: "British Thought and Thinkers" (1880); "Kant's Critique of Pure Reason: A Critical Exposition" (1882); and "Hegel's Philosophy of the State and of History: An Exposition" (1887). He died in 1889.

Morris, Gouverneur, an American statesman; born in Morrisania, N. Y., Jan. 31, 1752. He was member of the Continental Congress, 1777–1780; of the committee that drafted the Constitution, 1787; minister to France, 1792–1794; United States Senator from New York, 1800–1803. He was noted for ability both in political thought and political action. Specimens of his writing can be seen in Jared Sparks's "Memoirs of Gouverneur Morris" (3 vols. 1832), Annie Cary Morris's "Diary and Letters of Gouverneur Morris" (2 vols. 1889), etc. He died in Morrisania, Nov. 6, 1816.

Morris, Harrison Smith, an American poet; born in Philadelphia, Pa., Oct. 4, 1856. He was editor of "Lippincott's Magazine" from January, 1899. He wrote (with John A. Henry) "A Duet in Lyrics" (1883); "Madonna and Other Poems" "In the Yule-Log Glow" (1892); etc.

Morris, Sir Lewis, an English poet; born in Carmarthen, Wales, in 1833. He was educated at Oxford, where in 1855, he was graduated first-class in classics, and won the Chancellor's prize; was called six years later to the English bar, and practised till 1881, when he accepted the post of honorary secretary, afterward treasurer, to the University of Wales; in 1877 was elected an honorary fellow of Jesus College, Oxford; was knighted in 1895. He wrote: "Songs of Two Worlds" (1872, 1874, and 1875); "The Epic of Hades" (1876), his best known work; "Gwen, a Drama"; "The Ode of Life"; "Songs Unsung"; "Gycia, a Tragedy"; "A Vision of Saints" (1890); "Idylls and Lyrics" (1896); etc.

Morris, Richard, an English scholar; born in London, England, Sept. 8, 1833. He was educated at Battersea College; became lecturer on English language and literature at King's College School in 1869; took holy orders, and became curate of Christ Church, Camberwell, in 1871, and headmaster of the Royal Masonic Institution for Boys in 1875. He published "The Etymology of Local Names" (1857); "Specimens of Early English" (1867); "Historical Outlines of English Accidence" (1872); and edited Chaucer's "Canterbury Tales." He died in London, May 12, 1894.

Morris, Robert, an American financier, and a signer of the Declaration of Independence; born in Lancashire, England, Jan. 20, 1734. Coming to America at an early age, he embarked in mercantile business in Philadelphia, and rapidly acquired wealth. On the outbreak of the Revolution, he took a prominent part in upholding the National cause. In 1775, he was elected to Congress, and in 1781 appointed Superintendent of Finance. He died in Philadelphia, Pa., May 8, 1806.

Morris, William, an English poet; born in Walthamstow, Essex, England, March 24, 1834. He was graduated at Oxford. His artistic bent prompted him to embark in the designing and manufacture of high-class decorations for house interiors. This venture turned out a successful business speculation, and had a material effect in improving the style of design employed for decorative textiles, wall-papers, etc. Morris published an epic poem, "Jason" (1867); "The Earthly Paradise" (1868–1870); "Love Is Enough" (1873); "Sigurd the Volsung" (1877); etc. He translated various Scandinavian works, translated Virgil's "Æneid" and Homer's "Odyssey" into English verse, and published several lectures on art. He was a

WILLIAM MORRIS.

leader of the socialistic movement in Great Britain. He died in Hammersmith, England, Oct. 3, 1896.

Morris Brown College, a coeducational institution for colored students in Atlanta, Ga.; opened in 1885 under the auspices of the African Methodist Episcopal Church; has grounds, buildings, and other property valued at over $150,000; volumes in the library, about 3,000; average number of faculty, 30; average students, 780; ordinary income, $30,000.

Morris Dance, a rustic dance, formerly an accompaniment to the May Day games and Whitsun-ales, and not yet obsolete in England, probably of Moorish origin. Douce conjectures it was introduced into England in the reign of Edward III. by John of Gaunt on his return from Spain; but Strutt was of a different opinion, maintaining that the Morisco or Moor dance differed from the morris dance as practised in England, having been accompanied with castanets or rattles at the end of the fingers, and not with bells attached to various parts of the dress. The principal performers of the morris dance were Robin Hood, Maid Marian, the hobby horse, and the Bavian or fool, the number of actors having varied at different times. Shakespeare has several allusions to the morris dance; the music and whimsical attire of the actors being referred to by Beaumont and Fletcher.

Morris Island, a small island at the S. entrance to Charleston Harbor, S. C. During the Civil War it was occupied by Fort Wagner and other fortifications.

Morrison, Arthur, an English writer; born in 1863. During his employment and residence for some years as secretary of a Charity Trust in the East End of London, he made a study of life in the slums, which he reproduced in his powerful "Tales of Mean Streets" (1895), and "The Child of the Jago" (1896). He wrote also: "Martin Hewitt, Investigator" (1896), detective stories; "The Dorrington Deed-Box" (1897); "To London Town" (1899); etc.

Morrison, Robert, an English missionary; born in Morpeth, England, Jan. 5, 1782. In 1807 he went out as a missionary for Canton. In 1814, having completed the issue of the New Testament in Chinese, he commenced, with the assistance of Dr. Milne, who had joined him in 1813, the translation of the Old Testament. He was also the author of a Chinese grammar and dictionary. He died in Canton, China, Aug. 1, 1834.

Morrison, William Ralls, an American legislator; born in Monroe co., Ill., Sept. 14, 1825; was educated at McKendree College; served in the Mexican War as a private; from 1852 to 1854 was clerk of the Circuit Court of Monroe county; in 1855 was admitted to the bar, and from 1854 to 1860 was a member of the Illinois House of Representatives, serving as speaker the last two years. During the Civil War he served in the Union army as colonel of the 49th Illinois Regiment, which he commanded at Fort Donelson, where he was severely wounded. He was elected to the 38th Congress; in 1864 was defeated for reëlection, and in 1866 was again defeated; in 1870 and 1871 again served in the Legislature; in 1872 was elected to the 43d Congress, and served from Dec. 1, 1873, till March 3, 1887; was an Interstate Commerce Commissioner in 1887-1897, and chairman in 1891-1897. He died Sept. 29, 1909.

Morrisonians, a religious body known also as the Evangelical Union, which was formed in Scotland in 1843. Their founder, the Rev. James Morrison, of Kilmarnock, was ejected from the United Secession Church for holding views contrary to the standards of that body. He held that the death of Christ bore no special relation to the elect, but was for the sins of the whole world; that all men were able of themselves to believe the Gospel; that original sin cannot render men liable to condemnation; that no person ought to be directed to pray for grace to help him to believe. Mr. Morrison was soon after joined by several other ministers of the United Secession Church, and also by several of the Independents; and they formed themselves into a body. They comprise now upward of 40 churches, and have a theological hall in Glasgow for the training of their students. Their opinions are generally those of Mr. Morrison, but their government is independent, and considerable differences of opinion exist among them.

Morrison Observatory, an astronomical observatory at Glasgow, Mo., in lat. + 39° 13′ 45.6″, lon. 6 hours 11 minutes 18 seconds W.; founded in 1874 by Miss Berenice Morrison. One of its directors, C. W. Pritchett, discovered the remarkable red spot on Jupiter. The observatory is equipped with a 12¼-inch Clark equatorial and a 6-inch Troughton & Simms meridian circle.

Morristown, a city and county-seat of Morris co., N. J.; on the Lackawanna, the Whippany, and the Rockaway Valley railroads; 31 miles W. of New York. It is a favorite residence suburb of New York. The city is built on elevated ground about 500 feet above sea-level, and is surrounded by beautiful ranges of hills. Here are the remains of Fort Nonsense, built by Washington's troops and now marked with a memorial monument, the building occupied by Washington as his headquarters, which is filled with relics of the Revolutionary

period, All Souls' Hospital, Memorial Hospital, Morris Academy, Dana Seminary, St. Hilda's School, public library, gas and electric light plants, State and National banks, etc. Four miles distant, on Morris Plains, is the State Lunatic Asylum, one of the most complete institutions of its kind in the world, which cost nearly $3,000,000, and can accommodate 1,000 patients. The city has manufactures of carriages, paper, iron, etc. Pop. (1890) 8,156; (1900) 11,267; (1910) 12,507.

Morro Castle, a Spanish fort at the entrance to the harbor of Havana, Cuba; its dungeons are said to have been the prisons of many convicted of political offenses. Also an imposing fortification on the cliffs overlooking Santiago Bay, Cuba. It was in sight of this fort and under fire of its guns that Lieutenant Hobson and seven men of the United States navy, on June 3, 1898, sank the "Merrimac" at the entrance to the harbor to prevent the Spanish fleet from escaping. On their capture, while attempting to regain their vessels, the men were imprisoned for some time in Morro, but were well treated by the Spaniards and subsequently exchanged.

Mors, in Roman mythology, the god of death.

Morse, Mrs. Charlotte Dunning (Wood), pseudonym CHARLOTTE DUNNING, an American novelist; born in New York State, in 1858. She wrote: "Upon a Cast," a society novel; "A Step Aside"; "Cabin and Gondola."

Morse, Edward Sylvester, an American biologist; born in Portland, Me., June 18, 1838. He founded the Peabody Academy of Sciences, Salem, Mass., being its curator and president after 1881; was Professor at Bowdoin College, 1871–1874; Professor at the Imperial University, Tokio, Japan, 1877–1880; president of the American Association for the Advancement of Science, 1885–1887. Besides numerous scientific and popular papers, he published: "First Book in Zoölogy" (new ed. 1880); "Japanese Homes" (1885); etc.

Morse, John Torrey, an American biographer; born in Boston, Mass., Jan. 9, 1840; was graduated at Harvard College in 1860; coeditor with Henry Cabot Lodge of the "International Review"; editor of the "American Statesmen Series"; and published biographies of Alexander Hamilton (2 vols., his strongest work), John and J. Q. Adams, Jefferson, Lincoln, Franklin, and Dr. Holmes; also "Banks and Banking"; "Arbitration and Award"; and "Famous Trials." He began life as a lawyer in Boston, Mass.

Morse, Mrs. Lucy (Gibbons), an American novelist; born in New York, in 1839. Her home was in New York city. She wrote: "The Cheezles" (1888); "Rachel Stanwood" (1894).

Morse, Samuel Finley Breese, an American inventor; born in Charlestown, Mass., April 27, 1791. He was educated at Yale College, where he devoted special attention to chemistry and natural philosophy; but in 1811 went to England to study painting under West. In 1813 he was awarded the gold medal of the Royal Academy for his model of the "Dying Hercules." Returning to the United States in 1815, he continued painting, and in 1826 established the National Academy of Design, of which he was first president. In 1829 he went to Europe for three years, and during the return voyage worked out roughly a plan for employing electro-magnetism in telegraphy. It was not till 1835, however, that he was able to exhibit an instrument that was found to work well. By July, 1837, this instrument was perfected, and ultimately in 1843 Congress granted him means to construct an experimental line between Washington and Baltimore. From that time Morse's instrument came into general use in the United States and Europe. In 1857 the representatives of 10 countries met at Paris, and voted him $80,000. He died in New York city, April 2, 1872.

Morsel of Execration. See CORSUED.

Mortality, Law of, the statement of the average proportion of the number of persons who die in any assigned period of life or interval of age, out of a given number who enter on the same interval, and consequently the proportion of those who survive. Tables showing how many out of a certain number of infants, or persons of a given age, will die successively in each year till the whole become extinct, are generally called tables of mortality. In England the bills of mortality, or abstracts from parish registers, were long the only means of arriving at these results; but being found very imperfect and unsatisfactory, they were supplanted in 1836 by a general registration. The registers, if kept with accuracy and minuteness, enable us to determine the proportion of deaths, not only at different ages and in different regions, but at different seasons, in persons of different occupations and habits, in towns, or the country; and thus afford valuable materials for the science of political economy. The average rate of mortality is affected by regular or constant causes, such as race, climate, age, sex, profession, social position, density of population, political institutions, habits, etc., and by such irregular or occasional causes as war, famine, pestilence, etc., but notwithstanding the interruption of these occasional causes a constant tendency to a mean has been found to exist in any given state of society. The tendency of a popula-

tion to increase depends rather on the facility of procuring the means of subsistence than on the rate of mortality.

The United States census of 1900 indicated such a remarkable lowering of the average death rate of the country that it was believed that the life insurance companies would be obliged to reconstruct their mortality tables.

Mortar, a vessel, generally made in the form of a bell or conical frustum, in which substances are pounded by a pestle. When large, they are made of cast iron; a smaller size is made of bronze, and those for more delicate pharmaceutical operations are of marble, pottery, porphyry, or agate.

A *calcareous cement.* It differs in its characteristics according to the nature, proportions, or treatment of its constituents. The proportions vary from 1½ to 4 or 5 of sand to 1 of lime. Hydraulic mortar is made from certain limestones which include in their composition so large a proportion of iron and clay as to enable them to form cements which have the property of hardening under water, and are called hydraulic limestones. The proportions of clay vary in different quarries, and often in the same quarry from 8 to 25 per cent. See CEMENT; LIME.

Mortar, a short type of ordnance used to force shells at high angles, generally 45°, the charge varying with the range required. They are distinguished by the diameter of the bore, such as 12-inch, 10-inch, and 8-inch, which are the commonest forms of rifled mortars. They were formerly of cast iron or bronze; but, recently, rifled mortars, resembling short howitzers, are made, and these are of steel. The bronze mortars were called "Royals" or "Coehorns," and were generally of a small calibre (as 4¾-inch or 5¼-inch). They were employed in the advanced trenches because of their portability. Mortars of the earlier type had trunnions at the breech and were mounted in a rigid bed of wood or iron, so that they always fired at the same angle of elevation, and had little or no recoil. They were extensively employed in the bombardment of towns or forts, as the projectiles reach the interior of such places well, have great penetrative power because of the height to which they are thrown, and hold large bursting charges which afford a great volume of flame. Smooth-bore mortars are very inaccurate in their fire, as the projectile travels somewhat slowly, and is much affected by wind. Such are now obsolete and are replaced by rifled mortars having considerable accuracy. The United States 12-inch rifled mortars throw shells weighing 1,000 pounds and attaining ranges of at least six miles. The Japanese used 11-inch mortars or howitzers, throwing shells weighing 500 pounds, at the siege of Port Arthur. With their high angle fire they reached the Russian ships in the harbor and sank or disabled most of them. See also BOMB; GUNNERY; HOWITZER; ORDNANCE.

E. L. ZALINSKI.

Mortara, Edgar (-tä'rä), a Jewish boy who, on June 22, 1858, was forcibly carried off from his parents by the orders of the Archbishop of Bologna, on the plea that he had, when an infant, been baptized into Christianity by a Roman Catholic maid-servant. The manner of the boy's abduction, and the refusal of the Roman Catholic authorities to give him up to his parents, becoming known throughout Europe, excited great indignation, more particularly in England. But the boy remained in the hands of the Roman Catholic Church, and became an Augustinian monk.

Mortar Vessel, a class of gunboat for mounting sea-service mortars. Mortar boats were a smaller kind. The most ancient form of mortar vessel was the "bomb-ketch," convenient because of the length without a mast. In the British naval service these several kinds of bomb ships have ceased to exist.

Morte d'Arthur (môrt där'thur), a famous compilation of romances relating to the life and death of King Arthur and the knights of the Round Table, made by Sir Thomas Malory and printed by Caxton (1485). It is in prose, and was translated from the French prose romances. It is the main source on which Tennyson drew in writing his "Idylls of the King."

Mortgage, in law, the conveyance of propery as security for the payment of a debt or performance of a promise, and on the condition that if the debt be duly paid or the promises fulfilled the conveyance shall be void. The term is applied: (1) To the act of making such a conveyance; (2) to the deed by which such conveyance is made; (3) to the rights thereby conferred on the mortgagee. He who makes the mortgage is the mortgager; he for whose benefit it is made is the mortgagee. Whatever may be sold may be mortgaged. Mortgages may therefore cover chattels or real estate. Mortgages must be in writing, either in one single instrument containing the whole case, or in two, one containing the conveyance, the other the condition of the conveyance, this last document being the "defeasance." A deposit of title-deeds, with a verbal agreement, creates an equitable mortgage in some States which recognize this proceeding as a mode of securing a debt. The different States regulate the time in which mortgages are to be recorded, in order to protect innocent purchasers, but an unrecorded mortgage is good as against the mortgagor, or any purchaser knowing of its existence at the time of his

purchase. In those States which recognize chattel mortgages (or mortgages of personal property), a record of the same within a specified time is required, to render them valid as against other claimants.

Mortification, the complete death of part of the body. It is generally the result of acute inflammation, but may be also an idiopathic disease. When the process of decay commences, if slight, it may terminate: (1) By resolution; (2) by adhesion; (3) by ulceration; or (4), as it most commonly does, by the death of the part. To this process the names of mortification, gangrene, and sphacelus have been indifferently applied, but Dr. Thomson proposed to apply the term gangrene to that stage of mortification which precedes the death of a part, and sphacelus to the death itself. In Scots law: (1) The disposition of lands for religious or charitable purposes. (2) A term applied to lands given formerly to the Church for religious purposes, or, since the Reformation, for charitable or public purposes. By the present practice, when lands are given for any charitable purpose they are usually disposed to trustees, to be held either in blanch or feu (see MORTMAIN). (3) A charitable fund or institution obtained from the yearly revenue of such lands.

Mortimer, Edmund, Earl, espoused Philippina, daughter of Lionel, second son of Edward III., King of England. ROGER, son of the preceding, was declared heir to the crown in 1385, but died in 1399, leaving an only daughter, who married Richard, Duke of York, giving to that family a claim to the throne of England. Hence arose the wars of the "Red and White Roses," between the houses of York and Lancaster.

Mortimer, John. See CADE, JACK.

Mortimer, Roger, Earl of March, an English politician; born about 1287. On the death of his father, in the Welsh wars in 1303, he was made the ward of Piers Gaveston. He served under Edward I. in the Scotch war, in 1306–1307, and during the first 14 years of the reign of Edward II. was employed in Scotland, Ireland, and France, and was appointed lieutenant in Ireland in 1317. Three years later he joined the barons in revolt to banish the king's favorites, the Spensers, but was taken and imprisoned in the Tower. Having escaped to France, he allied himself with Isabella, Queen of Edward II., and the barons who shared her discontent. The queen accepted him as her paramour, and having obtained aid from the Count of Hainault, they came to England in 1326, deposed and imprisoned the king, and governed the kingdom at their will. The young prince was proclaimed (Edward III.); Mortimer was created Earl of March, and took a large share of the estates of the Spensers; the deposed king was shamefully murdered by his orders; and at last Edward, weary of subjection to this insolent usurper, and backed by the public hatred of him, assumed the government. Mortimer was seized at the castle of Nottingham, and hung at Tyburn, Nov. 29, 1330.

Mortlake, a parish of Surrey, England, formerly famous for its tapestry works; now malting and brewing are the leading industries. It is also a great boating place, the Oxford and Cambridge race being rowed from Putney to Mortlake. It has associations with Archbishops Anselm and Cranmer, the astrologers, Dr. Dee and John Partridge, Cromwell, Swift, and Stella, Sir Philip Francis, Sir Robert Owen, and Sir Richard Burton.

Mortmain, or **Mortmayn,** possession of real estate in perpetuity by a secular or religious corporation; an unalienable possession.

Morton, James Douglas, 4th Earl of. regent of Scotland, younger son of Sir George Douglas; born in Dalkeith, Scotland, in 1530. Having married a daughter of the 3d earl, he received the earldom on the death of his father-in-law, in 1553. He favored the Reformation, and was made Lord High-Chancellor of Scotland in 1563. Three years later he took part in the murder of Rizzio, and fled to England; he soon, however, obtained the queen's pardon, through the influence of Bothwell. Informed of the plot against Darnley, he refused to share in it, but did not reveal it. He was one of the leading opponents of Bothwell, was again made chancellor, and in 1572 was appointed regent of the kingdom. Having made himself odious to the people by maladministration, he resigned, but recovered his high office soon afterward; later being charged as accessory to the murder of Darnley, he was tried, condemned, and beheaded by the decapitating instrument he himself had introduced into Scotland, June 3, 1581. He died with great calmness, firmly maintaining his innocence.

Morton, John, an English prelate; born in Milborne St. Andrew, Dorsetshire, England, about 1420. He studied at Cerne Abbey and Balliol College, practised as advocate in the Court of Arches, and filled various ecclesiastical and civil offices. He adhered with great fidelity to Henry VI., yet by Edward IV. was made Master of the Rolls and Bishop of Ely. Richard III. imprisoned him, but he escaped, and joining Henry VII. was by him made Archbishop of Canterbury and chancellor (1486). In 1493 he became a cardinal. Sir Thomas More was a page in his house. He died Sept. 15, 1500.

Morton, John Madison, an English playwright; born in Pangbourne, England, Jan. 3, 1811. He wrote over 100 farces, many of great popularity; including the well-known "Box and Cox," adapted from the French. He died Dec. 19, 1891.

Morton, Levi Parsons, an American financier; born in Shoreham, Vt., May 16, 1824. His father was the Rev. Daniel Morton. He showed an early preference for business pursuits, and at the age of 16 entered a country store. In 1849 he went to Boston, and, though possessed of little capital, was admitted as a partner in a prominent mercantile firm; five years later he removed to New York, and in 1863 established the banking house of Morton, Bliss & Co., with a branch in London under the name of Morton, Rose & Co. In 1878 he was elected to Congress and was reëlected two years later. On General Garfield's accession to the presidency he appointed Morton minister to France, where he served with credit till after the election of Cleveland to the presidency. In 1888 he was elected Vice-President on the ticket headed by Benjamin Harrison, and was governor of New York in 1894–1896.

Morton, Oliver Perry, an American statesman; born in Wayne co., Ind., Aug. 4, 1823; studied law and was admitted to the bar in 1847; elected governor of Indiana in 1861, and by his loyalty to the government did much to sustain the administration during the trying times of the Civil War. He was elected a United States Senator from Indiana as a Republican in 1867, serving till 1877, and in the latter year was a member of the Electoral Commission. He died in Indianapolis, Ind., Nov. 1, 1877.

Morton, Samuel George, an American naturalist; born in Philadelphia, Pa., Jan. 26, 1799, studied medicine there and in Edinburgh, and in 1839 was appointed Professor of Anatomy in the Pennsylvania Medical College. Morton may be regarded as the first American who endeavored to place the doctrine of the original diversity of mankind on a scientific basis. His great works are "Crania Americana" (1839) and "Crania Ægyptica" (1844). His museum of comparative craniology, in the Academy of Natural Sciences, Philadelphia, contains some 1,500 skulls — 900 of them human. He died in Philadelphia, Pa., May 15, 1851.

Morton, Sarah Wentworth (Apthorpe), an American poet; born in Braintree, Mass., Aug. 29, 1759. She was the writer of "Quabi," an Indian tale in four cantos (1790), and "My Mind and its Thoughts" (1823). She died in Quincy, Mass., May 14, 1846.

Morton, Thomas, an English dramatist; born in the county of Durham, England, in 1764. He entered Lincoln's Inn, but soon quitted law for play-writing, and produced "Speed the Plough" (1798, with its invisible "Mrs. Grundy"), "The Blind Girl" (1801), "Town and Country" (1807), "School for Grown Children" (1826), etc. For 35 years he lived at Pangbourne, near Reading. In 1828 he removed to London, where he died, March 28, 1838.

Morton, William Thomas Green, an American dental surgeon, and the reputed discoverer of anæsthetics; born in Charlton, Mass., in 1819. In 1840 he commenced the study of dentistry in Baltimore, and two years later began to practise in Boston. In 1844, in the latter city, while engaged in experimental study, he discovered and introduced ethereal anæsthesia. It was first publicly tested on Oct. 16, 1846, in a surgical operation at the Massachusetts General Hospital. He patented his new anæsthetic under the name of "letheon," offering its advantages, however, free of cost to the charitable institutions of England and the United States. The committee of the French Academy awarded the Montyon prize of $1,250 to be equally divided between Dr. Jackson and Dr. Morton; but the latter refused to receive this joint award, protested against the decision of the Academy, and in 1852 received the Montyon prize medal. Bills were three times introduced in Congress, awarding him large sums of money, as a national testimonial to the value of his discovery, but did not pass. He died in New York city, July 15, 1868.

Mosaic, a term applied to any work which exhibits a representation on a plane surface by the joining together of minute pieces of hard, colored substances, such as marble, glass, or natural stones united by cement (mastic), and serving as floors, walls, and the ornamental coverings of columns. Mosaic work is of Asiatic origin, and is probably referred to in Esther, ch. i: 6, about 519 B. C. It had attained to great excellence in Greece, in the time of Alexander and his successors, when Sosos of Pergamus, the most renowned mosaic artist of antiquity, flourished. He acquired great fame by his accurate representation of an "unswept floor after a feast." The Romans also excelled in mosaic work, as evidenced by the innumerable specimens preserved. The *Opus tesselatum* was a tesselated geometrical pavement. Byzantine mosaics date from the 4th century A. D. The art was revived in Italy by Tafi, Gaddi, Cimabue, and Giotto, who designed mosaics, and introduced a higher style in the 13th century. In the 16th century Titian and Veronese also designed subjects for this art. The practice of copying paintings in mo-

saics came into vogue in the 17th century; and there is now a workshop in the Vatican where chemical science is employed in the production of colors, and where 20,000 different tints are kept. Modern Roman mosaic consists of pieces of artificial enamel, in place of natural stone. The enamel is drawn out into rods of various sizes, cut into lengths, and arranged in cases something after the manner of printing type, the boxes containing each a different shade or color. Some of the ancient Egyptian beads were thus made. Italy at present leads in this art, and St. Peter's in Rome is remarkably rich in specimens of such work.

In pyrotechnics, a device consisting of a surface with diamond-shaped compartments, formed by two series of parallel lines crossing each other. The effect is produced by placing at each intersection four jets of fire which run into the adjoining ones. The intervals between the jets must be associated with the discharge of others, so as to keep up a succession of fires in the spaces.

Mosaic Glass, a glass formed by the association of various colored opaque or transparent rods of glass, so arranged that the ends may form patterns. Sections being removed, the pieces are arranged for the production of a recurring pattern, or a general combination is formed by the union of a variety of separate ornaments.

Mosaic Gold, in chemistry, SnS_2; bisulphide of tin; prepared by exposing a mixture of 12 parts of tin, 6 of mercury, 6 of sal-ammoniac, and 7 of flowers of sulphur to a low red heat. It forms brilliant gold-colored scales, and is used as a substitute for gold powder.

Mosaic Wool, a form of rug or mat made from colored wool, arranged so that the ends of the wool present a definite pattern. Threads of wool of equal length are placed horizontally in a frame, close together, to form a compact mass. They are of different colors, and the colors are arranged in conformity with a pattern. The threads, being held firmly in the frame, are then cut across to form cubical masses, all the threads in each cube being kept rigidly in their places. The cube is then placed in a frame with the threads vertical, and a clean cut made across the top. The smooth surface is then wet with a solution of rubber, and a piece of canvas firmly attached. When dry, a machine cuts off a slice of such thickness as is desired for the length of the pile. A rug or mat of a velvety finish is thus produced. Other slices can be cut off in the same way till the wool is exhausted.

Mosasaurus, in palæontology, the name given by Conybeare to a gigantic marine Saurian, called by Wagler Saurochampsa. It is now made the type of a family, *Mosasauridæ.* *M. camperi* was discovered in the Maestricht chalk in 1780, and was named by Sömmering *Lacerta gigantea.* It came into possession of the French at the fall of Maestricht (1794). Another species, *M. princeps,* is believed to have been 70 feet long.

Mosaylima, or **Moseilema** ("Little Moslem"), one of the most important rivals of Mohammed. The traditions about his life and age are extremely contradictory and legendary. It appears, however, tolerably certain that he had risen to some eminence in his tribe, probably as a religious teacher only, before Mohammed assumed his prophetical office. It was in the ninth year of the Hegira that Mosaylima, at the head of an embassy sent by his tribe, appeared before Mohammed, in order to settle certain points of dispute. Shortly afterward Mosaylima openly professed himself to be a prophet. Mohammed sent a messenger to him, requesting him to reiterate publicly his profession of Islam. This was refused. The issue between them was one of supremacy, rather than of dogma, and was settled amicably in favor of Mohammed. After Mohammed's death, Abubekr, the Caliph, sent Khalid, "the Sword of the Faith," with a number of troops, to compel Mosaylima to submission. The latter awaited the enemy with so formidable a force that Khalid is said to have hesitated for a whole day and night. In the battle which ensued, he was victorious; Mosaylima fell, and his heresy was practically stamped out.

Mosby, John Singleton, an American military officer; born in Powhatan co., Va., Dec. 6, 1833; was graduated at the University of Virginia, and became a lawyer. On the outbreak of the Civil War, he entered the Confederate service as adjutant of the 1st Virginia Cavalry. In 1862–1865 he was colonel of the "Partisan Rangers," an independent cavalry command that did very effective work in cutting National communications, destroying supply trains, capturing outposts, etc. After the war he was United States consul at Hong Kong in 1875-1885; practised law in San Francisco; and was connected with the National Department of Justice in 1904-1910. He wrote "War Reminiscences" (1887) and "The Dawn of the Real South" (1901).

Moscheles, Ignaz (mōsh'e-les), a Bohemian musician; born in Prague, May 30, 1794, of Jewish parents; was between 1808 and 1816 the favorite music master of Vienna. Settling in London in 1825, he taught at the Academy of Music and conducted the philharmonic concerts. After residing in England for 26 years, he be-

came professor in the conservatory of Leipsic. Moscheles was a brilliant performer on the piano and an able composer. He edited, in English, Schindler's "Life of Beethoven" (1841). He died in Leipsic, March 10, 1870.

Moschus, in zoôlogy, a genus of *Cervidæ*, with a single species, *M. moschiferus*, the musk deer. It differs in many important structural characters from the cervine type; there are no horns in either sex, and the canines are prolonged three inches below the chin. The presence of a gall-bladder would seem to indicate relationship with the *Antilopidæ*. It is an alpine animal, inhabiting the mountains of Central Asia to China and Siberia.

Moschus, a Greek bucolic poet, usually designated of Syracuse in Sicily; he flourished about 150 B. C., and wrote in a style of almost painfully finished elegance an epitaph on Bion, a couple of short epics, and minor poems. His works are generally printed along with those of Theocritus and Bion; and there is a fine prose translation of the three, with an introduction by Andrew Lang (1889).

Moscow (Russian, Moskwá), the second capital (formerly the only capital) of the Russian empire. It is the chief town of

MOSCOW MUSEUM.

the government of the same name, and is situated in a highly-cultivated district on the Moskwa river, 400 miles S. E. of St. Petersburg, with which it is in direct communication by rail. It is surrounded by a wall or earthen rampart 26 miles in circuit and of no defensive value; and a considerable portion of the inclosed space is unoccupied by buildings. The quarter known as the Kreml or Kremlin, on a height about 100 feet above the river, forms the center of the town, and contains the principal buildings. It is inclosed by a high stone wall, and contains the old palace of the czars and several other palaces; the Cathedral of the Assumption, founded in 1326, rebuilt in 1472; the Church of the Annunciation, in which the emperors are recrowned; the Cathedral of St. Michael; the Palace of Arms, an immense building occupied by the senate, the treasury, and the arsenal; and the Tower of Ivan Veliki (209 feet), surmounted by a gilded dome, and having at its foot the great Czar Kolokol, or king of bells, 60 feet round the rim, 19 feet high, and weighing upward of 192 tons, the largest in the world. Outside the Kreml the chief building is the Cathedral of St. Vassili, with no less than 20 gilded and painted domes and towers, all of different shapes and sizes. Among the principal educational establishments are the Imperial University, founded in 1755 by the Empress Catharine. It has a rich museum and a library of 200,000 volumes, and is the most important of the Russian universities. Moscow is the first manufacturing city in the empire, and of late years its industrial and commercial activity has greatly increased. The principal manufactures are textile fabrics, chiefly woolen, cotton, and silk, besides hats, hardware, leather, chemical products, beer, and spirits. From its central position Moscow is the great entrepôt for the internal commerce of the empire. The foundation of the city dates from 1147. It became the capital of Muscovy, and afterward of the whole Russian empire; but was deprived of this honer in 1703, when St. Petersburg was founded. The principal event in the history of Moscow is the burning of it in 1812 for the purpose of dislodging the French from their winter quarters. The Emperor Nicholas II. and Empress Alexandra observed the ceremony of coronation in the Grand Kremlin in Moscow on May 26, 1896. The festivities were of unparalleled splendor and lasted for three weeks. Pop. (1907) 1,359,254.

Moselema. See MOSAYLIMA.

Moselle (German, Mosel), an affluent of the Rhine, rises at the S. W. extremity of the Vosges Mountains in France, at an elevation of about 2,412 feet. Its course is N. W. as far as Toul, passing Epinal on the way; thence it proceeds in a N. E. direction (latterly, with many zigzag picturesque windings) through Luxemburg and Rhenish Prussia, and joins the Rhine at Coblenz, flowing on its way through Metz, Thionville, and Treves. Its entire length is 315 miles, and it is navigable up to Frouard, 214 miles from Coblenz. The wines grown in the basin of the Moselle are noted for their lightness and their delicate aromatic flavor.

Moselle, formerly a frontier department in the N. E. of France, but the greater part

of it was taken by Germany after the war of 1870–1871, and became part of Alsace-Lorraine. The small portion left to France was joined to the department of Meurthe.

Mosen, Julius (mō′zen), a German author; born in Marieney, Saxony, July 8, 1803. He gave up the practice of law at Dresden to become official dramatist of the court theater at Oldenburg. His chief work was the epic "Ahasuerus" (1838), based on the legend of the Wandering Jew. He published "Poems" (1836), some of which became popular songs; the historical dramas "The Brides of Florence" (1842), "The Prince's Son" (1858), "Emperor Otto III." (1842), "Henry the Fowler" (1836), etc.; and the novels "The Blue Flower" (1837), "Homesickness" (1837), etc. ("Works," new ed., 6 vols., Leipsic, 1880.) He died in Oldenburg, Oct. 10, 1867.

Mosenthal, Salomon Hermann von (mō′-zen-täl), a German dramatist; born in Cassel, Jan. 14, 1821. He obtained a position in the Austrian government in 1850. His best-known works are "Deborah" (1850: the original of "Leah the Forsaken"), and "Heliotrope Manor" (1857). He wrote also "The German Actors" (1863); "The Mayor of Altenbüren" (1868); "Maryna" (1871); the tragedies "Düweke" (1860); "Pietra" (1865); etc. ("Works," 6 vols., Stuttgart, 1878.) He died in Vienna, Feb. 17, 1877.

Möser, Albert (muh′zer), a German poet; born in Göttingen, Prussia, May 7, 1835. His life has been that of a teacher. He wrote "Poems" (1865; new ed. 1890); "Night and Stars" (1872); "Idylls" (1875); "From the Attic" (1893); "Pol de Mont" (1893); etc.

Moser, Gustav von (mō′zer), a German comedy writer; born in Spandau, Prussia, May 11, 1825. He resigned from the army in 1856 to devote himself to literature. Among his pieces are: "What do You Think about Russia?"; "A Modern Barbarian"; "Ultimo"; "The Hypochondriac"; "The Temptress"; "The New Governess." ("Works," 18 vols., Berlin, 1873-1888.) He died Nov. 9, 1903.

Möser, Justus (muh′zur), a German jurist; born in Osnabrück, Prussia, Dec. 14, 1720. He held important government posts. Modern German historiography may be said to date from him; his theory being that history should describe the development of peoples, laws, customs, and habits, instead of being a mere chronicle of dynasties and wars. His most celebrated works were "History of Osnabrück" (3d ed. 1819); and "Patriotic Reveries" (latest ed. 1871), a work of national importance. ("Works," 10 vols., Berlin, 1842–1844.) He died in Osnabrück, Jan. 8, 1794.

Moses (Egyptian mo, water, and use, saved), the son of Amram and Joahabed, of the tribe of Levi. This great Jewish historian and lawgiver was born in Egypt, during the rigor of the decree that commanded the death of every new-born male Israelite. To save her child from this cruel edict, his mother made an ark, or basket of rushes, and carefully placing the infant in this cradle, committed it to the river, in a place where she was aware that the daughter of Pharoah was in the habit of bathing; the mother secreting herself among the reeds to note the effect of her stratagem. The princess, pitying the child thrown thus on her mercy, adopted the infant, gave it to the mother to nurse, and took charge of the child's future education and welfare; and Moses, being brought up in the court of the king, became "learned in all the wisdom of the Egyptians." When he attained his 40th year, seeing an Egyptian officer ill-treating an Israelite, he killed the task-master, and hiding the body, fled into the wilderness, where he pursued the calling of a shepherd for 40 years, marrying the daughter of a priest of the people among whom he had found shelter and protection. While so employed, the Almighty appeared to him in the "burning bush," and commanded him to return to Egypt, and lead his people from the house of bondage. In obedience to this command, Moses, after much opposition, eventually brought the Israelites out of Egypt, passed the Red Sea, and came within sight of the Promised Land; when, in consequence of the transgressions of the people, they were turned back, and condemned for 40 years to wander in the wilderness, till the whole generation of offenders had died. This national migration known as "The Exodus of the Hebrews," took place about 1300 B. C. Moses was not allowed to enter the land of Canaan. Having seen the glorious country from the heights of Mount Pisgah, he died in his 120th year, on the confines of Canaan. Moses is considered the author of the first five books of the Old Testament — Genesis, Exodus, Leviticus, Numbers, and Deuteronomy — or, as they are collectively called, the "Pentateuch," or the "Five Books." The Decalogue given through Moses, and many of the broader provisions of the Mosaic laws form the basis of all present moral and legal codes. His institutions breathe a spirit of freedom, purity, intelligence, justice, and humanity, unknown to contemporary nations,

MOSES.

and above all, of supreme love, honor, and obedience to God. They molded the character of the Hebrews, and transformed them from a nation of shepherds into a people of fixed residence and agricultural habits.

Moses, John, an American historian; born in Chippewa, Canada, Sept. 18, 1825; after 1837, a resident of Illinois. He was admitted to the bar in 1847. In 1874–1876 he was a member of the legislature. His principal work is "Illinois, Historical and Statistical" (2 vols. 1890–1892). He wrote several other historical works and papers. He died in Chicago, Ill., July 3, 1898.

Mosheim, Johann Lorenz von, a German church historian; born in Lübeck, Germany, Oct. 9, 1694. He studied at Kiel, became in 1723 Professor of Theology at Helmstedt, in 1747 at Göttingen, as well as chancellor of the university. His theological works are numerous, among which are a work on Bible morality and "Sacred Discourses." But his most important work is his "Church History" (1726; improved ed. 1755), being familiar to every student as a work of great learning and accuracy. It has been translated from the original Latin into English and other languages. Other works were "Greater Institutions of Christian History" (1763); "Christianity Before Constantine" (1753); "Dissertations on Ecclesiastical History" (new ed. 1767); and a "History of Heresy" (2 vols. 1746–1748). Mosheim's standpoint is that of liberal orthodoxy. He died Sept. 9, 1755.

Moskenström. See MAELSTRÖM.

Moskwa, a branch of the Volga's tributary, the Oka, rises in a marsh in the E. of Smolensk, flows E. to the city of Moscow, and thence 112 miles S. E. to the Oka. Its total course is 305 miles. It is navigable from its mouth to Moscow, except between November and April, when it is generally frozen, and is connected directly with the Volga by the Moskwa Canal.

Moslem (Arabic, *muslim*, a true believer; plural, *muslimin*, hence the corrupt form, *musulman*), a general appellation in European languages for all who profess Mohammedanism.

Mosque, a Mohammedan temple or place of worship. The design is not normal, and consequently the main form is not a settled one; but a mosque has three essential parts, which must never be wanting: these are the Mihrab, or Hall of Prayer, which marks the direction of Mecca and which must consequently have had a different position in different countries; a place for the ablutions, which precede prayer; and finally a large space for the entry and departure of the faithful, for the reading of the Koran and prayers. In this space are the maksura, or seat of the Caliph; as also a place for the preservation of the Koran, and finally the mimbar, or kind of pulpit. A further requirement is the minaret, a kind of tower, from which the iman calls the hour of prayer, and of which the larger mosques generally possess four or six.

Mosquito, the popular name of various two-winged insects, having a large proboscis, with which they attack man, sucking his blood. They belong chiefly to the genus *Culex*, or at least the family *Culicidæ;* though Humboldt says that those of South America are species of *Simulium*. The mosquito of the West Indies and parts of America is *C. mosquito*. Mosquitoes abound also in the tropical parts of the Eastern World, and are troublesome in the Polar regions. They so much resemble each other in appearance and coloring that the number of species and their geographical distribution have not been perfectly determined. The male of the mosquito feeds on plant-juices; it is the female which attacks man. The scientific theory attributing to the bites of mosquitoes the transmission of malaria and yellow fevers, has led to experiments by various physicians in the hospital in Havana, Cuba, and by Dr. Doty (during the summer of 1901) on Staten Island, N. Y. See MALARIA.

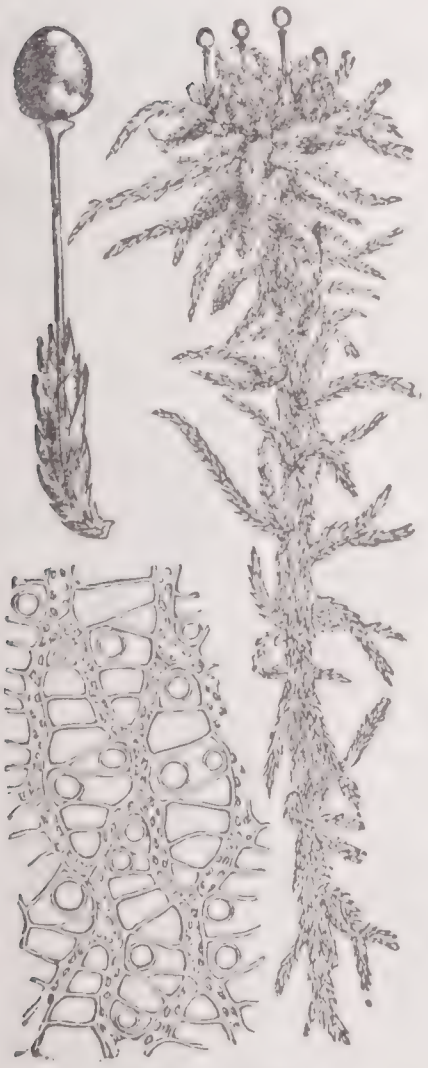
Mosquito Coast, or **Reserve,** a maritime tract of Nicaragua, having E. the Caribbean Sea, and S. the river San Juan, which separates it from Costa Rica. The river Segovia, which enters the Caribbean Sea near Cape Gracias a Dios, is the boundary with Honduras. Next the sea, the surface is low and broken by numerous lagoons, but gradually rises toward the interior. Mosquito Coast is inhabited by people of mixed Indian and African race, some 15,000 in all, and by tribes of aboriginal Indians. Chief town, Bluefields. Products, similar to those of the West Indies. Mosquito Coast was discovered by Columbus in 1502, and appropriated by Spain. From 1655 to 1850 it was an English protectorate, but in 1860 was made over to Nicaragua. After being for some time under the protectorate of Great Britain the Reserve was reincorporated with the territory of Nicaragua by free resolution of the Indians and named the Department of Zelaya, Nov. 20, 1894.

Mosquito Fleet, a term given to what is known among naval men as "the second line of defense." It is used in protecting the fortifications and harbors along the coast line, and, like the insect for which it is named, annoys the enemy in every way, at the same time preventing the possibility of a blockade. A fleet of this kind was organized during the American-Spanish War in 1898. It was composed of all sorts and kinds of ships to the number of about 130, and included revenue cutters, tugs, lighthouse tenders, yachts, river and harbor steamers, and any other craft that could

carry a gun or go a few miles out to sea. For convenience the coast from the Canada line to Key West, and from there around the Gulf of Mexico to Rio Grande, was divided into eight districts, and each district was patrolled day and night, by vessels in their turn. A complete system of signals was in use; and had the Spaniards at any time put in an appearance they would have met a sturdy resistance. See NAVAL FLEETS.

Mosses (*Musci*), a class of small flowerless plants, important in the economy of nature, and of great interest in their life history. They are found in all climates, but are most abundant in temperate regions and in damp places. They are included with the liverworts in the division *Muscineæ*, which is sharply separated from the higher division of vascular cryptogams (ferns, etc.) by the absence of vessels.

MOSS.



SPHAGNUM.

The uses of mosses in medicine and the arts are few and unimportant; but in mountain regions, the thick felts of moss and deep beds of peat soak up the rain, and so prevent floods from sudden storms, and in dry weather supply the streams through weeks of drought. With favoring surroundings, the life of a moss-plant seems to be endless; the mosses (*Sphagnum*) we see growing today in a bog are the tips of plants which began life perhaps thousands of years ago, and which have formed a great bed of peat, possibly 20 feet thick. This social habit of moss is a peculiarity. In some species cushions of marvellous regularity are formed; it enables individual plants to stand erect, and is of great importance in the process of fertilization. The capsules of many mosses must be familiar to every one as small sacs at the ends of their hair-like stalks, which rise in great numbers from a moss cushion. These contain the spores, from each of which when sown there grows in a few days a tiny thread-like plant, the protonema. Buds of young moss plants soon appear on this, and then, as a rule, the thread-plant dies. A moss plant consists of a stem with leaves and roots. The roots will grow out from any part of the plant that is kept dark and damp; they are very like the protonema, indeed buds of new plants may arise

MOSS.

on them. Even from a detached leaf, roots and new plants will grow. By their branching habit, and by the death of the older parts, which leave the branches as separate plants, and in many species by the growth of special buds which are easily separated from the parent, mosses are rapidly propagated, indeed in many species the production of spores is rare. The fern has a similar story, but in this case the spore-bearing generation is the conspicuous plant. Fossil remains of mosses have been found in rocks of Palæozoic age.

Classification.—There are about 3,000 species, divided into four orders: (1) *Bryeeæ*, which include the vast majority of genera. (2) *Phascaceæ*. (3) *Andreaceæ*, no operculum; the sporangium opens by 4–8 longitudinal slits. (4) *Sphagnaceæ*, or bog mosses.

Mostar, formerly the chief town of Herzegovina, on the Narenta, about 35 miles from the Adriatic, and the terminus of a railway running 27 miles down the valley. It takes its name (Most Star—"old bridge") from a Roman bridge of one arch, 95 feet in span; has numerous mosques, and is the seat of a Roman Catholic and a Greek bishop. Wine is produced, and

swords and tobacco manufactured. Pop. 14,370.

Mosul, a formerly important town of Asiatic Turkey, in the province of Al-Jezireh (ancient Mesopotamia); on the Tigris, opposite the ruins of ancient Nineveh, 200 miles up the river from Bagdad. It is partly surrounded by crumbling walls. During the Middle Ages it was a very prosperous city, with much industry (muslin takes name from this town); now its bazars are filled with the manufactures of the West, and almost the only export is gall nuts, from the Kurdish mountains. Mosul was formerly the metropolis of the Mesopotamian Christians (the Nestorians, the United Chaldæans, the Jacobites, etc.), and still contains many Catholic Christians. The town, which existed in 636, enjoyed its greatest prosperity in the 9th century, and onward, till the desolating inroads of the Mongols in the 12th. Then came the Seljuks; and they were followed by the Turks; since then Mosul has steadily declined. Pop. estimated at 61,000.

Motacilla, in ornithology, the typical genus of the family *Motacillidæ*. *M. lugubris* (or *Yarrelli*) is the pied wagtail, *M. alba* the white, *M. boarula* the gray, *M. flava* the grayheaded, and *M. rayi*, Ray's wagtail.

Mota-Padilla, Matias de la (mō'tä-pädēl'yä), a Mexican historian; born in Guadalajara, Mexico, Oct. 6, 1688. He was a lawyer, and during the latter part of his life a priest. He wrote among other things "History of the Conquest of New Galicia" (1870–1871). He died in 1766.

Motazilites. a numerous and powerful sect of Mohammedan heretics, who to a great extent denied predestination, holding that man's actions were entirely within the control of his own will. They maintained also that before the Koran had been revealed man had already come to conclusions regarding right and wrong, and held extremely heretical opinions with reference to the quality or attributes of Deity. They appeared a few generations after Mohammed, and became the most important and dangerous faction in Islam.

Motet, or **Motett,** a vocal composition in harmony, set to words generally selected from the Scriptures, or to paraphrases of the sacred writings. The motett was, at one time, a varied treatment of a given theme similar to the poem called in Spanish a "motto." Like the madrigal, the motett was at first set to words of a profane character, and there are ecclesiastical decrees extant forbidding its use in church. Metrical psalms and hymns, in which the several verses are sung to a varied setting, are called motetts in the Roman Catholic Church, and many sacred cantatas of unconnected movements are also similarly named.

Moth, the popular name of a numerous and beautiful division of lepidopterous insects (*Heterocera*), readily distinguished from butterflies by their antennæ varying in form to a point instead of terminating in a knob, by their wings being horizontal when resting, and by their being seldom seen on the wing except in the evening or at night (though there are many species of moth that fly in the brightest sunshine, and some butterflies that appear at twilight). Moths are comparatively larger than butterflies and more hairy or downy in character. There are thousands of species, differing greatly in color, form, size, habit and diet. The giant owl moth of Brazil measures nearly a foot from tip to tip, and there is a gilded species smaller than a pin's head. Certain moths are destitute of tongues and pass through the winged state without food. Among the moths notable for their striking appearance, are the death's head, the luna (having long-tailed wings of light green), the royal walnut moth (exclusively American), the tiger and the sphinx moths.

In their larval state, when they are known as caterpillars, moths are among the worst foes of our gardens, orchards and shade trees. The larva of the white miller is very common in gardens; the tent caterpillar is recognized by the webs it makes in fruit trees, and the larva of the apple moth (developed from eggs deposited in the blossom end of the fruit) is very familiar. The household moths (*Tineæ*) are well known on account of the injury they work among clothes, carpets, furs, etc. The best preventives against the *Tineæ* are thorough cleansing, careful packing and the use of turpentine, gum camphor, black pepper, tobacco, sulphur (in fumigations), etc.; cedar trunks form an excellent protection.

One species of moth, the silk worm (*Bombyx Mori*), has long been serviceable to man. Other species make very large cocoons of silk capable of producing a fabric more durable than the silk of commerce.

Mother Ann, a name given to Ann Lee (*q.v.*).

Mother Carey's Chicken, a name familiarly given by sailors to the stormy petrel and other small oceanic species of petrel. The name Mother Carey's Goose is, in like manner, given to the great black petrel or gigantic fulmar of the Pacific Ocean, popularly called "bone-breaker."

Mother of Cities, Balkh (the ancient Bactra), in Central Asia; so named by Orientals in allusion to its great antiquity. The modern town occupies but a fraction of the surface embraced by the ancient city, the remains of which cover a space 20 miles in circumference.

Mother Goose, the imaginary author of "Mother Goose's Melodies," the familiar collection of nursery rhymes. The name is probably of French origin; Bertha au Grand Pied (Queen Goosefoot), mother of Charlemagne, being in France considered as patroness of children, with a festival observed on January 2d. It has its more direct source, however, in the "Histoires ou contes du temps passé" of Charles Perrault (*q.v.*). This work bore the subtitle "Contes de ma mère l'oie" ("Tales of My Mother Goose"). In it literary form was for the first time given to "Puss in Boots," "Cinderella," "Blue-Beard," "Little Red Riding-Hood" and other traditional childhood classics. "Mother Goose's Melodies" were printed in London in 1760.

Mother-of-pearl, in zoölogy and commerce, the internal layer of oyster and other nacreous or pearly shells. It is of silvery brilliance and iridescent. This is due to the alternate layers of carbonate of lime and membrane. In entomology, a moth of the family *Botydæ*.

Mother of Pearl Micrometer, the micrometer of Cavallo. A thin, semi-transparent slip of mother-of-pearl, one-twentieth of an inch wide, is ruled with fine graduations, and mounted within the tube at the focus of the eye-lens of the telescope, where the image is formed.

Mother of Presidents, a name given to Virginia because that State has given six chief magistrates to the Union, namely: Jefferson, Madison, Monroe, Tyler, Harrison, and Washington.

Mother of States, a name given to Virginia, from the fact that out of the original Colony of Virginia were formed Kentucky, Ohio, Indiana, Illinois, and West Virginia.

Motherwell, William, a Scotch poet; born in Glasgow, Scotland, Oct. 13, 1797. He was educated in Edinburgh and Paisley; at the age of 15 was apprenticed to the sheriff-clerk of the latter town, and became sheriff-depute in 1819. While filling this situation he did his best work both as poet and ballad collector. After editing the collection of songs called the "Harp of Renfrewshire" (published in 1819), he compiled the more important collection of ballads published in 1827, under the title of "Minstrelsy: Ancient and Modern, with a Historical Introduction and Notes." In 1828 he became editor first of the Paisley "Advertiser," and then (1830) of the Glasgow "Courier." He published in 1832 a collection of his own poems. He died in Glasgow Nov. 1, 1835.

WILLIAM MOTHERWELL.

Motherwort (*Leonurus cardiaca*), a labiate plant, three feet high, flowers in crowded whorls, white with a reddish tinge, found in some parts of England and North America.

Motif, a musical term meaning the principal theme on which the movement of a musical composition is constructed, and which, during the movement, is constantly appearing in one or other of the parts, either complete or modified. In elaborate and long compositions there are also secondary motifs. The leit motif is a short passage of marked melody illustrating certain characters or ideas of a musical drama, and constantly recurring whenever the former appear or are referred to.

Motion, a movement. In art, the change of place or position which from certain attitudes a figure seems to be making. In law, an application made to a court of justice by the parties to an action or their counsel, to obtain some rule or order of court necessary to the progress of the action. In music: (1) The movement of a single part with reference to intervals taken by it. Conjunct motion takes place when the sounds move by single degrees of the scale, *e. g.*, C, D, E, F; disjunct motion in when they move by skips, *e. g.*, C, F, D, G. (2) The movement of two or more parts with relation to each other. Similar or direct motion is when parts move in the same direction either by single degrees or by skips; contrary motion is when parts move in opposite directions; oblique motion is when one part remains stationary while another moves.

In watches and clocks, the train of wheels immediately concerned in the moving of the hands.

Organic molecular motion, a kind of motion occurring in nearly all the internal processes in organic bodies. It must exist to produce absorption, secretion, etc.

Motion, Laws of, three principles or axioms which were laid down by Sir Isaac Newton:

(1) If a body be started in motion, and if no force act upon it, that body will continue in motion in the same direction, and with the same velocity. Of course this cannot be directly proved by observation, no one being able to start a body in a portion of the universe free from other bodies which will attract it, and if he could start it on in a vacant space, he could not watch its subsequent progress through infinite

space and eternity. But the length of time during which tops will spin or finely mounted pendulums will go in the exhausted receiver of an air pump, can be accounted for in no other way than by supposing the truth of the first law of motion.

(2) Change of motion is proportioned to the acting force, and takes place in the direction of the straight line in which the force acts.

(3) To every action there is always an equal and contrary reaction; or, the mutual actions of any two bodies are always equal and oppositely directed in the same straight line.

Motley, John Lothrop, an American historian; born in Dorchester, Mass., April 15, 1814; was educated at Harvard University and Göttingen, Germany; published two novels called "Morton's Hope" (1839) and "Merry Mount" (1849), contributed to the "North American Review"; and entered political life as a member of the Massachusetts House of Representatives. He published, after 10 years' labor and a journey to Europe, his great "History of the Rise of the Dutch Republic" in 1856, a work which was further developed in the "History of the United Netherlands" (1860–1865); and the "Life and Death of John of Barneveld" (1874). He was minister from the United States to Austria in 1861–1867, and to Great Britain in 1869–1870. He died in Dorchester, England, May 29, 1877.

JOHN L. MOTLEY.

Motmot, the Mexican name of a bird described by Hernandez. The best known species is *momotus brasiliensis* (*Rhamphastos momota,* Linn.), described by Waterton under its native name, houtou. From its geographical range this cannot be the original motmot of Hernandez. The motmots resemble the bee-eaters, but the plumage, in which shades of green and blue predominate, is not so brilliant. They are said to be solitary birds, or at most living in pairs among the gloomy forests of the neotropical region. Their ordinary food is small reptiles, insects, and fruits.

Motocycle. See AUTOMOBILES.

Motorcycle. See AUTOMOBILES.

Motor Vehicles. See AUTOMOBILES.

Mott, Lucretia, an American reformer; born in Nantucket, Mass., Jan. 3, 1793. She was educated in the school where James Mott, whom she subsequently married, was a teacher, and early became interested in the movement against slavery. In 1818 she joined the Friends, and soon became known for her clearness of thought and speech. In 1833 she assisted in the formation of the American Anti-Slavery Society, and in 1840 went to London as its delegate to the World's Anti-Slavery Convention. She was one of the four promoters of the Woman's Rights Convention in the United States, and was an active exponent of the cause of equal suffrage. She died in Philadelphia, Pa., Nov. 11, 1880.

Mott, Valentine, an American surgeon; born in Glen Cove, Long Island, N. Y., Aug. 20, 1785; studied in London and Edinburgh. In 1811 was Professor of Surgery in Columbia College; afterward in other colleges. Dr. Mott early gained a world-wide reputation for boldness and originality as an operative surgeon. He was the most intrepid operator of his time. He died in New York city, April 26, 1865.

Motte, Fort, a Revolutionary fort, on the Congaree river, S. C., about 33 miles below Columbia.

Motto, a word or sentence added to a device, and commonly used, when put on a scroll, as an external ornament of coat-armor. The use of mottoes for this purpose is very ancient, and when appended to a coat of arms, a motto is frequently hereditary in a family. Strictly, the motto should bear an allusion to something in the achievement; but in modern times, the taking of it entirely depends upon the pleasure of the bearer, and it may be changed at will. Also, a sentence or quotation prefixed to anything written or published.

Mouflon, Moufflon, or **Mufflon,** a wild species of sheep, formerly common in Spain, now restricted to Corsica and Sardinia. It is about the size of a common sheep, brownish-gray in color, with a dark dorsal streak, and a varying amount of white on the face and legs. Horns are present in the males only, and the tail is very short. The mouflon frequents the summits of hills, in small herds, headed by an old ram, and is not easily approached by the hunter. It breeds freely with the domestic species.

Moulins, a town in France, capital of the department of Allier, on the Allier, over which is a bridge of 13 arches, built 1750–1763, 194 miles S. E. of Paris. The principal public buildings are the cathedral (Notre Dame), never completed, the magnificent mausoleum of Duke Henry of Montmorency in the chapel of the lyceum, a museum,

public library of 30,000 volumes, and ruins of a castle belonging to the Dukes of Bourbon. It is a suffragan bishopric of Sens. Manufactures, machinery for sawmills, straw and felt hats, and cabinet making. The town owes its name to the great number of watermills, formerly on the Allier. Marshal Villars, opponent of Marlborough, and the Duke of Berwick, natural son of James II., were born here.

Moulmein (-mīn′). See MAULMAIN.

Moulting, a name for the process by which birds lose some of their feathers, crustaceans cast their cuticular shells, or young insects get rid of their outer husk in metamorphosis. The shedding of the hair in mammals and the sloughing of snakes, etc., are also analogous.

Moulton, Louise Chandler, an American poet; born in Pomfret, Conn., April 10, 1835. She married William U. Moulton, a Boston publisher, and published children's stories, novels, essays, and poems. She wrote: "Bedtime Stories" (1873; followed by a second series in 1875, and a third in 1880); "Some Women's Hearts" (1874); "Miss Eyre from Boston," etc. (1889); "In the Garden of Dreams" (1890); "Lazy Tours in Spain and Elsewhere" (1896); "At the Wind's Will" (1889); etc. She died Aug. 10, 1908.

Moultrie, Fort, a defensive work on Sullivan's Island, at the mouth of Charleston Harbor, S. C., celebrated for the repulse of a British squadron commanded by Sir Peter Parker, Jan. 28, 1776.

Moultrie, William, an American military officer; born in South Carolina, in 1731. He was of Scotch descent, his parents emigrating to South Carolina early in the 18th century. In 1761 he commenced his career as captain in a militia regiment of infantry, raised for the defense of the frontier against the Cherokees, rendering important service, and acquiring considerable military knowledge. Becoming a warm advocate of the rights of the colonies, he was elected to the provincial congress in 1775, and was at the same time appointed colonel of the 2d South Carolina regiment. In 1776 he was designated to construct a fort, which afterward received his name, on Sullivan's Island, at the mouth of Charleston harbor. The fort, which had 26 guns and 435 men, and was commanded by Moultrie, had been hastily built of palmetto logs, in two rows 16 feet apart, with the space between filled with sand. The spongy wood of the palmetto was found to resist the cannon balls perfectly. The British fleet attacked the fort before its completion, but were repulsed with great slaughter. Moultrie was soon after made brigadier of the Continental forces, and distinguished himself by the repulse of the British in their advance on Charleston, in 1779. In the spring of 1780 Charleston was again attacked, and Moultrie, who was second in command, shared in the capitulation of the American forces. He remained a prisoner two years, being exchanged in 1782, and was promoted a Major-General by Congress the same year. In 1785 he was elected governor of South Carolina, and again in 1794, after which he retired to private life. He was the author of "Memoirs of the Revolution." He died in Charleston, S. C., Sept. 27, 1805.

Mound, a ball or globe used as the sign of sovereign authority and majesty, and forming part of the regalia of an emperor or king. It is surmounted by a cross and encircled with a horizontal band, from the upper edge of which springs a semicircular band, both enriched with precious stones.

Mound Birds (*Megapodidæ*), a family of gallinaceous birds remarkable for the large mounds which they build as incubators for the eggs. They are natives of Australasia and of the islands in the Eastern Archipelago and Pacific. The Australian megapodes (*Megapodius tumulus*), about the size of common fowls, build mounds of leaves, vegetable refuse, and soil, and add to them year after year till they become immense structures. The largest on record measured 150 feet in circumference. Both sexes work at the nest, in which the eggs are laid in separate holes at a depth of five or six feet, and left to be hatched by the warmth of the decomposing vegetable matter. The mound of the Nicobar species (*M. nicobariensis*) seems to be used not only by the original pair, but by their descendants as well. In a related genus, *Leipoa*, the eggs are laid separately in a circle in the center of the mound, and then deeply covered up with compost. In the genus *Tallegallus* (represented by the large brush-turkey, *T. lathama*, of Australia) the mounds are used socially by a number of birds.

Mound Builders, the name given to a prehistoric race, formerly inhabiting the Ohio and Mississippi valleys, who have left some very remarkable earthworks as their only memorials, for even tradition is silent on the subject. The best known group of mounds is near Newark, O., and consists of "elaborate earthworks, in the form of a circle, octagon, and square, enclosing an area of about 4 square miles, on the upper terrace between two branches of the Licking river. Scattered over the same plain, and crowning the neighboring hills, are numerous tumuli or mounds, evidently erected by the same people that built the larger works." The human remains found in these mounds are usually so much decayed as to preclude the recovery of a single bone

entire. This fact has been regarded as evidence of the great antiquity of the mounds, since in England, where the moist climate is much less favorable for the preservation of such remains, perfect skeletons have been found after being buried 1,800 years. There is at present, however, a growing tendency to distrust the theory of their great age.

Mound City, St. Louis, Mo.; so named because in the vicinity are many of those artificial erections generally ascribed to the labors of the "mound builders."

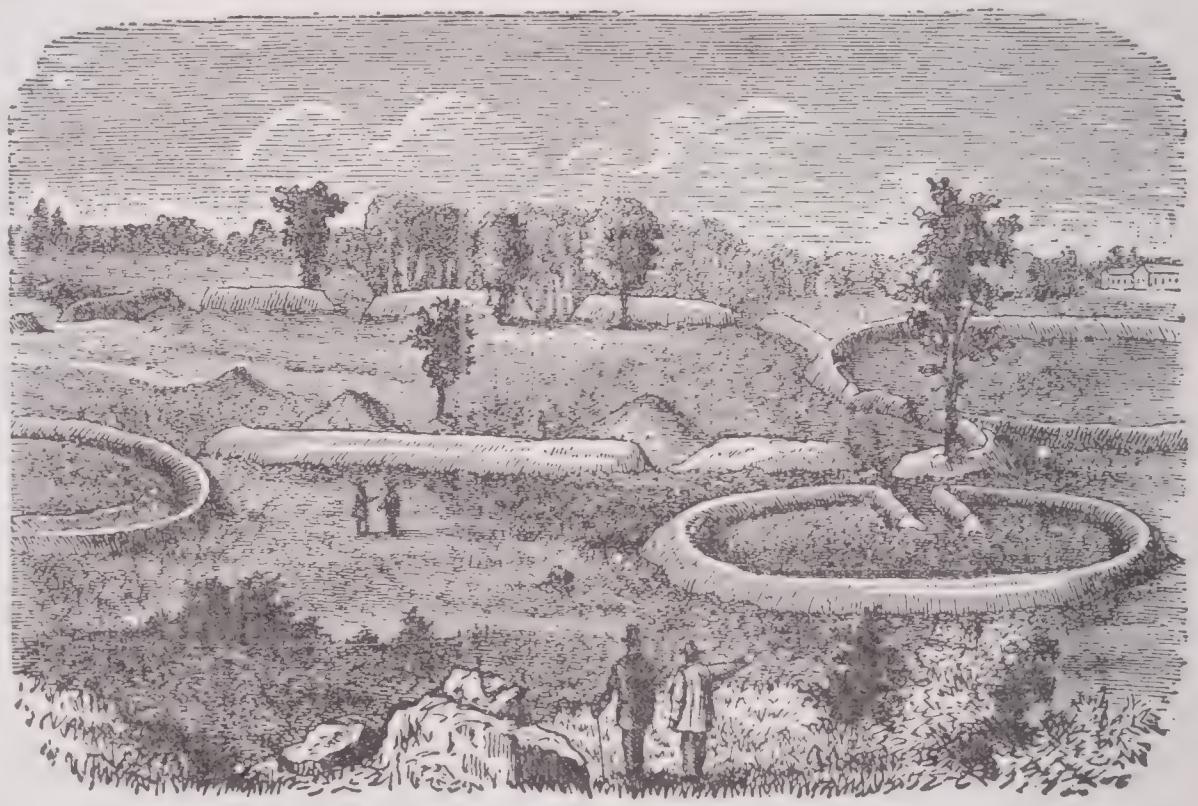
Mountain, a large or very high hill; a large mass of earth rising to a great height above the level of the adjacent land; a high elevation or prominence upon the earth's surface; a high mount.

In geography, mountains usually exist in chains, the highest being the Himalayas. Parallel to a leading mountain chain there are in some cases two others of inferior elevation, one on each side. Thus, parallel to parts of the Himalayas are the Siwalik Hills, or Sub-Himalayas, of inferior elevation to the central chain. In studying the geography of a country, the mountains or hills claim attention first, for from them flow the rivers, and the direction of these regulates the position of the towns, the most powerful factors in political geography.

In 1833 M. Elie de Beaumont published the hypothesis that a variety of independent mountain chains have been thrown up suddenly at particular periods, and that all such chains which have risen contemporaneously are parallel to each other, though widely apart. Sir Charles Lyell controverted these views, and proved that every great mountain is the result, not of one upheaval, but of many. The composition of the different parts of a mountain regulates its form; trappean rocks, for instance, tending to make one or more table lands with precipitous sides, and granite a rounded top.

HIGHEST AND GREATEST MOUNTAINS IN THE WORLD.

Name.	Feet.
Antisana, Ecuador	14,300
Ararat, resting-place of Noah's Ark	12,700
Ben Nevis, highest in Great Britain, Scotland	4,400
Black Mountain, the highest of the Blue Ridge, N. C.	6,500
Blanc, Mont, France	15,900
Brown Mountain, highest of the Rocky Mountains	16,000
Chimborazo, Republic of Ecuador	21,400
Cotopaxi, the highest volcano, Ecuador	18,900
Dhawalaghiri, one of the Himalaya Mountains, Asia	25,500
Etna, a volcano in Sicily	10,900
Fremont's Peak, Rocky Mountains, Wyo	13,575
Geesh, Africa	15,100
Hecla, a volcano in Iceland	5,500
Hindu-Kush, Afghanistan	20,594
Himalayas (Mount Everest), highest in the world, Thibet	29,000
Humphrey Peak, Ariz.	12,562
Hunchback Mt., Col.	13,755
Hunt Peak, Col.	14,055
Hurricane Peak, Col.	13,565
Jungfrau, Alps, Switzerland	11,700
Kilima-Njaro, highest in Africa	18,700
Lamotte Peak, Utah	12,892
La Plata Mt., Col.	14,311
Lebanon, Syria	10,000
Leon Peak, Col.	10,954
Lewiston Peak, Utah	10,623
Liberty Peak, Mont	9,162
Logan's Peak, Utah	10,004
Long's Peak, Col.	14,271
Mansfield, highest of Green Mountains, Vt.	4,275
Miltzin, highest of Atlas Mountains, Morocco	11,498
Mount Marcy, highest in New York	5,400
Mount Hood, Or.	11,220
Mount St. Helen's, Wash.	13,475
Mount Liedy, Wyo.	11,177
Mount Logan	19,500
Mount McKinley	20,500
Mount Ranier, Wash.	14,445
Mount Shasta, Cal.	14,440
Mount Fairweather, Alaska	14,475
Mount Washington, Cal.	10,802
Mount Whitney, Cal.	14,885



MOUNDS IN OHIO.

Name.	Feet.
Olympus, Greece	6,600
Ophir, Sumatra, East Indies	13,800
Orizaba, highest in North America, Mexico	18,170
Parnassus, the home of the Muses, Greece	6,000
Perdu, Mont, highest of the Pyrenees, France	11,300
Popocatapetl, Mexico	17,700
Peaks of Otter, Va	4,250
Pike's Peak, Col	14,215
Redslate Peak, Cal	13,400
Round Top, highest of Catskill Mountains, N. Y.	3,800
Roa, Mount, highest in Oceania, Hawaii	17,500
Santa Clara Mountain, N. M	11,507
Santa Fé Baldy Peak, N. M	12,661
San Francisco Mountain, Ariz	12,794
Sinai, Mount, Arabia	8,200
Sneehattan, highest Dovrefjeld Mountains, Norway	8,110
Sorota, highest in America, Bolivia	25,400
St. Bernard, Switzerland	8,000
St. Elias, Alaska	19,500
Stromboli, volcano in the Mediterranean Sea	3,000
Teneriffe, Peak of, one of the Canary Isles	12,000
Vesuvius, volcano, near Naples	3,900
Washaku Needle, Ariz	12,000
Washington, Mount, highest of White Mountains, N. H	6,293

Mountain, Old Man of the. See OLD MAN OF THE MOUNTAIN.

Mountain Ash, *Pyrus aucuparia,* a European tree, 10 to 30 feet high, with pinnate leaves, corymbose compound cymes with cream-white flowers, and scarlet berries with yellow flesh. Wild in woods, on hillsides, chiefly in mountainous districts, and cultivated in gardens. Called also the Rowan tree. Also, *Pyrus* (*sorbus*) *americana,* an American tree, bearing beautiful red berries.

MOUNTAIN ASH IN FLOWER.

Mountain Blue, a carbonate of copper with an azure vitreous luster which is liable to change to green if the substance is mixed with oil.

Mountain Brambles. See CLOUDBERRY.

Mountain Cork, a white or gray variety of asbestos, so called from its extreme lightness, as it floats in water. Called also mountain leather.

Mountain Limestone, in geology, a term to designate a series of calcareous rocks called carboniferous limestone. Typically it is massive, well-bedded, light bluish gray, reddish, or black in color, in some parts homogeneous, in others crystalline. In some places the mountain limestone is composed mainly of broken encrinites, in others of foraminifera, corals, bryoza, etc. Of mollusca: 334 lamellibranchs, 206 gasteropods, with various pteropoda and cephalopoda, have been found in it; and more than 70 species of fossil fish. In addition to the value of mountain limestone for turning into lime, it contains valuable ores of lead, zinc, etc. It also receives a good polish, and makes a fine marble.

Mountain Lion, See PUMA.

Mountain of Fire, the Saracenic name for Mount Etna, Sicily.

Mountain of Terrors, the Schreckhorn, in the Bernese Alps.

Mountain Railways, roads built especially for the ascension of mountains. The first example of this kind of road built in the United States, and probably the first in the world, was the railway at Mauch Chunk, Pa., opened in May, 1827. It was first used to draw coal from the mines to the Lehigh river, the cars descending by gravity and being returned by mules. There is now a powerful stationary engine on the summit to draw up the train which is used exclusively for tourists, the novelty of the ride and the views making the excursion one of the most popular in the Eastern States. The Mount Washington Railway in the White Mountains, N. H., was begun in 1866 and opened in 1869. The grade is very steep, being in places 1 foot in 3. The track is of three rails, bolted to a heavy timber trestle, the cog-wheel which draws the train, running on the center rail. The seats are so suspended as to swing horizontally. The ascent is made in an hour and a half. The Otis Elevating Railway, in the Catskills, has an incline 7,000 feet in length, with a rise of 1,600; in carrying capacity and elevation overcome it exceeds all other incline systems. The road running from Manitou to the summit of Pike's Peak, Col., is 8 miles long, ascending 14,146 feet. This is, also, a cog-wheel road, and the engine pushes up, instead of pulling the cars. It was finished in 1890. Among other engineering feats of a similar kind in the Rocky Mountains should be classed the building of a road from Boulder to Ward and one over the Marshall Pass. Early in 1898, the aërial railway over the Chilkoot Pass to Lake Linderman was completed, shortening the time between tidewater and the headwaters of the Yukon

river from a month to a day, and greatly reducing the hardships of the route.

The engineering exploits in the Transandine Railway of South America hardly belong to the same category as the above, being merely features of a transcontinental road.

Switzerland offers several striking examples of mountain railways. The road up Mount Pilatus has a maximum grade of 48 in 100, the highest station being 6,791 feet above the level of the sea. The engine pushes the cars up (as at Pike's Peak) at a speed of 65 yards a minute. The cost of this railway, which was built in 400 working days, was $380,000. On the Cable Water-Balance railway (running from Montreux to Glion on Lake Leman), the rise is 997 feet, and the maximum grade 57 in 100. There are several smaller water-balance inclines in Switzerland. A road modeled after an American system climbs the Rigi. Salene Mountain near Geneva is ascended by an electric road. The total length is about 5⅔ miles. Each car takes 40 passengers at a time and weighs eight tons. The road cost $460,000 and was two and a half years in building. Another electric road runs from the village of Stanz to the summit of the Stranseshorn, 2⅓ miles, reaching an altitude of 6,233 feet above sea-level.

In Italy there is a private road running up to the crater of Mount Vesuvius, near Naples.

Darjeeling, India, a point commanding a very extensive range of view in the Himalaya Mountains, is reached by a road that in one place skirts the edge of a precipice 1,000 feet deep. The speed of the train does not exceed 7 miles an hour, and eight hours are spent in covering the entire distance, 58 miles.

Mountain Soap, a mineral of pale brownish-black color, so named because it feels like soap.

Mountains of the Moon. See Moon, Mountains of the.

Mount Carmel, a borough in Northumberland co., Pa.; on the Philadelphia and Reading, the Lehigh Valley, and the North Central railroads. It contains a National bank, and daily and weekly newspapers. In the vicinity are several extensive anthracite coal mines. Pop. (1890) 8,254; (1900) 13,179; (1910) 17,532.

Mountcastle, Clara H., pseudonym Caris Sima, a Canadian artist; born in Clinton, Ont., Nov. 26, 1837. Her specialty was landscape and marine views. Her publications include: "The Mission of Love, and Other Poems" (1882); "Lost, and Other Poems" (1882); "A Mystery" (1886), verse; and the novel "Crow's Hollow."

Mount Etna. See Etna Mount.

Mounted Police, Canada. See Soldier Police.

Mountford, William, an American writer; born in Kidderminster, England, May 31, 1816; came to the United States in 1840. Among his publications are: "Martyria, a Legend" (1846); "Euthanasy; or Happy Talks Toward the End of Life" (1850); "Beauties of Channing"; "Miracles, Past and Present" (1870). He died in Boston, April 20, 1885.

Mount Desert, a mountainous island in the Atlantic, belonging to Hancock co., Me., off the coast; was settled by the French in 1608. It is 14 miles long and 7 miles wide. Soames's Sound divides it nearly in two. Bar Harbor, Northeast and Southwest Harbors, Soamesville, Seal Cove, and East Eden are the villages. The island abounds in beautiful little lakes, and is a favorite place of summer resort.

Mount Holyoke College, an educational, non-sectarian institution for women in South Hadley, Mass.; founded in 1837; has grounds and buildings valued at over $875,000; aggregate endowment, $825,000; volumes in the library, 42,000; fellowships, 4; scholarships, 73; ordinary income, $275,000; average number of faculty, 95; average students, 750; graduates, over 3,900.

Mount McKinley, a mountain of the McKinley range, in Alaska. It is situated about 125 miles N. of Cook Inlet, and stands close to the intersection of the 63d parallel of N. latitude with the 151st meridian of W. longitude. It was called by the early Russian settlers around Cook Inlet "Bulshaia," which translated means "big." Recent measurements made by the United States Geological Survey show this to be the tallest peak on the American continent, overtopping Mount St. Elias and Mount Logan by about 1,000 feet, its height being 20,500 feet. In a general way, the great height of Mount McKinley has always been known to the Indians and the scattering whites of that region, as its towering summit is plainly visible on clear days for a distance of 125 miles or more. So far as there is any record, however, no attempt was ever made prior to the summer of 1898 to measure its exact height.

Mount St. Elias. See Elias, Saint.

Mount Saint Mary's College, an edutional institution in Emmitsburg, Md.; founded in 1808 under the auspices of the Roman Catholic Church; has grounds, buildings, and other property valued at over $300,000; volumes in the library, about 12,000; average number of faculty, 37; average student attendance, about 360; ordinary income, about $18,000.

Mount Union College, a coeducational institution in Alliance, O.; founded in 1846 under the auspices of the Methodist Episcopal Church; has grounds and buildings valued at over $220,000; endowment funds, $130,000; scientific apparatus, etc., $100,000; volumes in the library, over 12,000; ordinary annual income, about $18,000; average number of faculty, 30; average student attendance, 525; graduates since organization, over 825.

Mount Vernon, a city in Westchester co., N. Y.; on the Bronx river, and on the New York Central and Hudson River, and the New York, New Haven, and Hartford railroads; 13 miles N. of New York. Here are a public library, hospital, gas and electric lights, several National banks, an electric street railroad system, and daily and weekly newspapers. The city includes the suburb of Chester Hill, the former village of Mount Vernon, and a part of the town of Eastchester. Most of the city has a high elevation and commands an excellent view of Long Island Sound. It has many beautiful residences, and an assessed property valuation of nearly $24,000,000. Pop. (1900) 20,346; (1910) 30,919.

Mount Vernon, a city and county-seat of Knox co., O., on the Kokosing river, and on the Cleveland, Akron, and Columbus, and the Baltimore and Ohio railroads; 25 miles N. W. of Newark. It is the center of a large agricultural region from which it draws a considerable trade. Here are a court house, National banks, Gambia College, an Adventist Asylum, electric lights, an electric street railroad, and several daily newspapers. It has a locomotive works, furnace foundry, Corliss engine works, woolen, flax, twine, flour and saw mills, and manufactories of leather, linseed oil furniture, sashes, and doors. etc.; and an assessed property valuation of nearly $2,500,000. Pop. (1900) 6,633; (1910) 9,087.

Mount Vernon, the estate of President Washington, in Fairfax co., Va., on the right bank of the Potomac river; 15 miles S. of Washington. The dwelling is a wooden mansion, 96 feet long, erected on a bluff 200 feet above the river, and commanding an excellent view. The estate, originally named Hunting Creek and comprising 800 acres, was inherited by Washington in 1752 from his brother Lawrence, who had changed the name in honor of his former commander, Admiral Vernon of the British navy. The central part of the house was built by Lawrence, and the wings were added by George. The house and 200 acres of land around it were bought by the Mount Vernon Ladies' Association in 1859 for $200,000, raised in great part through the exertions of Edward Everett, and have been restored as nearly as possible to their condition in George Washington's lifetime. In ascending from the river to the house the visitor passes the plain, brick tomb of Washington, containing, behind an iron grating, two sarcophagi with the remains of the general and his wife, Martha. The home contains an abundance of interesting relics of which, perhaps, the key of the French Bastille is the most notable. The room in which Washington died is at the S. end of the first floor, and Mrs. Washington died in the one immediately above it. The tiles in the piazza were brought from the Isle of Wight. The coach house contains Washington's carriage and in the garden are trees planted by his hands.

Mount Washington, a peak of the White Mountains, in Coos co., N. H.; about 85 miles N. by E. of Concord; height, 6,226 feet above sea-level, being not only the culmination of the White Mountains, but the highest land in New England. The summit is reached by a railroad.

Mourning, the outward expression of grief. At different times and among different nations mourning customs have varied greatly; the question of color being very prominent. As an evidence of mourning, the ancient Egyptians wore yellow; the Ethiopians, gray; the Roman and Spartan women, white, which is still the color of grief in China, Japan, and Siam; in Turkey, blue and violet; and in the other European countries black is used for this purpose. The Jews, in sign of grief at the loss of their relatives, rent their garments, tore out their hair, and wore coarse garments of a dark color. Among the Greeks and Romans, it was the custom to lay aside all ornaments of dress, to abstain from the bath, and other indulgences, and the former cut off their hair, a practice followed by some Eastern nations.

Mouse, a popular name for the smaller species of the genus *Mus,* the larger ones being called rats. The common mouse is dusky-gray above, ashy underneath; the tail being about as long as the body. The field mouse, which is reddish-gray above, whi underneath, is larger; and has the shorter than the body. The harvest is very small, the body being colore like a squirrel; beneath it is whit line between the colors. Also v mals more or less resembling mouse. Thus, by shrew mous common shrew, *sorex vulgar* tailed field mouse is *arvicol*

Mouse-ear Chickwee genus of plants, natura *laceæ,* consisting of m with small leaves and ing common weeds cold regions. The found from Canada

Mousquetaires, the mounted body-guard of the kings of France, all of noble birth. This guard was organized by Louis XIII. in 1622. They rode gray horses, and were disbanded in 1815.

Mouth, the cavity containing the organs of taste, mastication, and insalivation. It is bounded in front by the lips; on the sides by the internal surfaces of the cheeks; above by the hard palate and teeth in the upper jaw; below by the tongue and mucous membrane between it and the lower jaw, with the lower row of teeth; and behind by the soft palate and fauces. In fortifications, the outer or widest part of an embrasure; the narrow part being the neck. Also the part of a trench most remote from the besieged place.

Morano, Sebastian. See BENALCAZAR.

Moving Plant (*Desmodium gyrans*), a plant of the natural order *Leguminosæ*, a native of India, remarkable, as are also some other species of the same genus, for the spontaneous movement of the leaves.

Moving Stairway. See INCLINED ELEVATOR.

Mowbray George W., an American inventor; born in Lewes, England, in 1815; educated for a chemist; came to the United States in 1853. In 1868 he went to North Adams, Mass., where he invented the commercial form of nitroglycerin, and used it in blasting for the Hoosac tunnel. Continued experiments resulted in his invention of a smokeless powder, and an improved method of insulating electric wires. He died in North Adams, Mass., June 21, 1891.

Mowis, the bridegroom of snow, who (according to American Indian tradition) wooed and won a beautiful bride; but when morning dawned, left the wigwam and melted into the sunshine. The bride hunted for him night and day in the forests, but never saw him again.

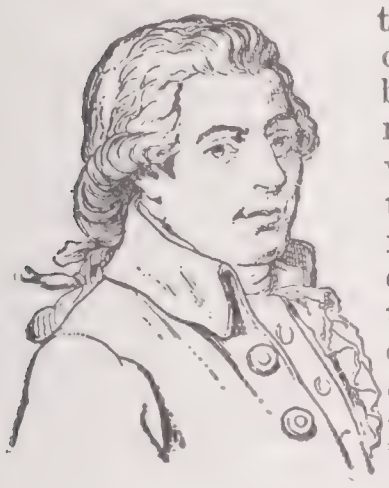
Moxa, in surgery, any substance burnt
a diseased part, so as to produce a sore
Formerly cotton-wool or the pith of
flower was employed for the pur-
temisia chinensis and other species
Chinese moxa. It is used as a
gout and rheumatism. *Poly-*
arius, a fungal, is used by the
moxa. Moxas are rarely

the chief division of the
ugal on the E. coast of
veen German East Af-
British East Africa on
om Cape Delgado to
below Delagoa Bay.
The N. boundary
is formed principally by the Rovuma river; the S. in part by the Maputa; and the W. frontiers by Lake Nyasa, the Ruo river, the Zambesi, the British South Africa Company's territories and the Transvaal. This demarcation includes the dependencies of Lourenço Marquez, Zambesia, Inhambane and Gaza, the whole being known as Portuguese East Africa. The limits of this territory were defined by an agreement made between Great Britain and Portugal in 1891, and Germany and Portugal in 1886 and 1890; the included area is about 300,000 square miles. The principal rivers, besides those above mentioned, are the Limpopo, and Sabi. The coast belt is low, swampy and unhealthy; but the interior rises into well-wooded plateaus having a fine climate. The forests yield valuable ornamental woods. The soil is naturally fertile, producing maize, rice, manioc, cotton, sesame, cocoanut, india-rubber and medicinal plants. The country is rich in minerals, coal, iron, silver, gold and copper being found there; and mines of the two last named are worked to some extent. The imports consist of cotton goods, hardware, arms and gunpowder, coal, beer, wine and provisions; the exports of ivory, ground nuts, oil seeds, honey, india-rubber, gums, ivory, tortoise-shell, amber and gold dust. The shipping is mostly in the hands of British firms. In 1897, the total trade of Portuguese East Africa amounted to $24,805,595. There is a railway running from Delagoa Bay to the Transvaal frontier (whence it continues to Pretoria) and one farther S. that connects the coast with Salisbury, the capital of Rhodesia. The chief towns are Mozambique, Chinde, Quilimane and Lourenço Marquez (pop. 6,430). The population of the colony is about 3,000,000. The administration is in the hands of a royal governor appointed for three years. Mozambique, the capital, stands on a small coral island lying close to the mainland, and has a fine government house, a cathedral, an arsenal, etc. A fort, built by Albuquerque in 1508, two years after he occupied the island for Portugal, still stands at the N. end of the island. Pop. 8,000. The total trade in 1895 amounted to $662,110.

Mozambique Channel, a waterway between Madagascar and the E. coast of Africa; about 1,000 miles long and 400 in average breadth. At its N. extremity are the Comoro Islands.

Mozarabs, a name applied by the Mohammedans in Spain to the Christians among them who retained their own religion. The Mozarabic liturgy which they used was suppressed about 1060, but was revived at the beginning of the 16th century in Toledo, where it is still preserved.

Mozart, Johann Chrysostom Wolfgang Gottlieb, a German composer; born in Salzburg, Austria, Jan. 27, 1756. His father was sub-director of the archiepiscopal chapel at Salzburg. His extraordinary musical talents were cultivated to the utmost by his father. At the age of four he played the clavichord, and composed a number of minuets and other pieces still extant. When only six years of age his performances were so remarkable that his father took him and his sister, who possessed similar gifts, to Munich and Vienna, where they obtained every kind of encouragement from the Elector of Bavaria and the Emperor Francis I. In 1763 and 1764 the Mozart family visited Paris and London. At the age of seven young Mozart surprised a party of musicians, including his father, by taking part, at sight, in a trio for stringed instruments. Symphonies of his own composition were produced in a public concert in London; and while there he composed and published six sonatas, and made acquaintance with the works of Handel, recently deceased. Two years later, when but 12 years of age, he composed the music for the religious service and for a trumpet concert at the dedication of the Orphan House Church in Vienna, and conducted it in presence of the imperial court. In 1769, at the age of 13, he was appointed director of the concerts of the Prince Archbishop of Salzburg, and in the same year traveled with his father to Italy, where he created great enthusiasm by his performances and compositions. In Rome he reproduced from memory the "Miserere" which he had heard sung in St. Peter's. He composed the opera of "Mithridates" at Milan in October, 1770, and it was publicly performed there in December of that year. His opera of "Idomenens" was composed in 1780. The "Seralio" followed. His six quartets, dedicated to Haydn, appeared in 1785, and in 1786 "Marriage of Figaro." In 1787 he produced his masterpiece, "Don Juan," which, though received with enthusiasm at Prague, was at first beyond the comprehension of the Viennese. To 1791, the last year of his short life, we owe "The Magic Flute," "Titus" and the sublime "requiem" composed in anticipation of death, and finished only a few days before his decease, which took place in Vienna, Dec. 5, 1791. His centenary was celebrated in 1891 all over Europe.



MOZART.

Mozdok, a town of Russian Caucasus; on the Terek; 58 miles N. of Vladikavkaz, with three large annual fairs for horses, sheep, cattle, etc. It grows excellent melons and wine. Pop. 13,000.

Mozley, James Bowling, an English theologian; born in Gainsborough, Lincolnshire, England, in 1813. Educated at Oriel College, Oxford, he became a fellow of Magdalen, vicar of Old Shoreham, canon of Worcester, and in 1871 regius Professor of Divinity at Oxford. His chief works are: "The Augustinian Doctrine of Predestination" (1855); "The Primitive Doctrine of Baptismal Controversy" (1863); "Miracles" (1865); "Oxford University Sermons" (1876); "Ruling Ideas in Early Ages" (1877); "Theory of Development," in answer to Newman, (1878); "Essays, Historical and Theological" (2 vols. 1878); and "Sermons, Parochial and Occasional" (1879). He died Jan. 4, 1878.

M. Quad. See LEWIS, CHARLES BERTRAND.

Msket, (also written MTSCHKETHA and otherwise), probably the most ancient town of the Caucasus, and down to the 5th century the capital of the old Georgian kings. It is on the S. side of the Caucasus, 10 miles N. N. W. of Tiflis. It contains a cathedral, already existing in the 4th century, in which the Georgian kings were crowned and buried. When the Poti-Tiflis Railway was constructed, an ancient necropolis was laid bare; the graves were those of a cannibal race, and furnished proof that the modern Georgians are the direct descendants of the ancient Iberi.

Muatta, or **Muta,** daughter of the river Almon, and goddess of silence.

Mucilage, in ordinary language, a solution of gummy matter of any kind in water. In chemistry, the gum of seeds and roots. It is present in large quantities in the root of the marsh-mallow and in linseed. To some extent it appears to be an almost universal constituent of plants, and is obtained by steeping the seeds or roots in hot water, when it assumes the character of a thick jelly. The soluble mucilage may be extracted by the action of acidulated water on linseed, and precipitating the mucilage from a concentrated solution by alcohol. It is less transparent and less brittle than gum, and is precipitated from its aqueous solution by tincture of galls. The name is also given to commercial adhesive gum made from gum arabic or dextrin. Mucilages, in pharmacy, water preparations of substances dissolved in water, used to suspend insoluble ingredients or to bind them together in a mass. They also sheath irritated surfaces.

Mucius Scævola. See SCÆVOLA.

Mucker, a sect of German mystics, belonging chiefly to the aristocracy, founded at Königsberg, about 1830, by two Lutheran clergymen, Diestel and Ebel. They professed great purity of life, but grave charges of immortality were brought against them, and in 1839 the founders were degraded from their office and sentenced to a term of imprisonment. On appeal, in 1842, they were reinstated, and the sentence quashed. See PRINCEITE: PERFECTIONIST.

Mucor, in ordinary language, moldiness, mustiness, mold. In botany, the typical genus of the sub-order *Mucorini.* The sporangium is glucose, with many spores. It contains the common molds on paste, decaying fruits, etc. The typical species is *M. mucedo,* which has the spores, etc., first whitish, but afterward blackish. It is very common. In medicine, the same as MUCUS (*q. v.*).

Mucous Membranes, membranes consisting of prolongations of the skin, having their surface coated over and protected by mucus. Their chief divisions are the gastro-pneumonic and genito-urinary mucous membranes, the former covering the inside of the alimentary canal, the air passages, etc.; the latter the inside of the bladder and the urinary passage.

Mucus, a word, under which various substances are included, consisting chiefly of horny-like substances, epithelium, detached from the mucous surfaces and floating in a peculiar viscid, clear fluid; in some cases these secretions are altered, becoming albuminoid, etc. Mucous affections are, mucin, an inflammatory product; mucous cysts, mucous laryngitis, polypi, softening, tumors. In botany, gummy matter, soluble in water. It also contains mucin.

Mud, in ordinary language, moist, soft earth; mire, slime; clay or earthy matter mixed with water. In geology, the finer particles left when rocks, stones, pebbles, etc., are ground against each other or disintegrated by other agencies. Sometimes, where sand, gravel, and mud or silt are brought down a river to the sea, the gravel, sand and mud are separated, the mud remaining mechanically suspended in the water, after the coarser gravels and then the finer sands, have sunk to the bottom. According to the composition of the rocks from which it was derived will be its chemical composition. Shale is hardened and compressed mud; slate is mud having undergone metamorphic action (see SHALE: SLATE). Mud contains diatoms and other minute algæ. When the surface of the fresh-water mud is red, that color arises from the presence of a small worm, *Tubifex rivulorum.*

Mudar, the name given in parts of India to an asclepiadaceous plant, *Calotropis gigantea,* the inspissated milk of which is a powerful alterative and purgative, and has been found useful in cases of leprosy, elephantiasis, intestinal worms, and venereal complaints. It is called also the akund or yercum.

Mud Bath, a bath in which the body is immersed in mud, often with chemical ingredients. At Eger, in Bohemia, boggy earth is artificially converted into black mud, heated to 100° of temperature. It contains sulphate of soda, iron, lime, alumina, and ulmic acid. The body is immersed for 15 minutes, after which the patient goes into water to remove the mud. Such a bath may be of use in chronic skin diseases, chronic rheumatism, gout, etc., though fresh air, temperance, regularity of life, and relaxation from business may have great influence in effecting the cure.

Mudfish, *Amia calva,* the sole species of the family *Amiidæ.* The color is dull, often dark-greenish, with black spots and bands, and there is frequently a round black spot on the tail. It attains a length of about two feet; it feeds on fluviatile crustacea, and is sometimes eaten by the Indians. It is limited to rivers and lakes of the United States, abundant between the Rocky mountains and the Alleghanies. Sometimes called the North American mudfish.

Mudford, William, an English journalist; born in London, England, Jan. 8, 1782. He was for many years editor of the London "Courier," afterward of the "Kentish Observer." Among his works were "Nubilia in Search of a Husband" (4th ed. 1809); "The Contemplatist" (1811), essays on morals and literature; "Life and Adventures of Paul Plaintive" (1811), a novel; "The Premier" (1831), a novel; "Tales and Trifles from Blackwood's" (1849), containing the well-known story "The Iron Shroud," his best work; etc. He died in London, March 10, 1848.

Mudie, Charles Edward, an English publisher; founder of the celebrated library which bears his name; born in Chelsea, England, in 1818. Having started as a bookseller, he established his library in 1842, which became a limited company in 1864, and had 25,000 members in 1890, the annual receipts being $500,000. He died in London, Oct. 28, 1890.

Mudir (mö-dēr′), a Turkish official at the head of a canton or part of a liva under a kaimakam; in Egypt, the governor of a province or *mudîrîyeh.*

Mudki, or **Moodkee** (möd′kē), a village of the Punjab, India, 26 miles S. of the Sutlej, and on the old road from Firoz-

pur to Karnal. Here the first battle in the Sikh war of 1845–1846 was fought (Dec. 18, 1845), when the British under Sir Hugh Gough repulsed the Sikhs, and Sir Robert Henry Sale, "Fighting Bob," was killed.

Mudstone, in geology, a series of beds of the Upper Ludlow formation (Upper Silurian) near Cader Idris, etc. The name was a local one adopted by Sir Roderick Murchison. The Lamellibranchs found in it outnumber the Brachiopods. *Rhynchonella navicula* is a characteristic shell. Also indurated clay.

Muezzin (mö-edz'zin) (Arabic Muzin or Muazzin; sometimes Mueddin), the official attached to the Mohammedan mosque, who anounces the different times of prayer.

Muffle, in chemistry, an arched vessel resisting the strongest fire, and made to be placed over cupels and tests in the operation of assaying.

Mufti, the title of a high Turkish office. The Grand Mufti or Sheikh-ul-Islam is the head of the great corporation of ULEMA (*q. v.*), the interpreters of the Koran, by whose decisions (when written down, Fetwas) the cadis have to judge. The chief of the Ulema is little less powerful than the grand vizier.

Mügge, Theodor (Müg'guh), a German author; born in Berlin, Nov. 8, 1806. For some years he was a journalist. Among his best-known works were the novels "The Cavalier" (1835); "Toussaint" (1840); "Life and Love in Norway" (1858); "The Prophet" (1860); etc.; and the volumes of travel "Sketches from the North" (1844); "Northern Picture-Book" (3d ed. 1862), etc. (Complete novels, 33 vols., Berlin, 1862–1867.) He died in Berlin, Feb. 18, 1861.

Muggletonians, a sect founded by Lodowick Muggleton (1610–1698), the son of a farrier in Bishopsgate street, London. He was a tailor, and when about 40 years old began to have visions and to hear "voices," and asserted that he and John Reeve, another tailor, were the two witnesses mentioned in the Revelation (xi: 3.). Their chief doctrines were that the distinction of Persons in the Trinity is merely nominal; that God has a real human body, and that when He suffered on the cross He left Elijah as His vicegerent in heaven. "The Divine Looking Glass" was published in 1656 as an exposition of their teachings, and in 1846 some member of the sect, which is now nearly, if not quite, extinct, subscribed to republish it.

Mugwump, a political term coined during the heated presidential campaign of 1884 between Grover Cleveland and James G. Blaine. It was applied by the New York "Sun" to such members of the Republican party as refused to support their party nominee, James G. Blaine, and advocated the election of Grover Cleveland in the interest, they claimed, of civil service reform. The word belongs to the Algonquin dialect of the Indian languages of North America, and is used by John Eliot in his translation of the Holy Bible to translate the Hebrew word *alluph*, "a leader." Eliot used it in the sense of "big chief," a term more comprehensible to the Indian mind than that which appears in the King James's version —"duke." The word was spelled "Mugquomp" in the singular, and "Mugquompaog" in the plural. It appears in many places throughout the Algonquin translation of the Old Testament.

Mühlbach, Luise (mül'bah), pseudonym of Madame KLARA MÜLLER MUNDT; a German novelist, wife of Theodore Mundt; born in Neubrandenburg, Jan. 2, 1814. She wrote a number of popular historical novels, including "Queen Hortense" (5th ed. 1861); "Emperor Joseph II. and his Court" (9th ed. 1866); "Marie Antoinette and her Son" (1867); "Emperor Alexander and his Court" (1868); "Mohammed Ali and his House" (1871); "Frederick the Great and his Court" (8th ed. 1882). She was a prolific writer. She died in Berlin, Sept. 26, 1873.

Muhlberg, (mül'berg), a town of Prussian Saxony, on the Elbe, 36 miles S. E. of Wittenberg. Here, on April 24, 1547, the Emperor Charles V. defeated John Frederick the Magnanimous, Elector of Saxony. See SCHMALKALD.

Muhlenberg, William Augustus, an American clergyman; born in Philadelphia, Pa., Sept. 16, 1796. From 1846 to 1877 he was rector of the Church of the Holy Communion, New York. His time was largely given to educational work and the amelioration of the condition of the poor. Among his writings are: "St. Johnland: Ideal and Actual" (1867); "Christ and the Bible" (1869); and "I Would Not Live Alway," the story of the hymn (1871). He died in New York, April 8, 1877.

Muhlenberg College, an educational institution in Allentown, Pa.; founded in 1867 under the auspices of the Lutheran Church; has grounds and buildings valued at over $300,000; endowment funds, over $260,000; scientific apparatus, etc., $15,000; volumes in the library, 17,000; average number of faculty, 20; average student attendance, 250; number of graduates, about 700; ordinary income, $45,000.

Mühlhausen (mül'hou-zen), a town of Prussian Saxony, on the Unstrut, 25 miles N. N. W. of Gotha; is an active center of commerce, and has manufactures of woolen and cotton goods, hosiery, etc. An important imperial free city even in the 13th century, it came to Prussia in 1802, to Westphalia in 1807, and again to Prussia in 1815. Pop. (1900) 33,428.

Muir, John, an American scientist; born in Dunbar, Scotland, April 21, 1838; educated in Scotland and at the University of Wisconsin. When a young man he was nearly blinded, while working in a carriage factory. Despairing of regaining his sight he set out to see as much of the world as possible before becoming totally blind. For 25 years he wandered from the Gulf of Mexico to the glaciers of Alaska. In 1879 he discovered the famous Alaska glacier which bears his name. He was a member of the relief expedition sent to the Arctic regions on the United States steamer "Corwin." He wrote over 150 articles on the physiography and natural history of the Pacific coast, on Alaska, etc. His most important work is "The Mountains of California" (1894).

JOHN MUIR.

Muir, John, a Scotch Sanskrit scholar; born in Glasgow, Scotland, Feb. 5, 1810. He studied at the University of Glasgow and at Haileybury, and at 18 went to Bengal to join the East India Company's Civil Service, in which he remained for 25 years. He founded and endowed a chair of Sanskrit in Edinburgh, as well as prizes for high attainments in that language and also provided the funds for a lectureship in comparative religion. His great work was his "Original Sanskrit Texts on the Origin and History of the People of India, Their Religion and Institutions" (5 vols. 1858–1870; 2d ed. 1868–1873). Another book is "Metrical Translations from Sanskrit Writers" (1878). He died in Edinburgh, Scotland, March 7, 1882.

Muir, Sir William, a Scotch Arabic scholar, brother of John Muir; born in 1819. At 18 he joined the Bengal Civil Service after having attended lectures at both the universities of Edinburgh and Glasgow. He rose rapidly in rank, was made K. C. S. I. in 1867, and was lieutenant-governor fo the Northwest Provinces, 1868–1874, and financial minister to the government of India, 1874–1876. After his return to England he sat on the Council of India, 1876–1885, when he was elected Principal of the University of Edinburgh. He wrote: "Life of Mahomet" (4 vols. 1858–1861; abridged ed. 1877); "Annals of the Early Caliphate" (1883); "The Koran, Its Composition and Teachings, and the Testimony it Bears to the Holy Scriptures" (1878); "Extracts from the Koran" (1880); "The Early Caliphate and Rise of Islam" (1881); "The Mohammedan Controversy" (1897); etc.

Mukaddasi, an Arab geographer; born in Jerusalem; traveled extensively for 20 years, and described Moslem lands in a work published in A. D. 985. It was edited by De Goeje in 1877; and the part relating to Syria and Palestine was translated from the Arabic for the Palestine Pilgrim's Text Society in 1887, by Guy Le Strange.

Mukden, Moukden, or **Fung-tien-fu,** a town of China, capital of Manchuria and of the province of Leao-Tong, about 380 miles N. E. of Peking. It is surrounded by a wall and has also a wall which incloses the government offices, palace, etc., and was the residence of the Manchu sovereigns before their conquest of China. Pop. (1904) 300,000. See MANCHURIA.

Mulatto, a person that is the offspring of parents of whom one is white and the other is a negro. The mulatto is of a dark color tinged with yellow, with frizzled or woolly hair, and resembles the European more than the African.

Mulberry (*Morus*), a genus of trees of the natural order *Moraceæ*, natives of temperate and warm climates, with deciduous leaves, unisexual flowers in short, thick spikes, a four-parted perianth, containing either four stamens or one pistil with two styles, the perianth of the female flowers becoming succulent and closing over the small pericarp, the whole spike coalescing into an aggregate fruit. The fruits of the several species are eatable, but cause diarrhœa if taken in excess. *M. nigra,* the white mulberry, is the one most frequently used in Europe for feeding silkworms. It has a sub-acid succulent fruit; *M. nigra,* the black mulberry, is also used for silkworms. The juice is a remedy for sore throat, and a good refrigerant in fever. The bark is purgative and a vermifuge. Nine kinds of mulberry tree — some of them species, others only varieties — occur in India. *M. alba, M. atropurpurea, M. cuspidata, M. indica, M. lævigata, M. serrata, M. multicaulis, M. nigra,* and *M. parviflora. M. serrata* is valued by the Simla wood-carvers; *M. indica,* wild in the sub-Himalayas, is cultivated through India. The larva of the Assam silkworm, *Bombyx textor,* is fed on its leaves. Its stem yields a gum. Its root is anthelmintic and astringent. The fruit has an agreeable, aromatic, and acid flavor; is cooling and laxative, allays thirst, and is grateful in fevers.

Mulcaster, Richard, an English philologist; born in Carlisle, England. In 1561 he

was appointed master of Merchant Taylors' School, and in 1596 master of St. Paul's School. He enjoyed great reputation as a Greek and Oriental scholar and successful schoolmaster. His English and Latin works were celebrated in their day, the principal being "Positions, etc., Necessarie for the Training up of Children" (Lond. 1581), and "Elementarie on the Right Writing of our English Tung" (1582). He was early addicted to dramatic composition, and assisted in the performance of plays before Queen Elizabeth. He died April 15, 1611.

Mulciber, a name of Vulcan.

Mule, in zoölogy, a term loosely used as synonymous with hybrid, more usually applied to the produce of a male ass with a mare, the mule proper (*Equus asinus*, variety gamma), and to the hinny (*E. asinus*, variety delta), the offspring of a stallion and a she-ass. The mule does not attain maturity as soon as the horse, but is useful a much longer period. As a beast of burden it is in some respects preferable to the horse; it is easily fed, is equally good for carrying and drawing, its less sensitive skin enables it to support exposure to the weather; like the ass, it enjoys comparative immunity from disease, and it is as surefooted as a goat. Mules have been known from the earliest ages; there are frequent references to them in Scripture and in Greek and Latin literature. Kentucky, Missouri, and Kansas take the lead in mule-raising in the United States, and the Mexican mule (by a male ass from a mustang mare) is a very useful animal. France is the most important mule-raising country in Europe; then come Italy, Spain, and Portugal, where they are used for pack and draught. They are largely employed as draught animals in warfare. Fecundation of the hybrid-female by the male ass or the stallion is not very rare, though she rarely throws a living foal. No instance is recorded, but it has been stated to have occurred within recent years between mules at the Jardin des Plantes and (on doubtful authority) between hybrids of birds. In the "Proceedings of the Zoölogical Society" (1884) is a paper by A. D. Bartlett, the superintendent, describing a remarkable hybrid born in the Gardens. On Oct. 29, 1868, a female hybrid was born from a Gayal cow (*Bibos frontalis*) and a Zebu bull (*Bos indicus*); from this female hybrid and a Bison bull (*Bison americanus*) a second female hybrid was born on May 21, 1881, from which and a Bison bull, a third female hybrid was born March 12, 1884 — the offspring of certainly three well-marked species, and, according to present definition, of three distinct genera.

In botany, a hybrid; a cross between two distinct species. They are produced by the application of the pollen of one to the stigma of the other. Mules between two different genera are called bigeners. They are rarely obtained. In farriery, a disease in horses. In spinning, a spinning machine in which the rovings are delivered from a series of sets of drawing rollers to spindles placed on a carriage, which travels away from the rollers while the thread is being twisted, and returns toward the rollers while the thread is being wound. It was invented by Samuel Crompton, of Bolton, England, and perfected in 1779. The combination which gave rise to the term mule was the junction of the drawing rollers of Arkwright with the spinning jenny of Hargreaves. The object of the machine is to deliver the roving with the required degree of attenuation and twist it as delivered. For this purpose, the spindles, instead of being stationary, are placed on a movable carriage, which is wheeled out to twist the threads and wheeled in again to wind on the spindles.

Mulford, Elisha, an American clergyman; born in Montrose, Pa., Nov. 19, 1833. He wrote "The Nation" (new ed. 1876) and "The Republic of God" (1881), two works of great elevation of thought and expression. He died in Cambridge, Mass., Dec. 9, 1885.

Mulford, Prentice, an American journalist; born in Sag Harbor, N. Y., in 1834. He was settled in New York, and afterward in San Francisco. He wrote: "The Swamp Angel"; "Life by Land and Sea"; "Your Forces, and How to Use Them" (2 vols. 1888). He died in Sheepshead Bay, N. Y., in May, 1891.

Mulhall, Michael George, a British statistician; born in Dublin, Ireland, in 1836. Having removed to South America, he founded the Buenos Ayres "Standard" (1861), the first English daily paper printed in South America. He published: "Handbook of the River Plata" (5th ed. 1885), translated into Spanish; "Progress of the World" (1880); "Dictionary of Statistics" (new ed. 1892); "Industries and Wealth of Nations" (1896); etc. His wife, Mrs. Marion Mulhall, published "Between the Amazon and the Andes" (1883), a book of travel. He died in Mulliney, Ireland, Dec. 12, 1900.

Mülhausen, or **Mühlhausen** (mül'houzen) (in French Mulhouse), a commercial and manufacturing town of Alsace-Lorraine, capital of the circle of Mülhausen, on the Ill river and the Rhone canal, 17½ miles N. W. of Basel, Switzerland; is the principal seat of cotton spinning in Western Germany, and carries on calico printing, dyeing, the spinning of woolen and worsted yarn, the manufacture of machinery, railway material, etc.; noted for its model arrangements for the

working classes. Mülhausen is first mentioned in 717; became an imperial free city in 1273; in the 15th century entered into an alliance with the Swiss which lasted till 1798, when it became French; was ceded to Germany, with Alsace, in 1871. Its industrial importance dates from 1746, when a cotton factory was established. It was the birthplace of Lambert, the mathematician (1728-1777). Pop. (1905) 94,498.

Mull, an island on the W. coast of Scotland, one of the Hebrides, belonging to Argyllshire, from which it is separated by the Sound of Mull and the Firth of Lorne; length 30 miles, breadth 29 miles. The island is for the most part mountainous, the highest point being Benmore, 3,185 feet above sea-level. The land in some parts is adapted for grazing, and there are numerous fresh-water lochs. The only town is Tobermory.

Mulla, the Awbeg river, an affluent of the Blackwater in Ireland. Spenser coined the term, he having resided in its vicinity for many years, during which his "Faerie Queene," 'Astrophel," and "Colin Clout" were composed.

Mullagatawny, a soup which is made with fowl or meat cut into small pieces and mixed with rice, curry power, etc.

Mullany, Patrick Francis, known as Brother Azarias, an Irish-American priest; born in Killemain, Ireland, June 29, 1847. He emigrated to the United States in childhood; joined the order of the Brothers of the Christian Schools; became in 1866 Professor of Mathematics and English Literature at Rock Hill College, Ellicott City, Md., and in 1878 president, remaining such till 1889, after which he lived in New York and its neighborhood till his death. As a lecturer on literary, philosophic, and pedagogic themes, he was eloquent and influential, and he was a steady contributor to the periodicals. He published: "The Development of English Literature"; "Old English Period"; "Philosophy of Literature"; "Psychological Aspects of Education"; "Address on Thinking"; "Aristotle and the Christian Church"; "Culture of the Spiritual Sense"; "Phases of Thought and Criticism." He died in Plattsburg, N. Y., Aug. 20, 1893.

Mullein, the common English name for the plant *Verbascum Thapsus,* natural order *Scrophulariaceæ.* The common mullein grows in old fields, roadsides, etc., and is a tall rough plant. The flowers are yellow, almost sessile, and are disposed in a long, cylindrical spike.

Müller, Friedrich, called Painter Müller, a German painter and dramatist; born in Kreuznach, Prussia, Jan. 13, 1749. His first interest was in art and in 1778 he went to Rome to study painting, but his pictures were unsuccessful. As a poet he belonged to the "storm and stress" school. He wrote: "Bacchido and Milo" (1775); "The Satyr Mopsus" (1775); "Adam's First Awaking and First Happy Nights" (1778); the dramas "Genoveva" (1808); "Life of Faust" (latest ed. 1881); the opera "Niobe" (1778); etc. ("Works," new ed., Heidelberg, 1825.) He died in Rome, April 23, 1825.

Müller, Friedrich Max, a German philologist; born in Dessau, Germany, Dec. 6, 1823; son of Wilhelm Müller, the German poet; was educated at the Universities of Berlin and Leipsic; removed to England in 1846; and was Professor of Comparative Philology at the University of Oxford in 1868–1875. He was a most engaging lecturer, being able to impart rare interest by his clear and brilliant style. He was the editor or translator of "Hitopadesa" (1844); the "Rig-Vedas" (6 vols. 1849–1874); etc., and the author of "A History of Ancient Sanskrit Literature" (1859); "Lectures on the Science of Languages" (1861–1864); "Handbooks for the Study of Sanskrit" (1865–1870); "Chips from a German Workshop" (1868–1875); "Lectures on the Science of Religion" (1870); "On the Origin and Growth of Religion as Illustrated by the Religions of India"; etc. He died in Oxford, England, Oct. 28, 1900.

FRIEDRICH MAX MÜLLER.

Müller, George, a British philanthropist; born near Halberstadt, Prussia, Sept. 27, 1805. While in training for the ministry he was dissipated in his habits, and at 16 he was sent to prison for defrauding a hotel keeper. He went to Halle as a student of divinity. A visit to a private meeting for praise and prayer proved the turning-point in his career; in 1826 he began to preach and teach, and took up his abode in free lodgings provided for poor divinity students. Through Tholuck's advice he went to London in 1829, and studied with the view of becoming a missionary to the Jews. He settled at Teignmouth as minister of Ebenezer Chapel, and in the conduct of his church abolished collections and de-

pended on voluntary gifts. In 1835 he printed proposals for the establishment of an Orphan Home, which took shape in 1836 at Bristol. By 1875 upward of 2,000 children were lodged, fed, and educated, and $3,750,000 had been received in donations, as the result only of "prayer to God." Müller visited Europe, America and Asia on evangelistic tours. He published "A Narrative of some of the Lord's Dealings with George Müller" (1837, 1841, 1856). He died in Bristol, England, March 10, 1898.

Müller, Johann, a German physiologist; born in Coblentz, Prussia, July 14, 1801. After taking his degree of doctor in medicine at the University of Bonn (1823) he became Professor of Physiology and Anatomy at the same place (1830), exchanging to Berlin three years afterward. In 1833 he published his great work, "The Physiology of Man," which was soon afterward translated into French and English. Müller founded the physico-chemical school of physiology, raising it from a speculative to a positive science, and reformed the theory of medicine. His 100 publications embrace nearly every subject in comparative anatomy and physiology. He died in Berlin, April 27-28, 1858.

Müller, Johannes Von, a Swiss historian; born in Schaffhausen, Switzerland, Jan. 3, 1752. He studied at Göttingen under Heyne, Schlözer, etc., and in 1772 was appointed Professor of Greek at Schaffhausen. From 1774 to 1780 he lived in Geneva, taught there, and wrote his "Universal History" (3 vols. 1810), and published the first volume of his great work, "History of the Swiss." Shortly afterward he became Professor of History and a librarian at Cassel, but resigned both posts in 1783. In 1786 he became librarian and councillor of state to the Elector of Mainz, and began the publication of his larger "History of the Swiss League" (5 vols. 1786–1808; improved ed. 1826). In support of the confederation of the German princes he wrote a "History of the Princes' League" (1787). In 1792, when Mainz was taken by the French, he went to Vienna, where the Emperor Leopold nominated him a member of the privy-council; but in 1804 he left Vienna for Berlin, where he was appointed historiographer of the Hohenzollern family, and wrote "History of Frederick I.," "Downfall of the Freedom of the Old Peoples," and "The Chronologies of the Primitive World." Introduced to Napoleon after the battle of Jena, he was appointed by him (1807) secretary of state in the new kingdom of Westphalia; but died in Cassel, May 29, 1809. His "Collected Works" were published, 27 vols. Tübingen, 1800–1817; new ed. 40 vols. Stuttgart, 1831–1835.

JOHANNES VON MÜLLER.

Müller, Julius, a German theologian, brother of Karl O. Müller; born in Brieg, Prussia, April 10, 1801. He studied at Breslau and Göttingen, at first law, next theology, and after a severe mental struggle adopted opinions in religion opposed to those of the Rationalists. In 1825 he was appointed pastor at Schönbrunn, S. of Breslau; in 1831 second university preacher in Göttingen; in 1834 extraordinary Professor of Theology there; next year ordinary professor in Marburg; and in 1839 in Halle. His reputation as a theologian chiefly rests on his great work, "The Christian Doctrine of Sin" (1829; 6th ed. 1878). It was translated into English by W. Urwick (2 vols. 1868). Another work was "Dogmatic Treatises" (1870). Müller, together with Neander and Nitzsch, edited (1850–1861) the "Journal of Christian Knowledge and Life." He died in Halle, Sept. 27, 1878.

Müller, Karl, a German author; born in Stuttgart, Feb. 8, 1819. He was editor of several periodicals. He wrote: "Life's Changes, by Franz von Elling" (1854); "New Mysteries of Paris" (1863); "New Mysteries of London" (1865–1867); "The White Woman" (1868–1873); "The Turks before Vienna" (1870); "At the Court of the Northern Semiramis" (1873); etc. Among his pseudonyms were "Otfried Mylius," Rod. Nellenburg," etc. He died in Stuttgart, Nov. 28, 1889.

Müller, Karl Otfried, a German classical scholar; born in Brieg, Prussia, Aug. 28, 1797. He studied at Breslau and Berlin; was appointed (1817) Professor of Ancient Languages in the former city; obtained the chair of archæology at Göttingen in 1819; visited Italy, and then Greece, where he died. His best-known works are on the Dorians, and the Etruscans, and his "History of the Literature of Ancient Greece" (1840). He died in Athens, Greece, Aug. 1, 1840.

Müller, Otto, a German novelist; born in Schotten, Hesse, June 1, 1816. He edited several periodicals. Among his works were the popular "Burgher" (3d ed. 1870); Charlotte Ackermann" (1854), which he dramatized; "The Mayor of Frankfort" (3d ed. 1878); "The Convent

Court" (2d ed. 1862); "Roderich" (2d ed. 1862); "Tales" (2d ed. 1870); etc. He died in Stuttgart, Aug. 7, 1894.

Müller, Otto Frederick, a Danish naturalist; born in Copenhagen, in 1730. After traveling in various countries as tutor to a Danish nobleman, he returned to Copenhagen in 1767, and married a lady of considerable property; whereupon he devoted his life to scientific pursuits. He was appointed by Frederick V. of Denmark to continue the publication of the "Flora" of his native country, and in 1779 he commenced a corresponding work on the "Zoology of Denmark," but lived to complete only two parts. Müller also made researches relative to the minute animals, and published several treatises thereon, which Cuvier declared entitled their author to a "place in the first rank of those naturalists who have enriched science with original observations." He died in 1784.

Müller, Wilhelm, a German poet; born in Dessau, Oct. 7, 1794. He studied at Berlin; volunteered in 1813 in the Prussian army, and was present at the battles of Lützen, Bautzen, Hanau, and Culm; journeyed to Italy in 1819; and on his return was appointed teacher of Latin and Greek at Dessau. His chief poetical works are lyrical, and are very popular in Germany. He also published the "Library of the Seventeenth Century German Poets." His son was the well-known Friedrich Max Müller. He died in Dessau, Sept. 30, 1827.

Müller, Wilhelm, a German historian; born in Giengen, Würtemberg, Dec. 2, 1820. He was professor in the gymnasium at Tübingen in 1863. He wrote: "Guide for Instruction in History" (14th ed. 1890); "Political History of the Present" (annual, 1867–1892); "Illustrated History of the Franco-Prussian War" (1873); "Historical Women" (2d ed. 1882); "Emperor William" (4th ed. 1880); "Count Moltke" (3d ed. 1889); "Prince Bismarck" (3d ed. 1890); "Emperor Frederick" (1888); "Political History of the Most Recent Times, 1876–1890" (4th ed. 1890); etc. He died near Ravensburg, Feb. 7, 1892.

Müller, William James, an English painter; born in Bristol, England, in 1812. He studied painting under J. B. Pyne, and first exhibited in the Royal Academy in 1833. In 1833–1834 he visited Germany, Switzerland, and Italy, and in 1838 Greece and Egypt; while in 1843 he accompanied, at his own expense, the Lycian expedition under Sir Charles Fellowes, bringing back many sketches and pictures of Oriental life and scenery. He lived for some time in London. Among the more notable of his pictures are the "Baggage Wagon," "Dredging on the Medway," "The Slave Market," and the "Salmon Weir." He died in Bristol, in 1845.

Müller, Wolfgang, called VON KÖNIGSWINTER (fon kuh'nigs-vin-ter), a German poet and novelist; born in Königswinter, Prussia, March 15, 1816. Originally a physician (1842), he was a member of the Frankfort Parliament in 1848, but abandoned both medicine and politics for literature. Among his works were: "Poems" (3d ed. 1868); "Legends of the Rhine in Ballad Form" (4th ed. 1873); "The May Queen" (1852), a charming village tale in verse; "Prince Minnewin" (2d ed. 1856), published anonymously; "Aschenbrödel" (Cinderella: 1863), an epic poem; the comedy "She Has Uncovered Her Heart"; and in the department of art history "Düsseldorf Artists" (1854) and "Munich Sketch Book" (1856). A selection of many of his best poems, entitled "Verses of a Rhine Poet," appeared in 6 vols. Leipsic, 1871–1876. He died in Neuenahr, Prussia, June 29, 1873.

Mullet, in ichthyology, the popular name of the genus *Mullus* and of the family *Mugilidæ*. The former are distinguished as red, and the latter as gray mullets. Red mullets are ground feeders, using their barbels in discovering their food; it was believed that they fed on putrid flesh, but probably they are attracted to decomposing bodies by the small crustaceans which feed thereon. Little is known of their habits; in winter they retire into deep water, in summer they approach the coasts, and are sometimes found in brackish waters. They are brilliantly colored, and as food fish should claim the attention of pisciculturists. The gray mullet is plainly colored, greenish on the upper parts, and more or less silvery on the sides. The flesh is well-flavored, and it is largely cultivated in the fish farms of Western Italy.

Mullion, a vertical division between the lights of windows, screens, etc., in Gothic architecture. Mullions are rarely found earlier than the Early English style. The term is also applied to the division between the panels in wainscotting.

Mulock, Dina Maria. See CRAIK.

Mulready, William, an English painter; born in Ennis, Ireland, April 1, 1786. He became a student of the Royal Academy about 1800; exhibited "The Rattle" (1808); "The Music Lesson" (1809), at the Royal Academy, and his "Idle Boys" (1815) secured his election as an associate of the Academy, while the following year he was elected an academician. Among the most popular of his numerous pictures after this time were: "The Wolf and the Lamb" (1820); "The Last In" (1835); "The Seven Ages of Shakespeare" (1838); "The

Sonnet" (1839); illustrations to "The Vicar of Wakefield" (1840); "The Whistonian Controversy" (1844); "Choosing the Wedding Gown" (1845); "Burchell and Sophia" (1847); "Women Bathing" (1849); and "The Toyseller" (1861). He lied in London, England, July 7, 1863.

Multan, or **Mooltan** (möl-tän'), a city of India, in the Punjab, the chief city and capital of a district of same name; 4 miles from the Chenab; partly surrounded by a wall, and overlooked by a fortress of some strength occupied by European troops. The streets are mostly narrow and tortuous. It is one of the most ancient cities in India, and is the center of a large trade. Pop. (1901) 87,394.

Multiple, in arithmetic and algebra, a number which contains another number an exact number of times without any remainder; thus, 20 is a multiple of 5. Common multiple of two or more numbers: In arithmetic, any number which contains each of these numbers an exact number of times without any remainder; as, 30 is a common multiple of 2, 5 and 6. The least common multiple is the smallest number which will do this; thus, 24 is a common multiple of 3 and 4, but 12 is their least common multiple. Multiple point of a curve: In geometry, a point in which two or more branches of a curve intersect each other. The analytical characteristic of a multiple point of a curve is, that at it the first differential coefficient of the ordinate must have two or more values.

Multiple Poinding, in Scotch law, a process by which a person holding money or other property, which is claimed by two or more persons, obtains an authoritative arrangement for the equitable division of it among the several claimants. It corresponds to an interpleader in English law.

Multiple Stars. See DOUBLE STARS.

Multivalves, the name given to such shellfish or molluscous animals as possess shells which consist of more than two pieces. The term is merely used with reference to the shell itself, and is not now employed as a term in the classification of the *Mollusca.* The multivalve mollusks are represented by the family *Chitonidæ,* or chitons, which are included in the class *Gasteropoda* of the subkingdom *Mollusca.* In these forms, which are common round the British coasts but attain a larger size in warmer latitudes, the shell consists of eight dorsal plates disposed transversely and slightly overlapping each other. These plates form the "valves" of the shell, and constitute an efficient protective casing for the animal which crawls by means of the broad ventral "foot" characteristic of the *Gasteropoda.* They adhere to rocks after the fashion of the limpets and possess the power of coiling their bodies up when irritated or alarmed. The other varieties of shells, characterized by the number of pieces in the shell, are the univalves (for example, snail, whelk, etc.,) and the bivalves (mussel, oysters, etc.,).

Mum, a kind of malt liquor much used in Germany, and brewed of the malt of wheat with a little oat and bean meal added.

Mumbo Jumbo, an African bogie, hideous and malignant, the terror of negro women.

Mummius, Lucius, a Roman consul, who, after serving as prætor in Spain, distinguished himself, in 146 B. C., by the conquest of Greece. He took, burnt, and pillaged Corinth, and sent the finest works of art found there to Rome. To Mummius was then intrusted the task of organizing the new province of Achaia. He was honored with a triumph and the surname of Achaicus. He afterward held the office of censor.

Mummy (by some derived from the Arabic *momia,* or the Coptic *mum,* bitumen or wax), the dead body of an Egyptian preserved by embalming. Owing either to the religious opinions of the Egyptians, or to the nature of the country which rendered interment inconvenient, or the want of fuel which rendered burning difficult, they embalmed all their dead, and deposited them in subterranean chambers or in grottoes excavated in the mountains. An immense number of them have been found in the plain of Saccara, near Memphis — hence called the plain of the mummies — consisting not only of human bodies, but of various animals, or heads of animals, bulls, apes, ibises, crocodiles, fish, etc. Numerous caves or grottoes with contents of the same kind are found in the two mountainous ridges which run nearly parallel with the Nile from Cairo to Syene. Some of the most remarkable of these tombs are those in the vicinity of ancient Thebes, in the Libyan mountains, many of which were examined by Belzoni, and those near Eleithias (described by Hamilton), further up the river, which, though less splendid than the Theban sepulchers, contain more illustrations of the private life of the Egyptians. The sepulchral chambers are almost entirely covered with fresco paintings and bas-reliefs, and frequently contain statues, vases, etc. Some of them (the royal sepulchers) consist of suites of spacious halls and long galleries of magnificent workmanship. Those of private individuals vary according to the wealth of the deceased, but are often very richly ornamented. Many of these tombs have been ransacked by Arabs for the purpose of plunder, and great numbers of the mummies destroyed for the resin or asphaltum they contain, which is sold to advantage in Cairo.

The tombs and mummies are, many of them, 2,000 or 3,000 years old, and are in part indebted for their preservation to the dryness of the soil and the mildness of the climate. The processes for the preservation of the body were various. Those of the poorer classes were merely dried by salt or natron, and wrapped up in coarse cloths, and deposited in the catacombs. The bodies of the rich and the great underwent the most complicated operations, and were laboriously adorned with all kinds of ornaments. Embalmers of different ranks and duties extracted the brain through the nostrils, and the entrails through an incision in the side; the body was then shaved, washed, and salted, and after a certain period the process of EMBALMING (*q. v.*), properly speaking, began. The whole body was then steeped in balsam and wrapped up in linen bandages; each finger and toe was separately enveloped, or sometimes sheathed in a gold case, and the nails were often gilded. The bandages were then folded around each of the limbs, and finally around the whole body to the number of 15 to 20 thicknesses. The head was the object of particular attention; it was sometimes enveloped in several folds of fine muslin; the first was glued to the skin and the others to the first; the whole was then coated with a fine plaster. A collar of cylindrical glass beads of different colors is attached to the masks which cover the head, and with it is connected a tunic of the same material. The beads, both in the collar and tunic, are so arranged as to form images of divinities, of the scarabæus, the winged globe, etc. Instead of this the mummy is sometimes contained in a sort of sheath, made of paper or linen, and coated with a layer of plaster, on which are paintings and gilding. These paintings represent subjects relating to the duties of the soul, its presentation to the different divinities; and a perpendicular hieroglyphical inscription in the center gives the name of the deceased, and of his relations, his titles, etc. The whole is then placed in the coffin.

Those mummies which have been examined present very different appearances. One class has an opening in the left side under the armpit, and in another the body is whole. Some of those which have been opened have been dried by vegetable and balsamic substances, others by salt. In the former case aromatic gums or asphaltum were used (the gums, when thrown into the fire, gave out an aromatic odor); in these the teeth and hair are generally preserved, but if exposed to the air they are soon affected. Those prepared with asphalt are of a reddish color, and are in good preservation. Those dried with saline substances are of a black, hard, smooth appearance. On exposure to the air they attract moisture, and become covered with a saline substance. Those mummies which have no opening are also partly preserved by saline substances, and partly by asphalt. In the latter not only the cavities of the body are filled with it, but the flesh, bones, and every part seem to be penetrated by it; it was probably injected in a hot state. These are the most commonly met with. They are hard, black, and without any disagreeable smell. The whole mummies prepared with salt alone are white and smooth, and resemble parchment. The coffin is usually of sycamore, cedar, or pasteboard; the case is entire, covered within and without by paintings representing funeral scenes and a great variety of other subjects; the name of the deceased is also repeated on them in hieroglyphic characters. The cover, which is also entire, is ornamented in the same manner, and contains too the countenance of the deceased in relief, painted, and often gilded. The breast is covered with a large collar, a perpendicular inscription occupies the center, and funeral scenes the sides. The coffin is often inclosed in a second and even third case.

The name of mummies is likewise given to human bodies preserved in other ways, either by accident or by some artificial preparations. The Guanches, or aboriginal inhabitants of the Canaries, preserved the bodies of their deceased friends, which have been found in great numbers in the catacombs of Palma, Ferro, Teneriffe, etc. The natives called them *xaxos*. They are dry, light, of a yellow color and strong odor, and often injured by worms; they are enveloped in goatskins and inclosed in cases. They are supposed to have been dried in the air after having had the entrails removed; and they were also covered with a sort of aromatic varnish. Humboldt found mummies prepared in a similar manner in Mexico. The Peruvians also had the art of preserving the bodies of their incas. Mummies were formerly used in medicine under the name of *mumia vera*, on account of the balsam they contained, but they have long ceased to be so employed. Natural mummies are frequently found preserved by the dryness of the air. In a vault of the cathedral at Bremen, called the lead cellar (because it was formerly employed for melting lead for conduits and organ pipes), are bodies in good preservation. In the celebrated monastery of St. Bernard the bodies of travelers who have been buried in the snow are deposited in a chapel, in which there are open windows protected by grates. They are placed in a sitting position, leaning each on another's breast. The cold prevents their putrefaction and gives them time to dry.

Mummy Wheat, a variety of wheat said to have been produced from grains found in Egyptian mummy. It has long been in

general cultivation in Egypt and neighboring countries in Africa. The spike is compound.

Mumps, a contagious disease communicated by the saliva, sometimes epidemic, and characterized by a specific swelling and inflammation in the parotid and salivary glands, commonest in children, and in boys rather than girls. It occurs mostly in spring and autumn, in cold and damp weather. One or both sides may be affected, and, in general, the disease appears first on one side and then on the other. There is seldom much fever. The inflammation is usually at its highest point in three or four days.

Munby, Arthur Joseph, an English poet; born in Bulmer, Yorkshire, England, in 1828. His themes are largely pastoral idylls. He wrote: "Verses Old and New" (1865); "Dorothy" (1880), which was well received; "Vestigia Retrorsum" (Steps Backward: 1891); "Vulgar Verses, by Jones Brown" (1891), mostly in dialect; "Susan" (1893).

Munch, Andreas (mönh), a Norwegian dramatist; born in Christiania, Oct. 19, 1811. Originally a student of law, he was an editor (1841–1846) and professor in the university (1866) at Christiania. His chief works were: "Ephemera" (1836), his first effort; "King Sverre's Youth" (1837), a drama; "The Singer" (1838); "Poems Old and New" (1848); "Pictures from North and South" (1848), in prose; "New Poems" (1850); "Grief and Consolation" (1852), his most successful production; "Lord William Russell" (3d ed. 1888), a tragedy; "An Evening at Giske" (1855), a historical drama. ("Works," Copenhagen, 5 vols., 1887–1890.) He died near Copenhagen, June 27, 1884.

Munch, Peder Andreas, a Norwegian historian; born in Christiania, Dec. 15, 1810. He was Professor of History in the university at Christiania in 1841. His masterpiece was "History of the Norwegian People" (1851–1864). ("Works," published by the State, 2d ed. Christiania, 1894.) He died in Rome, May 23, 1863.

Münch-Bellinghausen, Baron Eligius Franz Joseph von (münh bel'ling-houzen), better known as Friedrich Halm (hälm), an Austrian dramatist; born in Cracow, April 2, 1806. He studied law, and held various official positions at Vienna. He wrote: "Griseldis" (10th ed. 1893), which had great success; "The Adept" (1836); "Camoens" (1837); "Imelda Lambertazzi" (1838); "The Son of the Wilderness" (9th ed. 1894), well known in England and America under the title "Ingomar"; "The Fencer of Ravenna" (5th ed. 1893), perhaps his best work; "Wild Fire" (6th ed. 1894), a romantic comedy; etc. ("Works," 8 vols., Vienna, 1856–1864.) He died in Vienna, May 22, 1871.

München. See Munich.

München Gladbach. See Gladbach.

Münchhausen, Baron Hieronymus Karl Friedrich von (münh'hou-zen), a German-Russian military officer; born in Bodenwerder, Hanover, May 11, 1720. He served in his youth as an officer in the Russian cavalry, and passed the close of his life in his native country, delighting in narrating the most astounding stories of his warlike exploits in the campaign against the Turks in 1737-1739, and thereby gaining the reputation of being the greatest liar of his time. He died in Bodenwerder, Feb. 22, 1797. A compilation of his prodigious "yarns" was published in London in 1785, under the title of "Baron Münchausen's Narrative of His Marvellous Travels and Campaigns in Russia." In the following year a 2d edition appeared at Oxford, described as "The Singular Travels, Campaigns, Voyages, and Sporting Adventures of Baron Munnikhousen, commonly pronounced Münchausen; as he relates them over a bottle when surrounded by his friends." A 3d edition was also brought out in London in the same year, entitled "Gulliver Revived"; the best English edition is that by Shore (1872) illustrated by Doré and additions by Theodore Gautier. Rudolf Erich Raspe, the author of this marvellous narrative, was born in Hanover, in 1737, he was a professor and curator of the museum of Cassel, which position he lost. He fled to England and died in Ireland in 1794.

Muncie, a city and county-seat of Delaware co., Ind.; on the White river, and on the Lake Erie and Western; the Cleveland, Cincinnati, Chicago and St. Louis, and the Fort Wayne, Cincinnati and Louisville railroads; 53 miles N. E. of Indianapolis. It contains the Eastern Indiana Normal University, high school, hospital, public library, street railroad and electric light plants, several National banks, and daily and weekly newspapers. It has a pulp mill, a number of large glass works, several iron and steel works, and an assessed property valuation of over $8,000,000. Pop. (1890) 11,345; (1900) 20,942; (1910) 24,005.

Mundane Egg, in mythology, an egg said by the Phœnicians, the Egyptians, the Hindus, and the Japanese to have been produced by the Creator. From this egg the world and all its inhabitants were produced.

Mundatory, a purificatory; a cloth of linen or hemp, marked with a small cross, and used for cleansing the chalice in the Roman rite. Its use is of recent date, and it is not blessed. A mundatory is employed

by some of the more advanced Anglicans. The Greeks use a sponge for the same purpose.

Munday, Anthony, an English writer; born in London, England, in 1553. He wrote a large number of plays, generally in collaboration with Chettle, Drayton, Wilson, Dekker, Webster, and others; among them being "Richard Cœur de Lion's Funeral" (1589); "A Chance Medley" (1598); "The Rising of Cardinal Wolsey" (1601); "Death of Robert, Earl of Huntington" (1601); and "The Two Harpes" (1602). He was also a writer of ballads of much note, which were licensed to be sung in London. He wrote, translated, or adapted numerous romances, including "Palladino of England" (1588) and the two first books of "Amadis de Gaule" (between 1589 and 1595). His work "The English Romayne Lyfe" (about 1582) excited the most comment: it was ostensibly an account of his adventures among English Catholic refugees in France and Italy, and was anti-Catholic in tone. His prodigious activity in literature and affairs makes him one of the most notable characters of his time. He died in London, in August, 1633.

Munde, Paul Fortunatus, an American gynecologist; born in Dresden, Saxony, Sept. 7, 1846; came to the United States in 1849, and in 1863 after having graduated at the Public Latin School of Boston, entered the Medical Department of Yale University. Leaving college before his course was completed he entered the Union army and served as acting medical cadet during a part of 1864. He was graduated at Harvard Medical School in 1866; then went to Germany; enlisted as an assistant surgeon in the Bavarian army; and served throughout the war receiving the Iron Cross from the emperor for his heroism in removing the patients from a burning hospital on the outskirts of Paris. When he was mustered out of service he went to Würzburg and there became resident physician of the Maternity Hospital. He remained in Würzburg till 1870, then enlisted for the Franco-Prussian War, in which he served as a battalion surgeon in the Bavarian army. At the close of the war he applied himself to hospital work in Heidelberg, Berlin, London, Edinburgh and Paris, and in 1873 returned to the United States, settled in New York city, and applied himself to the specialties of gynecology and obstetrics. He was editor of the "American Journal of Obstetrics" in 1874–1892; one of the founders of the "American Gynecological Society; president of the New York Obstetrics Society in 1886–1893; president of the American Gynecological Society in 1897–1898; and a member of other medical societies, etc. His publications include "Obstetric Palpitation"; "Minor Surgical Gynecology"; "Pregnancy and the Puerperal State"; and "Diseases of Women." He died in New York city, Feb. 7, 1902.

Mundilfori, in Scandinavian mythology, one of the giant race, who had a son and daughter of such surpassing beauty that their father called them Mani and Sol (moon and sun).

Mundt, Louise. See MÜHLBACH, LUISE.

Mundt, Theodor (mönt), a German biographer; born in Potsdam, Prussia, Sept. 19, 1808. He belonged to the "Young Germany" school. He was Professor of the History of Literature at Breslau in 1848; professor and librarian at the University of Berlin, in 1850. Among his biographical writings and travels, which were his best, were monographs on Prince Pückler, George Sand, Lamennais, and others; "Walks and World Journeys" (1838–1839); "Italian Conditions" (1859–1860). His critical works include: "Art of German Prose" (2d ed. 1843); "Universal History of Literature" (2d ed. 1848); "History of Contemporary Literature" (2d ed. 1853); "The Pantheon of the Ancient Peoples" (2d ed. 1854); "History of Society" (2d ed. 1856). He wrote the novels "Thomas Müntzer" (3d ed. 1860); "Mendoza, the Father of Rogues" (1847); etc. He died in Berlin, May 30, 1861.

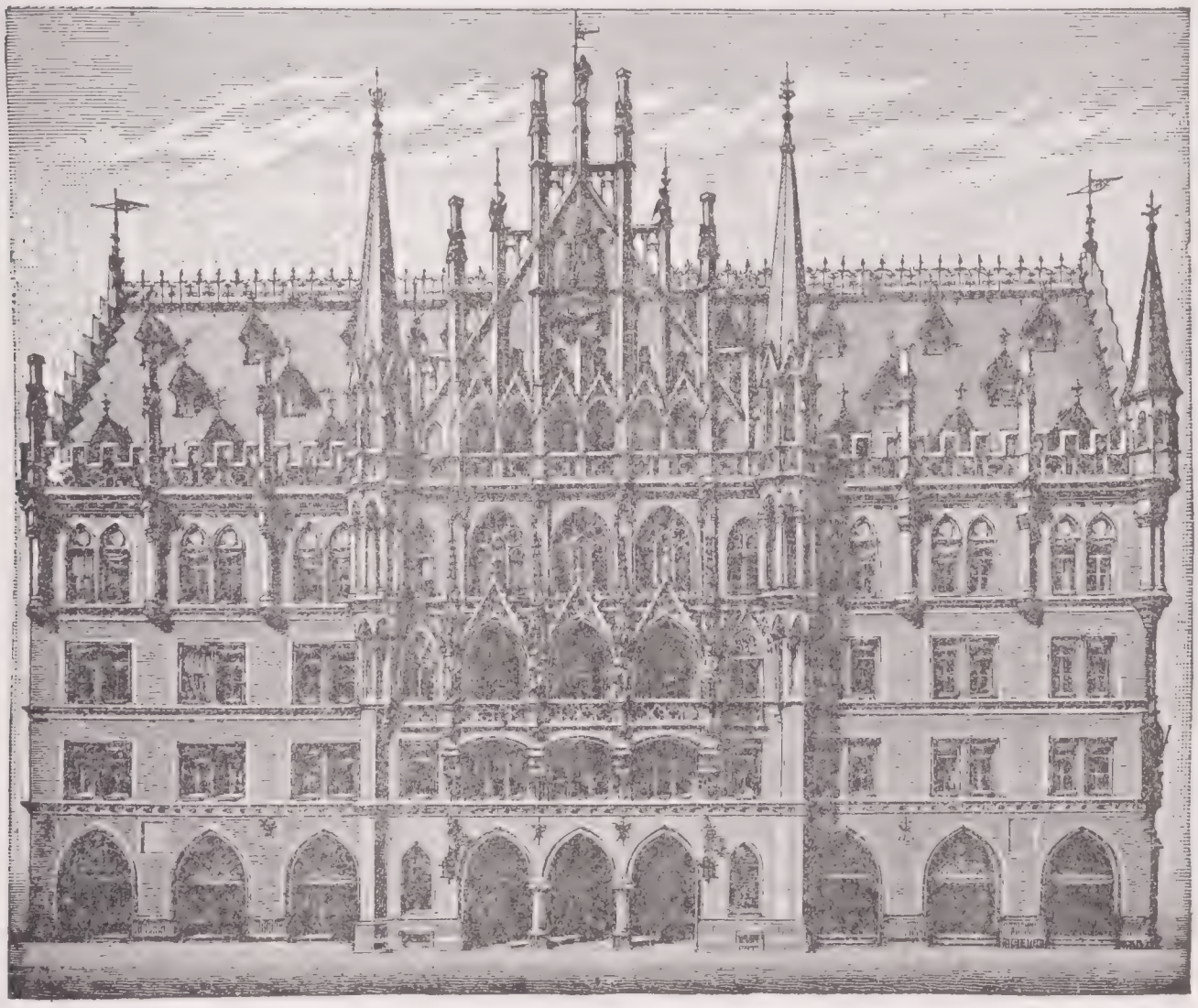
Munger, Theodore Thornton, an American clergyman; born in Bainbridge, N. Y., March 5, 1830. He was graduated at Yale in 1851, and at Yale Theological School in 1855. After 1885 he was pastor of the United Church, New Haven, Conn. He was a Congregational leader in his State; and active in municipal reform, and was well known as a writer of ability and attractiveness on ethical subjects, and an exponent of broad, progressive theology. He published: "On the Threshold"; "The Freedom of Faith"; "Lamps and Paths"; "The Appeal to Life"; "Horace Bushnell"; etc. He died in 1910.

Mungo, woolen cloth made of second-hand material. Old cloth and woolen goods are torn to pieces by cylindrical machines, and, being mixed with various proportions of pure wool, are re-spun and woven. Druggets and low-priced goods of but little strength are the result. See SHODDY.

Mungoos, or **Mongoose,** *Herpestes griseus,* an ichneumon, common in many parts of India, and closely akin to the Egyptian species, *H. ichneumon.* The mungoos is a weasel-like animal, tawny yellowish-gray, the head with reddish and yellow rings, the colors so disposed as to produce an iron-gray hue. Length of body 16 or 17 inches, of tail 14. It kills numerous birds, sucking their blood and leaving the body uneaten. It also with great adroitness seizes and kills many snakes, the formidable cobra included

Anglo-Indians have the notion that, when wounded by a venomous snake, it can heal itself by eating some remedial plant, but the alleged fact is very doubtful.

Munich (mū'nik) (German München), the capital city of Bavaria, on an extensive plateau, about 1,700 feet above sea-level, chiefly on the left bank of the Isar. The old town has a quaint and irregular character, but the new town, which has sprung up chiefly to the N. and W., has a regular and imposing appearance, and altogether Munich is one of the finest towns in Germany. Vast improvements are due to the munificence of King Ludwig I. The royal palace forms a very extensive series of buildings chiefly in the Italian style, and contains many magnificent apartments and rich artistic and other treasures. Connected with it are the court church and the court and national theater, among the largest in Germany. The city is highly celebrated for its fine galleries of sculpture (Glyptothek) and painting (Old and New Pinakothek), and for various other important collections, such as that of the Bavarian national museum. The royal library (occupying a fine building in the Florentine style) has upward of 1,000,000 volumes and 30,000 MSS., being thus one of the largest in Europe. The university had in 1899–1900, 194 professors and teachers, and 4,257 students in theology, jurisprudence, medicine and philosophy, together with a library of over 300,000 volumes. There is an academy of science, an academy of arts, and many fine churches, including the cathedral, founded in 1488. In addition to the public edifices, properly so called, Munich is rich in monuments, which adorn its squares, gardens, and public promenades. The so-called English Garden (laid out by Count Rumford) is a fine park of 600 acres watered by two arms of the Isar. The industries are numerous, and in some particular branches have acquired a high name. Among others may be mentioned painted glass and other artistic productions, mathematical, optical, and surgical instruments, gold and silver lace, jewelry, glass, carriages, bells, musical instruments, etc. Munich is the seat of the high courts of legislature and of law, and of all the more important offices of the state. It was founded by Henry, Duke of Saxony, in 962; taken by Gustavus Adolphus in 1632, by the French under Moreau in 1800, and by Napoleon in 1805. Pop. (1910) 595,053.



MUNICH: CITY HALL.

Munjeet, or **Munjeeth,** *Rubia munjista,* also called East India madder, which is extensively cultivated in India. Its root furnishes a dye-stuff yielding colors some-

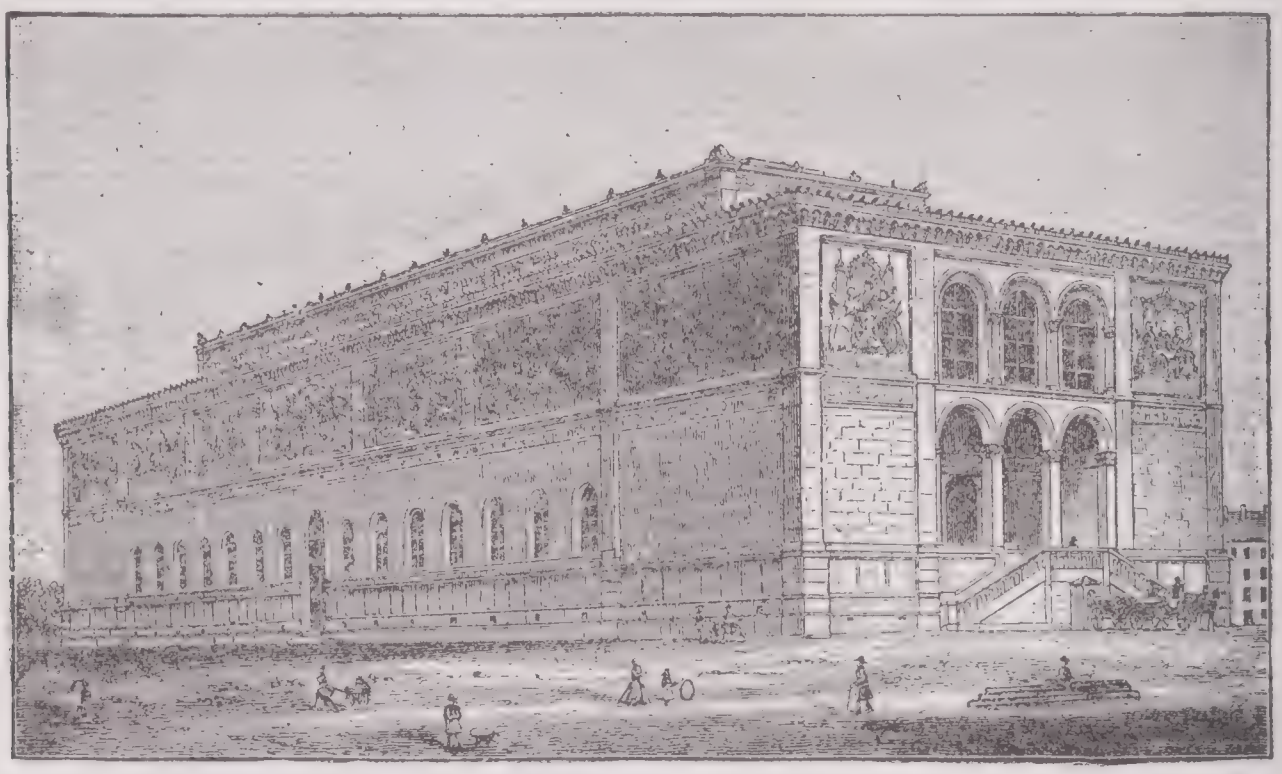
what similar to those of madder, the most important color, alizarin, being absent. The principal coloring matters, purpurin and munjistin, are comparatively feeble, which renders munjeet inferior to madder as a dye-stuff.

Munkacs (mön-käch′), a market-town of Hungary, at the foot of the Carpathians, 101 miles N. E. of Debreczin; has mines of iron and rock-crystals, called Hungarian diamonds. The citadel, built on an isolated height, resisted the imperial arms for three years (1685–1688); and having fallen in 1848 into the hands of the Hungarians was captured by the Russians in the following year. It is now a state prison. Pop. about 12,000.

Munkacsy, Michael (mön′kä-chē), a Hungarian painter, whose real surname was LIEB; born in Munkacs, Hungary, Oct. 10, 1846. He went as a turner's apprentice to Vienna, and studied painting there, at Munich, and at Düsseldorf, and in 1872 settled in Paris. He visited New York in 1886. Except a few portraits, his works are nearly all genre pictures. Three classes may be distinguished — those depicting Hungarian life, mostly very dark in coloring, as "The Condemned," "Wartime," "Night-roamers," "The Village Hero," and others; those illustrative of the social life of Paris, much lighter and brighter in tone, as "Munkacsy in His Studio," "Father's Birthday," "Two Families," etc.; historical pieces, of which the best-known examples are "Milton Dictating 'Paradise Lost' to His Daughters," "Christ before Pilate" (finally sold to John Wanamaker for $100,000), "Crucifixion," and "Mozart's Last Moments." He died in Bonn, Germany, May 1, 1900.

Munkittrick, Richard Kendall, an American poet; born in Manchester, England, March 5, 1853. He was on the editorial staff of "Puck," New York, 1881–1889. He wrote "Farming" (1891); "The Moon Prince" (1893); "New Jersey Arabian Nights" (1893); "The Acrobatic Muse" (1896); "The Slambangaree" (1898); etc.

Munro, Sir Thomas, a British administrator; born in Glasgow, Scotland, in 1761. He was educated at the Glasgow grammar school and university, arrived as an officer at Madras in 1780 in time to serve in the operations against Hyder Ali in 1780–1783, assisted in the reorganization of Mysore, administered Canara, and introduced the ryotwari system of tenure, subsequently extended to most of Madras and Bombay. In 1807–1815 he was in England, where he had great influence on Indian legislation. Having commanded in the second Mahratta war, he was in 1819 named governor of Madras. He died of cholera in 1827.



MUNICH: NEW ART GALLERY.

Munro, Sir Hector, a British military officer; born in Cromartyshire, Scotland, in 1726. He served in the Low Countries; embarked for India in 1760; won the great battle of Buxar in Behar in 1764; and shared with Coote in the defeat of Hyder Ali. He returned to England in 1781, held military appointments at home, and spent his last years in improving his estate at Novar, Cromartyshire, where he died in 1805.

Munroe, (Charles) Kirk, an American writer; born in Wisconsin, Dec. 15, 1856.

He made Florida his home. He wrote: "The Flamingo Feather" (1887); "Wakulla" (1888); "Campmates"; "Canoemates"; "Raftmates"; "Rick Dale"; "Dorymates"; "The White Conquerors"; "Big Cypress"; "At War with Pontiac"; "Life of Mrs. Stowe" (with her son); "Copper Princess" (1898); "Forward March" (1899); "Under the Great Bear" (1900), etc.

Münster, a town of Prussia, capital of the province of Westphalia; in a plain on the Aa; 78 miles N. N. E. of Cologne. It was once fortified, but the fortifications have been converted into promenades. The principal edifices are the cathedral, the church of St. Lambert, the town house, the exchange, museum, theater, etc. The manufactures include woolen, linen, and cotton goods, etc. Münster was long governed by independent bishops, in whom a warlike spirit was often more conspicuous than a Christian spirit. The most memorable events in the history of the town occurred in 1532–1535, when it fell into the hands of the Anabaptists. Pop. (1905) 81,-

Münster, Sebastian, a German scholar; born in Ingelheim, Germany, in 1489. He studied at Heidelberg and Tübingen, and became a Franciscan monk, but at the Reformation he embraced the new doctrines (1529). He then taught Hebrew and theology at Heidelberg, and from 1536 mathematics at Basel. He brought out the first Hebrew Bible (1534–1535) edited by a German; wrote "Cosmographia" (1544), a work on geography that kept its ground for more than a century; and published a Hebrew grammar, a Chaldaic grammar (1527), and lexicon (1527), and a Latin-Greek-Hebrew dictionary (1530). He died in Basel, Switzerland, May 23, 1552.

Muntjac, or **Muntjack,** *Cervulus,* a genus of deer, indigenous in the S. and E. parts of Asia and the adjacent islands. They are diminutive animals, with small and simple antlers in the males, which have the upper canines strongly developed and sharp, curving downward, and capable of inflicting deep and dangerous wounds. Four species are known: *C. muntjac, C. lacrymans, C. reevesi,* and *C. crinifrons,* the hairy-fronted muntjac.

Muntz Metal, an alloy of six parts of copper and four parts of zinc; it is rolled into sheets, and used for sheathing ships and for other purposes.

Münzer, Thomas (münt'ser), a leader of the ANABAPTISTS (*q. v.*); born in Stolberg, in the Harz, about 1489. He studied theology, and in 1520 began to preach at Zwickau. His Christian socialism and his mystical doctrines soon brought him into collision with the Reformers and the town authorities. He thereupon made a preaching tour through Bohemia, Silesia, Brandenberg, and settled in Thuringia (1523). Again deprived of his office, he visited Nuremberg, Basel, and other S. German cities, and was finally in 1525 elected pastor of the Anabaptists of Mühlhausen, where he won the common people, notwithstanding Luther's denunciations of him, introduced his communistic ideas, and soon had the whole country in insurrection. But on May 15, 1525, he and his men were totally routed at Frankenhausen by Philip of Hesse. Münzer himself was captured in flight and executed in Mühlhausen, Prussian Saxony, May 30, 1525.

Murad V., Sultan of Turkey; born Sept. 21, 1840. He was son of Abdul-Medjid, and he succeeded to the throne on the forcible deposition of Abdul Aziz, Aug. 31, 1876, but was deposed in the course of the same year on account of insanity, and was succeeded by his younger brother ABDUL HAMID II. (*q. v.*). He died Aug. 29, 1904.

Murad Effendi. See WERNER, FRANZ VON.

Muræna, in ichthyology, the typical genus of the family *Murænidæ.* Scaleless; the teeth well developed. Gill openings and clefts between the branchial arches narrow. No pectorals; dorsal and anal fins well developed. Two nostrils on each side of the upper surface of the snout. Eighty species are known, from the tropical and sub-tropical zones. *M. macrurus,* from the Indian seas attains a length of 10 feet and has the tail twice as long as the body. *M. richardsonii* has the skin folded so as to form pouches and *M. undulata* is remarkable as not being able to close its mouth completely. The majority are armed with formidable pointed teeth; in a few species they are molar-like, and fitted for crushing crustaceans. Most of the murænas are beautifully colored.

Mural Arch, a wall, or walled arch, placed exactly in the plane of the meridian line for fixing a large quadrant, sextant, or other instrument, to observe the meridian altitudes, etc., of the heavenly bodies.

Mural Circle, an astronomical instrument consisting of a graduated circle, furnished with a telescope and firmly affixed to a wall, in the plane of the meridian. It is used for determining with great accuracy altitudes and zenith distances, from which may be found declinations and polar distances, and has a graduated circle secured at right angles to its horizontal axis. See TRANSIT.

Mural Crown, the *corona muralis* of the Romans; a wreath, chaplet, or crown of gold, indented and embattled, given by the Romans to the soldier who first mounted a breach in storming a town.

Mural Decoration, the embellishment of walls. It dates from very ancient times. The Egyptian and Etruscan monuments form an integral and important part of the history of painting, and have helped to mold the development of certain styles of art (see ARABESQUE). Incised work and reliefs have been largely employed. The Greeks tinted their temples and "picked out" their sculptured friezes and pediments with color; colored bricks were used in Assyrian, and wall tiles in Moslem, architecture. Some of the Roman walls were built of tufa and red brick, colored brick, terra-cotta, and variegated arrangements of marble were largely used in Italy. The plaster work known as sgraffito is especially adapted for this use. Many English churches of the mediæval period have been built of flint and stone, and much Tudor work of parti-colored brick. Distemper and fresco are described in separate articles; water glass is a silicate process of which there is an example in the English Houses of Parliament. Mosaic work is extensively used in floors and ceilings, but also occasionally employed in mural decoration. The dado of the Albert Memorial Chapel at Windsor, England, is composed of slabs of inlaid marble hatched with colored gold cement.

Another system is that known as encaustic painting (Greek *encaustikē*, "fixed by fire"), a manner of mural painting with a medium composed principally of wax, practised by the ancients. As the name implied that fire was used in the execution, some have been led to suppose that encaustic painting was the same as enamel painting; but notices by Pliny and other writers show clearly that it was a species of painting in which the chief ingredient used for uniting and fixing the colors was wax dissolved by heat. Various attempts have been made in modern times to revive it. About the middle of the 18th century Count Caylus and Bachelier, and in 1792 Mrs. Hooker, of Rottingdean, under the name of Emma Jane Greenland, made various successful experiments with this view. Encaustic painting was again taken up in Germany under the patronage of Louis I., of Bavaria, who commissioned Louis Schnorr to execute a series of historical subjects on the walls of the royal palace, Munich. For preparing her medium Mrs. Hooker dissolved gum-arabic in water, afterward adding gum-mastic, which was dissolved by stirring and boiling, and when the mixture had reached the boiling point she put in the wax. After painting the picture, she passed a thin coating of melted wax over it with a hard brush, and then drew over the surface an iron — for ironing linen — moderately heated. After the picture cooled it was rubbed with a fine linen cloth. The German method is somewhat similar, but some other ingredients are used; among these, potash with the wax; and, in place of an iron being passed over the surface, the wax is brought to the surface by a vessel containing fire being held at a little distance from the picture. It is also possible to employ a medium made of a mixture of turpentine and beeswax sufficiently elastic to be worked like oil. A modification of the system was also devised by Mr. Gambier-Perry, and is known as spirit fresco. By his method the walls are coated with wax and gum compounded with spirit of lavender. The colors are ground with the same medium.

Murano (mö-rä′nō), an island and town of Italy, about a mile N. of Venice; it is famous as the seat of the Venetian glass manufacture — an industry established in the 13th century, and revived in 1860 by Antonio Salviati (1816–1890). It possesses a fine 12th-century cathedral, and another church with some valuable pictures, including Paul Veronese's "St. Jerome in the Desert."

Murat, Joachim (mü-rä′), a French military officer; born in Bastide, Lot, France, March 25, 1771. He was the son of

PRINCE MURAT.

an innkeeper at Cahors, and was intended for the Church, but escaping from the College of Toulouse, he enlisted as a chasseur, but was shortly after dismissed for insubordination. On the formation of the constitutional guard, he entered it, and displaying an active zeal for revolutionary principles, he was soon advanced to the rank of lieutenant-colonel. The overthrow of the Terrorists checked his progress for a time, but the Directory made him chief of brigade, and in 1796 he accompanied Bonaparte to Italy as aide-de-camp Here he distinguished himself by his impetuous courage as a cavalry officer, and was em-

ployed as a diplomatist at Turin and at Genoa. He followed Napoleon to Egypt, where he decided the victory over the Turks at Aboukir, and returned as General of Division. In 1800 he married Marie Caroline, Napoleon's younger sister; and in 1804 Murat was made Marshal, Grand Admiral, and Prince of the French empire. His services in the campaign of 1805 against Austria, during which he entered Vienna at the head of the army, were rewarded with the grand-duchy of Berg. He continued to share Napoleon's victories with such distinction, that, in 1808, the emperor placed him on the throne of Naples. After reigning peaceably four years, he was called to accompany Napoleon to Russia, as commander-in-chief of his cavalry; and, after the defeat of Smolensk, he left the army for Naples. He next took part with Napoleon in the fatal campaign of Germany; but, after the battle of Leipsic, he withdrew, and finding that the throne of the emperor began to totter, concluded an alliance against him. In 1815, however, he again took up arms, and formed a plan to make himself master of Italy as far as the Po, at the very time that Austria and the allies, on his repeated assurances that he would remain true to them, had determined to recognize him as King of Naples. It was too late. Austria, therefore, took the field against him, and he was soon driven as a fugitive to France. After the overthrow of Napoleon he escaped, in the midst of continual dangers, to Corsica, from which he sailed with a few adherents to recover his lost throne. A gale, off the coast of Calabria, dispersed his vessels, but Murat determined to go on shore. He was seized, and carried in chains to Pizzo, brought before a court-martial and condemned to be shot. This sentence was executed Oct. 13, 1815.

Murat, Napoléon Achille, a French-American author; born in Paris, France, Jan. 21, 1801. He was son of Joachim Murat, King of Naples, and hence Prince of the Two Sicilies. Coming to the United States in 1821, he settled at Tallahassee, Fla., where he was mayor 1824, and postmaster 1826–1828. He wrote in French "Essays Moral and Political on the United States of America"; "Exposition of the Principles of Republican Government as Perfected in America," the latter running through over 50 editions. He died in Nasceissa, Fla., April 15, 1847.

Muratori, Ludovico Antonio (mö-rä-tō'rē), an Italian historian; born in Vignola, near Modena, Italy, Oct. 21, 1672. He was made keeper of the Ambrosian library at Milan, and, subsequently, librarian and archivist to the Duke of Modena. He wrote: "Writers of Italian History"; "Italian Antiquities"; "Latin Anecdotes"; "Greek Anecdotes"; "Annals of Italy"; etc. He died in Modena, Italy, Jan. 23, 1750.

Muravieff, Andreii (mö-rä'vē-eff), a Russian writer; born in 1798. His works enjoyed considerable popularity in Russia. They contained: "Dante" (1841), a drama; "History of the Russian Church" (1845); "Souvenirs of Rome" (1846); "Souvenirs of the East" (1851); "Impressions of the Ukraine and Sebastopol" (1859); etc. He died in 1874.

Murchison, Sir Roderick Impey, an English geologist; born in Tarradale, Rossshire, Scotland, Feb. 19, 1792. After receiving a portion of his education at the Durham grammar school, he entered the military college at Marlow in 1805, and left it two years subsequently, on receiving a commission in the 36th regiment. He served at the battle of Vimiera, and shared the dangers of the retreat made by Sir John Moore on Corunna. In 1815 he married, quitted the military profession, and directed himself to the study of the science of geology. In 1828 he accompanied Sir Charles Lyell in a geological tour among the extinct volcanoes of Auvergne. He subsequently succeeded in discovering the whole series of Silurian rocks in the seacliffs W. of Milford Haven, England. The term "Silurian System," which is the name of his first great work, was first used by him. In the years 1835 and 1839 he explored the Rhenish provinces; and, in 1840, with M. de Verneuil, a French geologist, he set out for Russia, with the intention of investigating the geological formations of that country, hitherto very little known. The result of his several expeditions was published in 1845, in a volume, entitled "Geology of Russia and the Ural Mountains," in the production of which he was assisted by M. de Verneuil and the Count Von Keyserling. Shortly after the publication of this book Murchison was knighted. About the same time the Royal Society awarded him its Copley medal, for his efforts in establishing the "Silurian System." In 1854 he produced "Siluria; the History of the oldest known Rocks containing Organic Remains, with a Brief Sketch of the Distribution of Gold over the Earth." In 1855 he was appointed Director-General of the Geological Survey of Great Britain and Director of the Metropolitan School of Science applied to Mining and the Arts. He died Oct. 22, 1871.

Murcia (mör'thē-ä), an ancient town of Spain, on the Segura river; 46 miles S. W. of Alicante. It stands in the productive vale of Murcia, an old-fashioned Moorish town, embosomed in gardens of mulberry, orange, fig, palm, and other fruit trees. Almost the only notable buildings are the bishop's palace and the cathedral, this last begun in 1353, but reconstructed in 1521,

and surmounted by a fine bell tower. Silks, saltpeter, soda, gunpowder, musical instruments, and glass are manufactured; fruit growing, the preparation of olive oil, and the weaving of esparto also flourish. Alfonso X. of Castile took the city from the Moors in 1263; an earthquake almost destroyed it in 1829; and it was captured by the insurgents in 1843. Pop. 111,539. The province of Murcia has an area of 4,478 square miles; pop. 577,897. With the present province of Albacete it was an independent Arab kingdom for 27 years in the 13th century.

Murder, homicide with malice aforethought; the unlawful killing of a human being by a person of sound mind, with premeditated malice. Murder is divided into various degrees, such as murder in the first degree, which is punishable by death in most of the States of the Union, and lesser degrees punishable by various terms of imprisonment. The crime is modified in law also by the terms manslaughter and homicide.

"Murder is when a person of sound memory and discretion, unlawfully killeth any reasonable creature in being, and under the king's peace, with malice aforethought, either express or implied."— Blackstone.

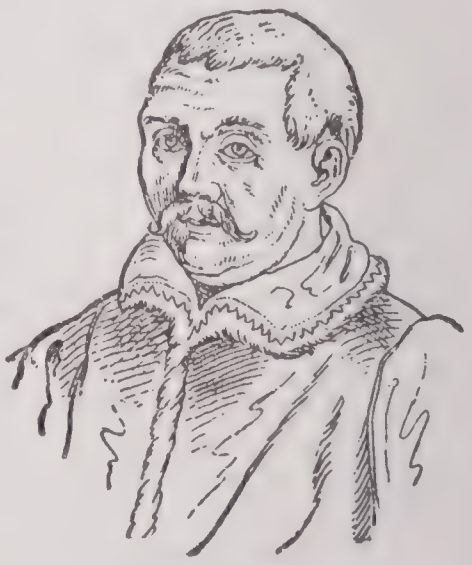
Murdoch, William, a Scotch inventor; born near Auchinleck, Ayrshire, Scotland, Aug. 21, 1754. His father was a millwright and miller, and under him William worked till he was 23 years of age. He then went to Birmingham, England, where he obtained employment in the engineering establishment of Boulton and Watt. A demand for Watt's engines was fast rising in the Cornish mines, and Murdoch was soon sent thither to superintend the erection and fitting of these. At Redruth, in 1784, he constructed a model high-pressure engine to run on wheels, the precursor of the modern steam locomotive; a year later he invented the oscillating engine, the system of which is still in use; and the rotary engine with sun-and-planet circular motion is also his invention. He made many improvements on Watt's engine on the lines of economizing steam and securing simplicity. About the end of the century he was made manager of the works of Boulton and Watt, being afterward admitted as a partner. In 1803 he constructed a steam gun; and some time later produced the well-known cast-iron cement made of iron borings and sal-ammoniac. In 1815 he introduced the hot-water apparatus which, with certain slight modifications, is now extensively used for heating large buildings and conservatories. But his work as a gas inventor remains his most conspicuous achievement. In 1792 he first lighted his offices and cottage at Redruth with coal gas, but it was not till 1798 that he constructed his first extensive apparatus at Birmingham for the making, storing, and purifying of gas, with a view to the supply of factories. Not long after this the offices at Soho were lighted with gas, and the new illuminant was brought prominently before public notice in 1802, when the exterior of the factory was lighted up in celebration of the Peace of Amiens. His great invention was never patented. He retired from business in 1830, and died in Birmingham, England, Nov. 15, 1839.

Murdoch, William, a Canadian poet; born in Paisley, Scotland, Feb. 24, 1823. His publications include "Poems and Songs" (2d ed. 1872); and "Discursory Ruminations: a Fireside Drama," with other pieces (1876). He died in St. John, N. B., May 4, 1887.

Mure, William, a Scotch Hellenist; born in Ayrshire, Scotland, July 9, 1799. He was educated at Westminster and the universities of Edinburgh and Bonn, represented Renfrewshire 1846–1855, and was Lord Rector of Glasgow University 1847–1848. He was for many years commandant of the Renfrewshire militia. He was the author of "A Critical Account of the Language and Literature of Ancient Greece" (1850–1857), a work of sound scholarship and great learning; he maintains the unity of the Homeric poems. Mure also wrote "Journal of a Tour in Greece" (1842) and a couple of treatises on Egyptian chronology. He died in London, England, April 1, 1860.

Mure, Sir William, a Scotch poet; born in Rowallan, Ayrshire, Scotland, in 1594. He was a nephew of the author of "The Cherrie and the Slae," and was wounded at Marston Moor. His principal work is his "True Crucifix for True Catholics" (Edin. 1629). His fine version of the Psalms dates from 1639. He died in 1657.

Muret (Muretus), Marc Antoine (mürā′), a French humanist; born in Muret, near Limoges, France, April 12, 1526. In early life in France he lectured on civil law with great success, but afterward in Italy he seems to have devoted himself entirely to literature till 1576, when he took orders. He afterward resided in Rome. His well-known "Orations," though shallow, are remarkable examples of elocution in the style of Cicero, and his learned criticisms and commentaries, "Various Readings," are held in great



MARC A. MURET.

estimation. He died in Rome, Italy, June 4, 1585.

Murex, plural **Murices,** in zoölogy, the typical genus of the family *Muricidæ.* It is of world-wide distribution, and 180 species are known. *M. tenuispina* is popularly known as Venus' comb. The canal is produced to twice the length of the body of the shell, and fringed with three rows of long, slender spines, curved like the teeth of a harrow. In *M. adustus,* the spines somewhat resemble the branches of a fir tree. The celebrated Tyrian purple was obtained from a species of *Murex.*

Murfree, Mary Noailles, pseudonym CHARLES EGBERT CRADDOCK, an American novelist; born in Murfreesboro, Tenn., Jan. 24, 1850. She wrote: "In the Tennessee Mountains" (1884); "The Prophet of the Great Smoky Mountains" (1885); "In the Bluffs" (1887); "The Young Mountaineers" (1897); "The Bushwhackers," etc.

Murfreesboro, a city and county-seat of Rutherford Co., Tenn.; on the Nashville, Chattanooga, and St. Louis railroad; 32 miles S. E. of Nashville. It is in a cotton and agricultural region. Here are a court house, National banks, Soule College (Bapt.), Union University (Bapt.), and several weekly newspapers. The city has a tannery, carriage shops, planing mill, sawmills, manufactory of red cedar goods, flour mill, and an assessed property valuation of about $1,400,000. In 1819–1826 it was the capital of Tennessee. Close by the bloody battle of Stone river was fought, Dec. 21, 1862, and Jan. 2, 1863, between Generals Rosecrans and Bragg; the Confederate army was compelled to retreat but the losses on both sides were nearly equal — National, 9,511; Confederates, 9,-236. Pop. (1900) 5,531; (1910) 4,679.

Murger, Henri (mür-zhār'), a French author; born in Paris, France, March 24, 1822. He lived a life of extreme privation; formed an informal club or society of unconventional young artists and authors similarly situated which was named "Bohemia," and his associates "Bohemians"—a name famous in general literary history. He contributed a great mass of "copy" to numerous periodicals, and at last made a reputation by his "Scenes from Bohemian Life." He also published two volumes of poetry, "Ballads and Fancies" and "Winter Nights"; and wrote dramas for the Luxembourg theater, and tales, etc., for the "Revue des Deux Mondes." He died in Paris Jan. 28, 1861.

Murillo, Bartolomeo Esteban, the greatest of all the Spanish painters; born in Seville, Spain, Jan. 1, 1618. He received his first instruction in the art from his relation Juan del Castillo; but the latter having gone to settle at Cadiz, Murillo was obliged for subsistence to paint banners and small pictures for exportation to America. In that business he obtained full employment, and began to distinguish himself as an able colorist. He was still very young when he happened to see some works of Pedro de Moya, who was passing through Seville on his way to Cadiz, which being painted in the style of Vandyke, inspired him with the desire of imitating that great artist, under whom De Moya had studied shortly before his decease. The time he was able to avail himself of Moya's instruction was very short, and he resolved afterward to repair to Italy for improvement. But his means were totally inadequate to meet the expenses of such a journey. Collecting, however, all his resources, he bought a quantity of canvas, divided it into a number of squares, on which he painted subjects of devotion and flowers, and with the produce of the sale of these set out on his journey unknown to his relations and friends. On his arrival at Madrid he waited on Velasquez, his countryman, and communicated his plans to him. Struck with the zeal and talents of the young artist, Velasquez treated him with the greatest kindness, and diverted him from his project of the journey to Rome by procuring him full employment at the Escurial and in the different palaces of Madrid. Murillo returned to Seville in 1645, after an absence of three years. The following year he finished painting the little cloister of St. Francis; and the manner in which he executed it produced the greatest astonishment among his countrymen. His picture of the "Death of Santa Clara," and that of "St. James Distributing Alms," crowned his reputation. In the first he showed himself a colorist equal to Vandyke, and in the second a rival of Velasquez. They obtained him a multitude of commissions, which procured him an independent fortune. His success, however, never led him to be careless.

He gradually perfected his manner by giving more boldness to his pencil, without abandoning that sweetness of coloring which distinguished him from all his rivals, increasing its strength, and giving greater freedom to his touch. He enriched the churches and convents of Seville and other cities with numerous works. Having been invited to Cadiz to paint the grand altar of the Capuchins, he there executed his celebrated picture of the "Marriage of St. Catharine." As he was about to finish it he injured himself severely by a fall from the scaffolding, and died soon after from the effects of the accident, in Seville April 3, 1682.

To the greatest merit as a historical painter Murillo joined equal excellence in flowers and landscape. His works afford

proofs of the perfection to which the Spanish school had attained, and the real character of its artist; for, as Murillo never left his native country, he could have been comparatively little influenced by any foreign style; and his originality of talent places him in the first rank among the painters of every school. He has neither the charming dignity of Raphael, the grandeur of Caracci, nor the grace of Correggio; but, as a faithful imitator of nature, if he is sometimes vulgar and incorrect he is always true and natural; and the sweetness, brilliancy, freshness, and harmony of his coloring make us forget all his defects. The works of Murillo are numerous. Many of them are preserved in his native town, where, besides those distributed among the churches, convents, and hospitals, and the cathedral, there is a special gallery bearing his name. Among these are several popularly known by engraving. The Seville collections comprise several "Madonnas" and "Conceptions," which were among his favorite subjects, an "Adoration of the Shepherds," an "Annunciation," and "Ecce Homo,"' an "Infant Jesus Asleep," and his celebrated pictures "St. Thomas of Villa Nueva Distributing Alms," "St. Anthony of Padua," "Moses Striking the Rock," and the "Miracle of the Loaves and Fishes." At Cadiz is his "Marriage of St. Catharine"; at the Museum of Madrid are 45 of his works, nearly all of high value. Among them are the "Conversion of St. Paul," and a series of four pictures representing the career of the prodigal son. The Museum of the Louvre has likewise some treasures of Murillo, one of the most famous "Conceptions," "Jesus on the Mount of Olives," and others. Examples of the master are also to be found in Munich, Dresden, and Vienna. In the National Gallery in London are a "John the Baptist," a "Holy Family," and a "Young Beggar." Many of his works are also in the hands of private collectors.

Murphy, Henry Cruse, an American journalist and historical writer; born in Brooklyn, N. Y., July 5, 1810. He was a lawyer by profession; was minister to The Hague 1857–1861. He wrote: "Henry Hudson in Holland" (1859); "Anthology of the New Netherlands" (1865), consisting of translations and memoirs; "The Voyage of Verrazzano" (1875); etc. He died in Brooklyn, N. Y., Dec. 1, 1882.

Murray, the largest river in Australia, rising in the Australian Alps about 36° 40′ S. and 147° E., its source being partly in New South Wales, partly in Victoria. It flows for a long distance W., forming the boundary between the two colonies, then passes into South Australia, where it takes a S. direction, and falls into the sea through a large shallow sheet of water called Lake Alexandrina. There is a sandbar at the mouth which impedes navigation, but small steamers ascend the river as high as Albury, 1,700 miles from its mouth. Its chief tributaries are the Murrumbidgee, the Darling, and the Lachlan. The Darling before its junction with the Murray may even be considered the main stream.

Murray, Alexander, a Scotch philologist; born in Dunkitterick, Kirkcudbright, Scotland, Oct. 22, 1775. He had hardly any education save what his father could impart, till 1788, when he was at school for a short time. Yet by diligent and omnivorous reading of all such books as fell in his way or could be borrowed, he, when engaged as a shepherd, acquired, besides a scholarly knowledge of English literature a mastery of the classics, all the principal European tongues, and Hebrew. The fame of the learned shepherd led to an invitation to Edinburgh, where he obtained a bursary, gave private lessons, and continued his linguistic labors, which were extended to Oriental tongues and ancient and modern Abyssinian. In 1806 he became minister of Urr, in 1812 Professor of Oriental Languages in Edinburgh University. His "History of the European Languages" was published in 1823. He died in Edinburgh, Scotland, April 15, 1813.

Murray, David Christie, an English novelist; born in West Bromwich, Staffordshire, England, April 13, 1847. He had served as reporter and then as war correspondent (1877–1878) for several newspapers, when in 1879 he published "A Life's Atonement" in "Chamber's Journal." In the same journal appeared "Val Strange" and "John Vale's Guardian." Other works are "By the Gate of the Sea," "The Way of the World," "Aunt Rachel," "Old Blazer's Hero," "The Weaker Vessel," 'A Dangerous Catspaw," etc. He died in London, Aug. 1, 1907.

Murray, Eustace Clare Grenville, an English diplomatist; born in 1824. He was the natural son of the second Duke of Buckingham. After studying at Oxford, he served till 1849 in the Austrian army; in 1851 joined the British embassy at Vienna as attaché; in 1853–1854 went on a special mission to the islands in the Ægean Sea; in 1857 was attaché at Teheran; and in the next year consul-general at Odessa. For exposing in the public press in 1866 certain abuses connected with the foreign office he was dismissed the service. He spent the rest of his life in Paris. As a journalist he is best known for his brilliant papers in the "Daily News" and "Pall Mall Gazette," and as an author by "The Roving Englishman" (1854–1855), "Embassies and Foreign Courts" (1855), "History of the French Press" (1874), "Men

of the Second Empire," etc. (1872–1874), and a few brilliant novels. Of the last, "The Member for Paris" (1871) is the cleverest, but "Young Brown", (1874) from the circumstances of its hero's birth, has the most interest. He died in Passy, France, Dec. 20, 1881.

Murray, Hugh, a Scotch geographer; born in North Berwick, Scotland, in 1779. He was a clerk in the excise office at Edinburgh, devoting his leisure to literature, especially geography; edited the "Scots' Magazine." He wrote: "Histories of Discoveries and Travels," consisting of "Africa" (2 vols. 1817), "Asia" (3 vols. 1820), and "North America" (2 vols. 1829); "Descriptive Geography of British India" (3 vols.); "China" (3 vols.); "United States" (3 vols.); "Marco Polo's Travels" (1 vol. 1839); and "Encyclopædia of Geography" (1834), his chief work. He died in London, England, March 4, 1846.

Murray, James Augustin Henry, a British lexicographer; born in Denholm, Roxburgshire, Scotland, in 1837. He has long been compiling "A New English Dictionary on Historical Principles" (first number 1888), founded mainly on materials collected by the Philological Society. The aim of this dictionary "is to furnish an adequate account of the meaning, origin, and history of English words now in general use, or known to have been in use at any time during the past 700 years." Its purpose is "not to dictate to usage, but to record usage." Dr. Murray also published "Dialect of the Southern Counties of Scotland," and similar philological studies. Knighted in 1908.

Murray, James Stuart, Earl of, Regent of Scotland, the natural son of James V. by Margaret, daughter of Lord Erskine; born in 1533. At five years of age his father made him Prior of St. Andrews, and he was long known by that title. He accompanied his sister, the Princess Mary, to France, and was frequently passing to and fro between the French and Scottish courts. He became a warm supporter of the Reformers, and was chosen a member of the council, and one of the lords of the articles. On the return of Mary to Scotland as queen, Murray became her chief adviser, and was created first, Earl of Mar, and then Earl of Murray. He was opposed to the queen's marriage with Darnley, and has been accused of implication in the murder of the latter; he appears to have been aware of the plot, and to have stood aloof from it. He remained out of Scotland for some months, in 1567, only returning on the accession of James VI. He saw his sister a captive in Lochleven Castle, and was soon after named regent. Mary having escaped and taken arms, he encountered and defeated her at Langside, in 1568, and was one of the witnesses against her on her trial. The Regent Murray fell by the shot of an assassin in Linlithgow, Jan. 21, 1570.

Murray, John, founder of UNIVERSALISM (*q. v.*) in the United States; born in Alton, Ill., Dec. 10, 1741; died in Boston, Mass., Sept. 3, 1815.

Murray, John Clark, a Canadian educator; born in Paisley, Scotland, March 19, 1836. In 1872 he became Professor of Mental and Moral Philosophy in McGill University, Montreal. He was the author of "The Ballads and Songs of Scotland" (1874); "Handbook of Psychology" (1885); and "Solomon Maimon: an Autobiography," translated from the German, with notes and additions (1888); "An Introduction to Ethics" (1891); etc.

Murray, John O'Kane, an American historian; born in Glenariffe, County Antrim, Ireland, Dec. 12, 1847. He was a man of unusual culture. His most notable work was a "Popular History of the Catholic Church in the United States" (1876). This was succeeded by "The Prose and Poetry of Ireland" (1877); "The Catholic Heroes and Heroines of America" (1878); "The Catholic Pioneers of America" (1881); and "Lessons in English Literature" (1883). He died in Chicago, Ill., July 30, 1885.

Murray, Lindley, an American grammarian; born in Swatara, Lancaster co., Pa., April 22, 1745. He received his primary education in Philadelphia in the academy of the Society of Friends. He was originally destined for a mercantile life; but having been severely chastised for a breach of domestic discipline, left his father, who was then residing in New York, and taking up his abode in a school at Burlington, N. J., he there contracted a love of books and study. He afterward studied the law, and practised as a barrister; but in course of time he quitted the bar for the counting house, and having realized a competency, he went, in 1784, to England, and settled at Holdgate, near York. His "English Grammar," which so long held its ground, and has passed through an immense number of editions, appeared in 1795. He soon after published the "English Exercises and Key." These were followed by many other school-books, and several moral treatises. He died in Holdgate, England, Feb. 16, 1826.

Murray, Nicholas, pseudonym KIRWAN, an American clergyman; born in Ireland, Dec. 25, 1802. He was settled at Elizabethtown, N. J. Among his works were: "Letters to Bishop Hughes" (collective ed. revised and enlarged, 1855), translated into several languages; "Romanism at Home" (1852); "Men and Things as I Saw Them in Europe" (1853); "Preachers and

Preaching" (1860); etc. He died in Elizabeth, N. J., Feb. 4, 1861.

Murray, William Henry Harrison, an American writer; born in Guilford, Conn., April 26, 1840. His publications include: "The Perfect Horse"; "Adirondack Tales"; "How Deacon Tubner Kept New Year's"; "Daylight Land"; "Adventures in the Wilderness"; "Deacons"; "Music Hall Sermons"; "Sermons from Park Street Pulpit"; "The Doom of Mamelons"; etc. He died March 3, 1904.

Murray Hill, the former fashionable locality of New York, answering to the London BELGRAVIA (*q. v.*)

Murray-Prior, Rose Caroline. See PRAED, MRS. CAMPBELL MACWORTH.

Murrhine, a term applied to a delicate kind of ware, brought from the East, and made of fluorspar or fluoride of calcium. The term was also applied to vases of great beauty and value, used by the luxurious Romans as wine cups, and believed to have the faculty of breaking if poison was mixed with the beverage. They appear to have been made of variegated glass, perhaps of onyx, but some writers assert that they were of colored earths of fine quality like modern porcelain. They were greatly valued by the Romans.

Murrumbidgee, a large river of Australia, in New South Wales, rising in the great Dividing Range, and entering the Murray after a W. course of about 1,300 miles; chief tributary, the Lachlan.

Murshidabad, a town of India, on the Bhagirathi river, a branch of the Ganges; 124 miles N. of Calcutta. The chief buildings of note are the palace of Nawab (1837), the miambara, and a Mohammedan mosque. Two miles S. of the city is Motijhil or Pearl Lake; on its bank stood the palace of Surajud-Dowlah, in which Clive enthroned Mir Jafar, and the English residents — among them Warren Hastings the first — dwelt. On the opposite side of the river is the old cemetery of the Nawabs, containing a mausoleum, mosque, etc. The city is noted for its ivory carving, its embroidery in gold and silver lace, silk weaving, and the manufacture of hookah pipes and musical instruments. It is, moreover, a busy center of trade. During the 18th century it was the capital of Bengal and a very populous city; but about the time (1790) the British made Calcutta their headquarters Murshidabad began to decline.

Murviedro (mör-vē-ā′*th*rō), a town of Spain, 18 miles N. N. E. of Valencia; on the site of the ancient Saguntum, a Greek colony, the siege of which by HANNIBAL (*q. v.*) was the beginning of the 2d Punic war. Pop. 6,287.

Musaceæ, an order of endogens, alliance Amomales. It consists of stemless, or nearly stemless, plants, with the leaves so sheathing at the base as to constitute a spurious stem; veins of the leaves parallel, and running regularly from the midrib to the margin, often splitting into fringe-like divisions. Flowers spathaceous, perianth irregular, six-parted petaloid in two rows; ovary inferior, three-celled, many-seeded, rarely three-celled. Fruit capsular or indehiscent. Palmlike plants, natives of the Cape of Good Hope and other parts of the tropics. Genera four, species 20.

Musæus, one of the ancient mythical poets, seers, and priests of the Greeks, said to have been the son of Eumolpus and Selene, or, according to others, the son and pupil of Orpheus. He was the reputed author of a number of poems, oracles, purificatory verses, hymns, etc., of which we possess but a few fragments, and those of doubtful authenticity. A later Masæus, who flourished about the end of the 5th century, was the author of a beautiful little poem in Greek, entitled "Hero and Leander." See HERO.

Musaeus, Johann Karl August (mözā′ös), a German writer; born in Jena, Germany, March 29, 1735. He studied theology at Jena. In 1763 he was appointed tutor to the pages at the ducal court of Weimar, and in 1770 became professor at the gymnasium. His first production in 1760 was a parody of Richardson's "Sir Charles Grandison," a book that was extravagantly admired in Germany. Eighteen years later he satirized Lavater in "Physiognomical Journeys." But his literary fame rests on his version of "Folklore of the German," which professed to be a collection of popular tales noted down from the lips of old people; but such is not exactly the case. They are tinctured with such a blending of satirical humor, quaint fancy, and graceful writing that they have become a classic of their kind. He continued to work the satirical vein in "Visions of Grisly Death in Holbein's Manner" (1785), and began a course of tales "Ostrich Feathers" (1787), which he did not live to complete, dying at Weimar, Oct. 28, 1787.

JOHANN MUSAEUS.

Musa Ibn Nosair, the Arab conqueror of Northern Africa (699–709) and of Spain (712); born in Mecca, about 660. He fell under the displeasure of the Caliph of Damascus, and died in poverty in Hedjaz, in 717.

Musca, in astronomy, the bee; one of Lacaille's revised S. constellations, called by Bayer, Apis. It is situated between Cruz and the South Pole. No star in it is above the fourth magnitude. In entomology, the typical genus of the family *Musidæ*. *M. domestica* is the common house-fly; *M. canaria*, the flesh-fly; *M. vomitoria* and *erythrocephala*, blue-bottle or blow-flies; *M. cæsar* and *M. cornicina*, green-bottle flies, etc.

Muscæ Volitantes (mus'sē vol-i-tan'-tēz) (literally floating flies), in physiology, the name given to ocular spectra which appear like motes or small bodies floating before the eyes. One class of these specks is a common precursor of AMAUROSIS (*q. v.*), but another class is quite harmless.

Muscardine, a disease very fatal to silk-worms. It arises from the attacks of a fungus (*Botrytis bassiana*), which commences in the intestines of the caterpillars and gradually spreads till it destroys them.

Muscat, or **Maskat,** capital of the independent State of Oman or Muscat, which occupies the E. continuation of Arabia. It stands in a narrow rocky cove that opens out to the Indian Ocean on the one side and on the other forms the exit of a pass leading from the interior of Arabia. It is surrounded by a wall, and defended by forts planted on the rocky heights above. Its streets are narrow and not over clean; in summer the heat is intense; hence Muscat is not a healthy place. Yet the advantages of its situation make it of great importance for the commerce between Eastern Arabia, Persia, India, the W. coast of Africa, and the Red Sea. Its total trade reaches the value of $5,500,000 annually, the chief exports being pearls and fish, in which its coastal waters are extraordinarily rich, and salt, dates, drugs, dyestuff, horses, and the imports chiefly coffee, rice, sugar, piece-goods, oil, etc. Though a very ancient place, Muscat remained small and of little importance till the Portuguese took possession of it in 1508. Under their rule, lasting exactly a century and a half, it developed into a prosperous commercial center. It was subsequently governed by native rulers (*imams*), who in the 17th century succeeded the Portuguese also as masters of Zanzibar and some places on the E. coast of Africa. These African possessions were, however, wrested from the reigning imam of Muscat by an illegitimate son in 1856. Pop. about 25,000.

Muscatel, the name given to many sweet, strong French and Italian wines, whether white or red. Among the finest are the white Rivesaltes and red Bagnol from Roussillon, and the Lunel from the Pyrenees, the Lacrymæ Christi of Naples, etc. Fine varieties are yielded by Syracuse, Sardinia, the Cape, Canary Islands, Corfu, Crete, and Cyprus.

Muscatine, a city and county-seat of Muscatine co., Ia.; on the Mississippi river, and on the Burlington, Cedar Rapids, and Northern, and the Chicago, Rock Island and Pacific railroads; 211 miles W. of Chicago. Here are a County Hospital, German Lutheran Orphans' Home, County Insane Asylum, Leverick Normal School, public library, an Old Ladies' Home, National and State banks, waterworks, electric street railroad, electric lights, and several daily and weekly periodicals. It has large lumbering interests, pork-packing houses, flour mills, one of the largest oatmeal mills in the world, fruit and vegetable canneries, rolling mills, foundries, large sawmills, plumbers' supply factory, etc.; and an assessed property valuation of more than $2,000,000. Pop. (1890) 11,454; (1900) 14,073; (1910) 16,178.

Muschelkalk, in geology, a series of German beds of Middle Triassic age. It consists of a compact, grayish limestone, with dolomite, gypsum, rock-salt, and clays. It abounds in the heads and stems of lily encrinites, specially *Encrinites liliiformis*, estherias and fossil shells, including Ceratites. There are no belemnites, and the ammonites lack completely foliated sutures.

Muscidæ, flesh-flies; a family of dipterous insects, tribe Athericera. Antennæ short, three-jointed, the third joint usually the longest, and with a bristle from its back; the proboscis has fleshy terminal lobes, and incloses only a single bristle with the labrum; the palpi generally project; the wings have no false vein; the abdomen has five segments, and the tarsi two pulvilli. The larvæ constitute maggots. It is an extensive family, containing the sub-families *Conopariæ*, *Pachinariæ*, *Muscariæ*, and *Acalyptera*.

Muscle and Muscular Tissue, tissue specially distinguished by its contractile power, the instrument by which all the sensible movements of the animal body are performed. If examined under a high magnifying power the fibers of which it is composed are found to exist under two forms, which can be distinguished from one another by the presence or absence of very close and minute transverse bars or stripes. The fibers of the voluntary muscles, or those whose movements can be influenced by the will, as well as the fibers of the heart, are striped; while those of the involuntary muscles, the muscular structures over which we have no control, as, for example, the muscular fibers of the intestinal canal, uterus, and

the bladder, are unstriped. On examining an ordinary voluntary muscle with the naked eye, we observe that it presents a fibrous appearance, and that the fibers are arranged with great regularity in the direction in which the muscle is to act or contract. On closer examination it is found that these fibers are arranged in fasciculi, or bundles of various sizes, inclosed in sheaths of areolar tissue, by which they are at the same time connected with, and isolated from, those adjoining them; and when the smallest fasciculus visible to the naked eye, is examined with the microscope, it is seen to consist of a number of cylindrical fibers lying in a parallel direction, and closely bound together. These primitive (or, as some writers term them, the ultimate) fibers present two sets of markings or striæ, viz., a longitudinal and a transverse set. Bowman has proved that in a state of contraction there is an approximation of the transverse striæ, and a general shortening with a simultaneous thickening of the fiber, but that it is never thrown out of the straight line except when it has ceased to contract, and its extremities are acted on by the contraction of adjacent fibers. Muscles grow by an increase, not of the number, but of the bulk, of their elementary fibers, and Bowman believes "that the number of fibers remains through life as it was in the fetus, and that the spare or muscular build of the individual is determined by the mold in which his body was originally cast."

Muscles vary extremely in their form. In the limbs they are usually of considerable length, surrounding the bones and forming an important protection to the joints; while in the trunk they are flattened and broad, and contribute very essentially to form the walls of the cavities which they inclose. Muscles derive their names (1) from their situation — as the temporal, pectorals, glutæals, etc.; or (2) from their direction — as the rectus, obliquus, etc., of which there may be several pairs; or (3) from their uses — as the masseter, the various flexors and extensors; or (4) from their shape — as the deltoid, trapezius, rhomboid, etc.; or (5) from the number of their divisions — as the biceps and triceps; or (6) from their points of attachment — as the sterno-cleido-mastoid, the genio-hyo-glossus, the sterno-thyroid, etc. In the description of a muscle we express its points of attachment by the words origin and insertion; the former being applied to the more fixed point, or that toward which the motion is directed, while the latter is applied to the more movable point. The skeleton, which may be termed the locomotive frame work, may be regarded as a series of levers, of which the fulcrum is, for the most part, in a joint, viz., at one extremity of a bone; the resistance (or weight) at the further end, and the force (or muscle) in the intermediate portion. The great and characteristic property of muscular tissue, that of shortening itself in a particular direction when stimulated, is called contractility. The stimulus may be direct irritation by mechanical means, or by galvanism, or by some chemical substance, but in the living body the muscular fibers are, in most cases, made to contract by the immediate influence of the nerves distributed among them, which are consequently termed motor nerves, and are under the influence of the will.

Muscogee Indians. See CREEK INDIANS.

Muscovado, unrefined sugar; the raw material from which loaf and lump sugar are prepared by refining. It is obtained by evaporating the juice of the sugar cane, and draining off the liquid portion, or MOLASSES (*q. v.*).

Muscular Atrophy, the name proposed for a disease first recognized as distinct in 1853. It is a progressive degeneration, and consequent loss of volume and power, affecting the voluntary muscles. It commences with pain in the ball of the thumb, then affects one or both of the upper limbs, and sometimes the whole body. Called also wasting palsy, peripheric paralysis, or lead palsy without lead.

Muscular Christianity, a term introduced by Charles Kingsley to denote that robust, healthy, religious feeling which encourages and takes an active part in the harmless and healthy amusements of life, as opposed to a puritanical, ascetic, or contemplative form of religion. Hence a muscular Christian is one who does not think it inconsistent with his religious feelings and duties to take an active part in the ordinary occupations of life, and to share its harmless and health-giving amusements.

Muscular Tissue. See MUSCLE.

Muse, in mythology, one of nine nymphs or inferior divinities, distinguished as the peculiar protectresses of poetry, painting, rhetoric, music, and generally of the belles-lettres and liberal arts. They were the daughters of Zeus and Mnemosyne (Memory). Originally there appear to have been only three of these divinities, and their names, Mneme, Melete, and Aœde, or Memory, Reflection, and Song, sufficiently show the nature of the faculties over which they were supposed to preside. According as the fine and liberal arts were cultivated and expanded, the province of each muse seems to have been more restricted; and additions were made to their number, which ultimately was fixed at nine, their names and respective functions being: Clio, the muse of History; Euterpe, of Lyric Poetry; Thalia, of Comedy and Idyllic Poetry; Melpo-

mene, of Tragedy; Terpsichore, of Music and Dancing; Erato, of Erotic Poetry; Calliope, of Epic Poetry; Urania, of Astronomy; and Polyhymnia, or Polymnia, of singing and harmony. Helicon and the region round Parnassus was the favorite seat of the muses, where they were supposed, under the presidency of Apollo, to be perpetually engaged in song and dance, and in elevating the style and conceptions of their favored votaries. Apollo, as patron and conductor of the muses, was named Musagetes, "Leader of the Muses"; the same surname was also given to Hercules. They were generally represented as young, beautiful, and modest virgins, usually appareled in different attire, according to the arts and sciences over which they presided, and sometimes as dancing in a chorus, to intimate the near and indissoluble connection between the liberal arts and sciences. Their worship was universally established particularly in Greece, Thessaly, and Italy. No sacrifices were offered to them; but the poets invariably prefaced their compositions with a solemn invocation for the aid and inspiration of the muses.

Museum (-zē'-), a building or apartment appropriated as a repository of things that have an immediate relation to literature, art, or science, and where the objects may be inspected by those who are curious in such matters. Of the museums of Great Britain the British Museum is the largest; being perhaps the greatest in the world. Museums illustrative of the industrial arts, though of recent origin, are of great importance. Foremost among institutions of this kind in Great Britain may be instanced the South Kensington Museum. All the chief capitals of Europe and many other large cities have valuable museums. New York city has two noted museums, the Metropolitan Museum of Art, and the American Museum of Natural History; Boston has a Museum of Fine Arts; Chicago, the Field Columbian Museum; Philadelphia, the Bourse and Commercial Museums; Pittsburg, the Carnegie Museum and Art Gallery; and there are other notable institutions of this character connected with several of the universities and large colleges, and also established in various cities by individual munificence.

Mushroom, or **Agaric,** a genus of fungi, of the sub-order *Hymenomycetes,* having a hymenium of unequal plates or gills on the lower side of the pileus. The species are very numerous. Many are poisonous, many are edible, and some are among the most esteemed fungi. The species most esteemed is the common mushroom (*A. campestris*), a native of most of the temperate regions both of the Northern and Southern Hemispheres, and of which a large and fine variety occurs in East Australia. It is found during summer and autumn in pastures, orchards, vineyards, etc. Its pileus is regularly convex, becoming almost flat when old; fleshy, dry, white with a tinge of yellow or brown; of a silky smoothness on the upper surface, or somewhat scaly, but never warty; thickly set on the under side with very unequal gills, which in a young state are pink, and afterward become dark brown. The stem is of a firm, fleshy texture, and toward the top is surrounded by a more or less distinct white membranous ring, the remains of the curtain or veil, which in a young state extends to the pileus and covers the gills. This mushroom is gathered for the table when young, being preferred when the veil is still unbroken, and the unexpanded pileus has the form of a ball or button; but both in this state and afterward, while it shows no symptoms of decay, it is used for making catsup.

Music, originally, any art over which the Muses presided; afterward, that science and art which deals with sounds as produced by the human singing voice, and by musical instruments. The science of music includes several branches: (1) The physics, that is, the analysis of the cause and constitution of sound, the number of atmospheric vibrations which produce given sounds, and the arrangement of series of sounds standing in a definite relationship to each other as regards their vibration-number (scales); also, the form and construction of instruments with reference to the character and nature of the sounds they produce; and also, the apparatus of experimental acoustics, such as sound-measures (tonometers, sirens, tuning forks, etc.). These branches, of course, involve problems of pure mathematics. (2) The physiology of music. This deals with the construction and functions of the sound-producing organs of the human body, the vocal chords, larynx, etc., and also, with the receptive organ of sound, the ear. (3) The mental philosophy of music, that is, the effect of music on the emotions and intellect. The art of music includes the formation of melody (sounds in succession), and harmony and counterpoint (sounds in combination); also, the "technique" of voice production and singing, and of performing on musical instruments. The earliest efforts of mankind in music consisted in the elevation and depression of the voice in reading sacred writings and lyrical poetry, and in the construction of pipe instruments, tubes pierced with holes (flutes), tubes containing a vibrating tongue (reed instruments), and collections of pipes in which the sound was produced by making the breath or other column of air impinge on a sharp edge (the syrinx and the organ), in using the lips as a cause of vibrations in open tubes (the trumpet fam-

Music

ily), in the stretching of strings in a frame (the lyre and harp family), in placing stretched strings over a resonance box (the lute and guitar family), in the use of the "bow" to excite vibrations (the viol family), and in the striking of strings over a resonance box by means of hammers (the dulcimer and harpsichord and pianoforte family).

The ancient signs for the elevation and depression of the voice in reading were called accents (not stress, but the raising and the dropping of the voice without adding to its force). These led to characters called neumes; these again led to signs called notes, the position of which on lines showed their pitch, and the shape of which determined their duration. The use of letters in various positions to represent definite sounds was an essential element of ancient Greek music, which, however, was discarded at the revival of music in the early Christian Church; but the system has, in an improved form, been revived in the modern tonic sol-fa system. The earliest crude attempts at the combination of vocal sounds were called organum or diaphony; these were succeeded by an arbitrary system of harmonization called descant, which in its turn was superseded by counterpoint, the laws of which to this day govern vocal part-music, and are exhibited in their highest form in the vocal or instrumental fugue. The germ of the romantic style of music is to be found in the love-songs of the troubadours and their collateral brethren; the use of music as a language of emotion in the present day has been gradually developed from this source. The highest form of unaccompanied music is to be found in madrigals and pure vocal masses; the constant improvement of musical instruments led to an independent branch of pure instrumental music, which, passing through fantasias and concerti, has culminated in the modern symphony. The wedding of vocal and instrumental music has led to the production of the opera and oratorio.

History.—The first public use of music by every people has been in religious rites and ceremonies. The means presented by this art of amplifying and prolonging ceremonial; of raising and sustaining in great multitudes a similar state of feeling; above all, of giving simultaneous expression to this feeling, be it what it may—these qualities have at all times recommended music to those on whom the arrangement of rites and ceremonies has fallen. There are few materials in the Old Testament or other trustworthy writings of the ancient Hebrews for obtaining a satisfactory account of the music of the Jewish people, whose restricted intercourse with other nations prevents our receiving it from contemporary writers. One of the oldest songs on record is that which Miriam sang, with instrumental accompaniment, at the crossing of the Red Sea. In I Sam. x: 5 the prophet says to Saul: "Thou shalt meet a company of prophets coming down from the high place, with a psaltery, and a tabret, and a pipe, and a harp before them." These prophets were, in all probability, improvisatori of verses which they sang to accompaniments, and many authorities have supposed that the Jews had a school of prophets which was also a school of music, for they almost invariably sang to accompaniments played by themselves or by others.

During the reigns of David and Solomon music had reached its highest perfection among the Hebrews; great corps of musicians were appointed for the celebration of religious ceremonies. For some time before the destruction of the temple and the first Babylonish captivity, the sacred rites and music were interrupted both on account of war and intercourse with other nations. The subsequent inroads of Babylonians, Egyptians, Persians, and Romans, left the Jews no opportunity to cultivate the arts.

Among the ancient Egyptians the profession of music, like all others, was hereditary. We learn from Strabo that the youth were instructed at the earliest age in the art, that the songs were fixed by law, and that the sort of music used was established by the government exclusive of every other sort. It was the general opinion of the ancients that Pythagoras was indebted to the Egyptian priests for all the knowledge he possessed, especially that of music, and even the Greeks themselves attributed the invention of some of their musical instruments, as the triangular lyre, the single flute, the drum, and the sistrum, to the Egyptians. Herodotus mentions that in the processions of Osiris the Egyptians carried statues of the god, singing his praises, and were preceded by a flute. The invention of the three-stringed lyre is attributed to Thoth. The single flute or photinx, as we learn from the representations of it in sculpture, resembled the bullock's horn, and there can be little doubt that in the earliest ages the horns themselves were used for the purpose. Harps of various shapes, some not unlike that of the modern instrument, and with as many as 15 strings, are represented on several Egyptian monuments. Among the modern Egyptians no remains or traces of the ancient art are now to be found. They are, however, passionately fond of music, and there are to be found among them both male and female musicians, who sing and accompany themselves. They are said to be most successful in plaintive music, and it is asserted that even the Turks, the enemies of art, will sit and listen to them whole nights.

Music

The instruments mentioned in the Homeric poems are the lyre, the flute, and the pipes of Pan. The Greek poets and musicians, like the Celtic bards, seem to have wandered about chanting their productions before the multitude and usually finding admission to the households of the great, where they were treated as if they were inspired. Among the celebrated musicians mentioned by the Greek writers are Thaletas of Crete, the founder of the second Spartan musical school; Archilochus of Paros, one of the first conquerors in the Pythian games; Tyrtæus, famous for his military songs or airs; Terpander, who is credited with adding three strings to the lyre, who was fined by the conservative Spartan Ephori for his invention, and who carried off successively four of the prizes at the Pythian games. These games, founded in remembrance of Apollo's victory over the serpent Python, were at first restricted to musical competitions, and music always held a prominent place in the celebration. At the Olympic, Nemean, and Isthmian games there were somewhat similar contests. An air was composed by Timotheus, and sung by Pylades, in which the words were so suited to the circumstances of the battle of Mantinea that the audience immediately turned their eyes toward Philopœmen, who was present, and interrupted the singer by shouts and acclamations of applause. This Timotheus (born in Miletus, 446 B. C.) added two or four strings to the lyre (authorities differ as to the number). He must not be confounded with the celebrated flute player of Alexander; he died two years before that prince's birth. At Athens, during the era of Pericles, music was considered so necessary a part of education that not to understand it nor to play an instrument was looked upon as a disgrace. Besides regulating the form and increasing the number of musical competitions at the Panathenaic games, Pericles built an edifice called the Odeum, for the purpose of rehearsals previous to performance in the theater. During his time the two most eminent performers on the flute, Antigonides and Dorion, flourished, and so great was the passion for flute playing that as much as three talents (upward of $3,000) were given for a single flute.

Women performed on this instrument; among the most renowned of whom was Lamia, to whom the Athenians dedicated a temple under the name of Aphrodite Lamia. To so great an extent was execution on this instrument carried, that Aristotle cried out against the difficult passages that were practiced, and indeed against music generally. After the complete subjugation of the Greeks, music, like all other arts, fell into decay. To some extent it was cultivated under the Roman and Byzantine emperors; indeed, under the Turks it formed one of their chief amusements; but so barbarous has it become that we are unable to fancy that the same nation ever possessed a music which is credited with so intense an influence on assembled thousands of the cultured and fastidious. It is now past all hope to form any very definite conclusion as to the application of the theories of ancient Greek music; materials on which we could found any opinion having been almost wholly lost. There were originally three "modes" or scales—the Dorian, the Phrygian, and the Lydian, which seem at one time to have consisted of seven tones, but as known comprised eight. These three modes were increased to nine, and ultimately to fifteen. The nine were those of most importance, and from them was developed the so-called "perfect system," on which mediæval music was based. The Greek system of musical notation was extremely complicated; and indeed the whole subject, technically considered, is very involved and much debated by experts. The Romans derived their music very largely from the Greeks, and the art was for a long period confined to sacred uses. It was only after the death of Antiochus the Great that the Asiatic custom was introduced of having female musicians play at festivals and private banquets. Later, music became (as in the case of the Greeks) inseparable from the drama. The Emperors Caligula, Claudius, Hadrian, and more especially Nero and Commodus encouraged music.

Though we cannot trace so clearly the art of music in its restoration as we can the arts of design, we know that to the religion and church which brought them forward we owe the foundation of all that is good in the musical art. We have no authentic record as to the kind of music in which the piety of the early Christians found expression. Short fragments of melody have come down to us which it is certain are of great antiquity, and which as certainly have been little, if at all, altered from very remote times. These strains—tones, tunes, or chants as they are indifferently called—have been supposed by some to be of Hebrew and by others of Greek origin. Both suppositions are reasonable. Every attempt to bring within the limits of a musical system the utterances of the human voice when moved by intense feeling of any kind, must result in something like the chants, and other not unrhythmical, but timeless music of the Latin Church. There is no reason for doubting the existence of such music among any people at all advanced in civilization; indeed, even this latter condition is scarcely needed, for traces of it are found among the natives of almost every newly discovered country. Eusebius speaks of a regular choir at Antioch in his time (the end

Music

of the 3d century), and of an order of monks who practised what was called perennial psalmody. We also know, beyond doubt, that the Psalms of David were sung antiphonally, that is, by two choirs, as early as the time of Ignatius. That the clergy had attained a standard of excellence in the art in the 4th century is evident, for the Council of Laodicea (315) saw no way of securing decency and order in public worship but by forbidding the laity to sing at all.

St. Ambrose (elected Archbishop of Milan, 374) may be regarded as the father of the music of the Western Church. Not only had Ambrose to compose and adapt music to the different portions of the church service, but to determine and define — almost to form — the musical idiom in which it was to be cast; he had to select from the exceedingly complicated system of the Greeks a set of scales few and simple enough for the use of a very rude people. His reputation has, however, been somewhat obscured by the next great musical reformer, Gregory the Great, whose epoch is fully two centuries nearer our own. During this long period the institutions of Ambrose fell, as might be expected in such an age, into utter confusion. Gregory began his reform of ecclesiastical music by gathering together what remained of the labors of Ambrose and others, intending to cast them into an antiphonary, or authorized body of sacred music. He would seem early in his labors to have found that the Ambrosian scales were too few, and of too limited extent to admit, without mutilation, of numerous compositions which might seem fitted for his purpose. He therefore supplemented the Ambrosian scales, then first designated authentic, by four other subordinate or collateral scales called plagal. From this time, even till now, not only have the chants for the Psalms, still in extensive use, borne the name of Gregory, but every variety of plain song is popularly called Gregorian music.

During the four centuries which connect the epoch of Gregory with that of Guido Aretino, the next great musical reformer, only two names are worthy of mention. It is in the "Sententiæ de Musica" of Isidore, Archbishop of Seville, that we meet, for the first time, at least among Christian writers, with the mention of harmony in the modern sense of the term. He mentions two kinds, symphony and diaphony; by the former he would seem to have meant a combination of consonances, and by the latter of dissonances. Hucbald, a monk of St. Armand, Tournay (died 932), not only mentions harmony, but gives examples of the harmony of his age, diaphony or organum. In his treatise on music the melody is called the vox principalis or simply principalis; the added part the vox organalis, or organalis. A principalis could be accompanied — (1) with the octave above or below; (2) with the fifth above; (3) with the fourth above; (4) with the fourth above and the fifth below; (5) with the fifth above and the fourth below. The name we have now to mention is the greatest of the early Middle Ages, Guido Aretino. He has been popularly credited with the invention of the scheme of designating by points distributed upon lines and spaces, the different sounds of the scale, an invention which, however, is claimed for two Frenchmen a century earlier. The names which he gave to the notes, Ut (for Do), Re, Mi, Fa, Sol, La, are universally understood and extensively used to this day. Si was afterward added by a musician named Le Maire.

Within 50 years after the death of Guido a new form of musical art made its appearance, the characteristic of which was the combination of sounds of unequal lengths — music in which two or more sounds succeeded one another, while one equal to them in length was sustained. This was called discantus, or descant. Descant, it is obvious, would argue the existence of some system of musical proportion among sounds of different duration, and written descant some means of distinguishing such sounds from one another. As might be expected, we hear of both inventions about the same time, the middle of the 12th century, when the treatise on the "Cantus Mensurabilis" of Franco of Cologne was written, when notes appear first to have been used, and signs to represent the raising and depressing of individual sounds (flats and sharps) first came into being. Late in the 13th century we hear of a trouvère, not only a poet and melodist, but also a veritable composer — Adam de la Hale, the Hunchback of Arras as he was called — born in 1240. He was the composer of several three-part songs, somewhat rude in structure, it is true, but greatly in advance of that of any preceding or contemporaneous music; and also of the first comic opera, "Li Gieus de Robin et de Marion." The beginning of the next century furnishes us with a remarkable evidence of musical advancement, in the word contrapunctum (point against point, or as we now say, note against note). This word was first used instead of the word discantus in the works of Jean de Muris, the greatest theorist of the 14th century. Its appearance in many treatises of the same time shows that points or musical notes were then pretty generally accepted as the symbols of musical sounds. The middle of the century gives us the first example of four-part music, in a mass performed at the coronation of Charles V. of France (1360) and composed by Guillaume de Machault. By this time the organ must have reached some

Music

degree of mechanical perfection, for we find a certain Francesco Landino, a Florentine, distinguishing himself greatly in the fêtes given by the Venetian republic in honor of the King of Cyprus in 1364. Landino attained also a high reputation as a composer, and some of his songs recently brought to light show that this reputation was well deserved.

About this epoch we find the musicians of Belgium springing into notice. It has been ascertained from the records of the Pope's chapel that several Belgian musicians visited Rome in the last years of the 14th century, carrying with them, along with other music, the first masses that had ever been seen there in written counterpoint. In the list of these singers we find the name of Dufay, who was a singer in the pontifical chapel in 1380. His compositions, at least in sacred music, are of a grave, grandiose stamp, harsh in places to our modern ears, but far superior in design and clearness of texture to anything known to have been produced by his predecessors. But the works of Dufay and his contemporaries have been cast into the shade by those of a later generation, of the masters of the new Belgian school, Ockenheim, his contemporaries and pupils.

Musical composition of any real value does not consist in an unintermittent presentation of phrases embodying new thoughts, but in the development, the pursuit to their ultimate consequences, of a few thoughts, sometimes even of one; technically, making the same passage heard successively in various scales, in various parts, and under various forms of accompaniment. This art exemplified in canon, fugue, and imitation, was practised by Dufay, but greatly improved by Ockenheim. Great as the latter undoubtedly was as a composer, he interests us more as a teacher. His best works were his pupils, and among these was the musician with whose name the last years of the 15th and the first of the 16th century are commonly associated in musical history, Josquin Deprès, or Del Prato. His works drove those of every other composer from the churches of Italy, Spain, France, Germany, Flanders, and Hungary. Greatest and most prolific in the greatest style, he was no less delightful to his public at least, in productions of a lighter class. He was more learned in the science and more skilled in the art of music than any of his predecessors or contemporaries. Shortly afterward we meet with the pupils and countrymen of Josquin in every court and important city of the Continent. Tinctor, Garnier, and Hyart laid the foundation of a school at Naples, destined afterward to take precedence for a time of all others; Gombert became chapel master to the Emperor Charles V.; Mouton held the same office at the court of Francis I.; Genet found such favor with Pope Leo X. that he was made a bishop *in partibus*, and was sent to France on a special mission as legate; Henry Isaac was at Florence composing masses for the Church of San Giovanni, and carnival songs for Lorenzo de' Medici; Willaert founded the musical school of Venice.

Notwithstanding the number of Belgian masters who visited and taught in Italy in the end of the 15th and beginning of the 16th century, no regular music school was opened in Rome before 1540. Many Italians, however, had profited in some way by Belgian instruction. Constanzo Festa, at the time of his death, had attained considerable reputation. He is one of the creators of the madrigal; and a "Te Deum" of his has been sung on the election of every Pope since his time. Equally famous too were the brothers Giovanni and Paulo Animuccia, the former being specially interesting to us from his connection with Filippo de' Neri—a connection to which may be traced the origin of the oratorio. The first Roman school was founded by Claude Goudimel (1510-1572). His masses and motets, composed before his conversion to Protestantism, are numerous and excellent. He arranged the music to the metrical psalms of Marot and Beza; and in the department of secular art he set a selection of the odes of Horace. Among his pupils was the greatest composer the world had yet seen, Giovanni Pierluigi da Palestrina (1524-1594). Musical learning had done its utmost. Every kind of contrapuntal artifice had been brought into play; no attempt was made to bring out the meaning of the words, to give them force, or to make them intelligible. The theorists had had their own way, and the ears of listeners were wearied with the incessant chasing of fugue, canon, and imitation. All these elaborate compositions, too, were built on borrowed themes, often fragments of well-known secular melodies; and not only was the music employed, but the words were also bodily transported. These evils came under the censure, first of the Council of Basel, and then of the Council of Trent, and the committee appointed to carry out the decrees of the latter deputed Palestrina the hard, and at that moment all important, task of showing that his favorite art was worthy of the closest union with the grandest inspirations of the poet. He produced three masses, the first two of which created an enthusiasm altogether without precedent, while the third, the "Missa Papæ Marcelli," at once saved music to the Church, and established a type which all the changes in the musical art since his day have failed to render less precious. The only master whose name is really worthy of mention beside his is the

Music

Belgian Orlando di Lasso, yet we can scarcely pass unnoticed the name of Luca Marenzio, in whose hands the madrigal reached its highest perfection. One thousand compositions of this kind are said to have been produced by him.

There is every reason to believe that at this period great musical skill and knowledge extended over every part of civilized Europe. Spain had, early in the 16th century, furnished the Italian choirs with excellent voices. In Protestant Germany the influence of Luther, no mean musician himself, had been brought to bear on the cultivation of the higher branches of the art, nor was it less honored in Catholic Germany. Duke Albert of Bavaria maintained a choir of 62 singers and 30 instrumentalists in his chapel at Munich, of which Orlando di Lasso was director. The Italians, however, were now, as the Belgians had been before, at the head of the art, and were its chief masters and interpreters throughout Europe, with the single exception of England, which in the 16th century had a strictly national school worthy of the country. Tallis, Byrd, Farrant, and Bevin, in church music; Morley, Ward, Wilbye, and Weelkes, in the madrigal; Bull, excellent in performance as in composition; Dowland in the part song, and last and greatest in all styles, Orlando Gibbons — these are names to which the English musician may refer with proud confidence as worthy of being associated with those of Palestrina, Marenzio, and Lasso. The close of the century witnessed the birth of another species of musical composition, the opera seria. It is true some faint approaches had been made in this direction before, the most notable of which are the "Orfeo," performed for the entertainment of Cardinal Gonzaga at Florence in 1475; a pastoral drama by Alfonso della Viola, "Il Sacrifizio," performed at the court of Henry II. of France in 1555; and in 1574 an opera by Zarlino, said to have been performed when Henry III. passed through Venice on his way from Poland to France after the death of Charles IX. There can be no doubt but that these works were composed with little or no attempt at dramatic coloring or expression of the sense of the words. About the year 1580, however, a number of amateurs living in Florence formed themselves into a society for promoting the closer union of the arts of poetry and music by the revival of the musical declamation of the Greeks. The leading spirits of this society were Bardi, Corsi, Strozzi, Galileo (the father of the astronomer), and others. The result of the association's labors was a setting of the episode "Ugolino," from Dante's poem, by Galileo; the "Satiro" and the "Disperazione di Fileno," by Emilio del Cavaliere; "Dafne," a pastoral, set by Peri to words by Rinuccini; and a lyric tragedy, "Il Morte di Euridice," by Peri and Caccini. But all these were soon surpassed by the works of Claudio Monteverde. His "Orfeo" opened up a new musical world. His melody was more symmetrical, his harmony purer, his rhythm more marked, and his instrumentation fuller and more varied than had been ever heard before. If he was not the first to invent the perfect cadence, he was certainly the first to appreciate its importance, and to turn it to good account. Many progressions and combinations first proposed by him have now found universal acceptance. The first to profit by the discoveries of Monteverde was an artist born some 20 years later — Carissimi, the first great master of the sacred cantata in its various forms. In his oratorio of "Jephtha," his choruses are grand and noble, but have been surpassed by those of his successors, who have had the good fortune to have had them for a point of departure; but in the recitative Carissimi has never been surpassed. He is said to have been the teacher of Alessandro Scarlatti, the founder of the Neapolitan school. With this school begins modern musical practice; better methods of fingering the keyed instruments, and of bowing the stringed instruments, not to speak of improvements in the instruments themselves; and above all these in importance and difficulty, the art of singing.

The history of the French school proper begins late in the 17th century, with J. B. Lully, born in Florence, 1633. He must have left Italy too young to have profited by the instruction of any of the excellent instructors who then abounded, and musical science and skill did not exist in France when he must have most needed their example and help. Yet he became, certainly not one of the greatest, but one of the most popular composers of any age, and what is extraordinary in a self-taught man, one of the best instrumental performers of his day. His industry was enormous; he composed 20 grand operas, numerous ballets carried on entirely by music; and occasional music in divertissements and other theatrical pieces (many of which were written by Molière); and though not so numerous, compositions for the church. Though his music never had great popularity beyond France, yet the influence of his example was extensive. Pelham Humphreys was sent by Charles II. to receive instruction from him, and though the pupil did not live long to profit by his instruction, there can be no doubt but that the master's ideas were followed out by his fellow students, Wise and Blow, and by those of their immediate successors in the English chapel royal, the most distinguished of whom was Henry Purcell, who has been regarded by all musical authori-

Music

ties as the type of English composers. His compositions were for some years after his death the chief music heard in England. Dr. Arne had, indeed, succeeded in obtaining a hearing; and the works of Croft and Green occupied the choristers of the cathedrals; but a new era was opened by the advent of Handel, so large a portion of whose life was spent in England, and so large a portion of whose music is due to English suggestion, that he has come to be looked upon universally as more than half an Englishman.

In the early part of the 18th century Germany began to make for herself a place among the musical nations of Europe, and from about the time the career of J. Sebastian Bach ended that place has been indisputably the highest. In every department of the musical art but one—singing—the German school has equaled, and even surpassed all others. In 1722 Bach, in the first part of his "Well-Tempered Clavichord," introduced the free use of all the major and minor keys, for the first time, adding tremendously to the material for the modern composer. Subsequently Haydn, who has been called "the Father of Instrumental Form," established the sonata in its various shapes, including string quartette and symphony. Mozart and Beethoven improved and brought to culmination these forms. In recent times Brahms has proved that these are still among the most effective forms in instrumental music.

In opera, Mozart attained the highest point of the 18th century, and Beethoven, the greatest combiner of the emotional with the intellectual in music, produced one great and dramatic work—"Fidelio." The first distinctly German opera ("Der Freischütz") was composed by von Weber. Wagner followed this national school of work, but gave it an entirely new and greater significance, terminating the dramatic opera (which he called "Music Drama") with his Trilogy and other works. Wagner's influence changed the course even of Italian opera. Rossini had composed most singable works, which, however, violated some of the dramatic unities. He was followed by Donizetti and Bellini in the same brilliantly vocal school. Verdi, too, seemed inclined to follow in the footsteps of his predecessors, but in his later works suddenly labored to place dramatic power above vocal effects, and began to develop his orchestral touches in a masterly fashion. He may be called the leader of the new Italian movement, which is still vocal. Mascagni, Leoncavallo, Puccini and others are following the same new path.

In France, although Gounod has won popular success in standard operas, the modern movement has been more orchestral than vocal. Berlioz was the first great orchestral composer in that country, and he, with Wagner, may be classed among the modern orchestral pioneers. Another marked influence was that of César Franck. Schumann, in Germany, and Franck, in France, struck out new and romantic paths in defiance of the ultra-classicists. The pupils of Franck, especially Vincent d'Indy, have gone still further along the path of musical impressionism. The improvements made in the piano have caused an entire school of composition to grow around that instrument. Beethoven was the pioneer in this, with his sonatas. Czerny, Cramer, Clementi, and others took charge of the technical advance by constantly progressing studies. Liszt finally became the technical king of the instrument and gave to it a vast modern repertoire. But the poet of this instrument was Chopin, whose entire musical reputation rests on his piano compositions. His works are also national in a degree, and he has made the whole world acquainted with the beauties of Polish music. Modern music is much tinged with this nationalism, and Grieg, in Norway, and Tschaikowsky, in Russia, have brought their native folk-music into the classical repertory. In Russia there is a strong forward movement which leans towards orchestral music, and is also in a large degree national in its character. Glinka may be called the first Russian composer who made any impression outside of his native country. But Glinka was operatic in his tendencies, while Rimski-Korsakoff, Balakireff, Borodin, Glazounoff, and others of the present are most brilliant in the orchestral domain. Among modern English composers are Balfe, Cowen, Macfarren, Mackenzie, Stanford, Sullivan, Thomas, and Wallace; and England has contributed a master to the newer school in Sir Edward Elgar, one of the most important figures in English music since Purcell. It may be added that England also possesses a striking character in Coleridge-Taylor, the first negro who has ever become famous as a composer.

The influence of Wagner, in the direction of freedom of modulation and of form, has led to a remarkable degree of experimenting in the most modern music. In almost all countries there are now many composers who are trying new paths and straining for new effects. Among these the most prominent figure is that of Richard Strauss, who is the greatest master of orchestral effects that has yet existed. Music has, in the past, often gone through periods of marked transition. There was one such period when it passed from unemotional counterpoint to melodic opera (about 1600); another when Gluck led the world from unmeaning melodies to dramatic effects in opera; another when Beethoven turned from the suave sonata forms of the

eighteenth century to the vast and developed form of the grand symphony; another when Wagner transformed the opera in its poetic, dramatic and orchestral aspects; and it is very probable that modern music is going through the throes of such a transition at present, the outcome of which it will take many years, perhaps a generation, to determine. For further particulars in connection with this subject, see in this Encyclopedia such titles as CHORD; CONCERTO; COUNTERPOINT; FUGUE; GREGORIAN CHANT; HARMONY; INSTRUMENT; INTERVAL; LYRE; OPERA; ORATORIO; ORGAN; PIANOFORTE; PITCH; PLAIN SONG; SCALE; SCORE; SONATA; SYMPHONY; TEMPERAMENT, etc.; and also MUSIC IN THE UNITED STATES.

Revised by LOUIS C. ELSON.

Musical Clock, a clock which plays tunes at the hours. It may consist of a musical-box attachment set in motion by the clockwork at the expiration of the hours.

Musical Glasses, a musical instrument consisting of a number of goblets, tuned by filling them more or less with water, and played by touching their rims with the wet finger. The size of the glasses being equal, the smaller quantity of water contained in them produces the lower note in the scale.

Music in the United States. On November 20th, 1788, F. Hopkinson, Esq., dedicated a set of eight songs to General Washington, with the statement: "I cannot, I believe, be refused the credit of being the first native of the United States who has produced a musical composition." But it appears probable that James Lyon, A.B., who printed a collection called "Urania," in 1761, was yet earlier. William Billings, however (b. Boston, Oct. 7, 1746; d. there, Sept. 29, 1800), was the first professional composer that this country produced. There was very good music among the Moravians in Pennsylvania during the 18th century, and much psalm-singing in New England at the same time. The Handel and Haydn Society, of Boston, was the first important effort (1815) to establish classical music regularly. Educational enterprises soon followed. The Musical Fund Society of Philadelphia (1820) and the Boston Academy of Music (1833) were the first of these. From the latter sprang (1836-38) the first attempts at public-school musical training in this country. The first music store was established in Baltimore in 1794, the first American piano made by John Behrent, in Philadelphia, in 1775, and a large piano industry was established by Jonas Chickering in 1823. The first regular orchestra was that founded in Boston in 1798 by Gottlieb Graupner.

Everything was more or less tentative at first, and the full growth of American musical activity was not achieved until much later. The first American operatic composer of any importance was William H. Fry (b. Philadelphia, Aug. 10, 1813; d. Santa Cruz, 1864), who wrote "Leonora" (1845), subsequently sung in Italian in New York (1858). Many moderately successful composers might be named, but the first prominent American composer in the classical forms was John K. Paine (b. Portland, Me., Jan. 9, 1839), until September, 1905, professor of music in Harvard. He composed the first American oratorio ("St. Peter," 1873), and has also written the first American symphonies of standard merit. From the time of Professor Paine's successes, the American composers follow in rapid succession. The chief among them may be mentioned as follows: George W. Chadwick has composed the most important American overtures, and his symphonies, cantatas, and opera ("Judith") take high rank. Horatio W. Parker has written the best sacred work, an oratorio—"Hora Novissima." E. A. MacDowell has composed the best concertos and orchestral suite. He has also composed the most important piano sonatas yet achieved in the native repertoire. F. Van der Stucken has composed the most ambitious orchestral works, his "Pax Triumphans" being a composition of enormous proportions. America possesses one of the leading woman composers of the world in Mrs. H. H. A. Beach, who has composed in all the large orchestral and choral forms. She has written a mass, several cantatas, a symphony, etc. Mrs. Beach is the foremost woman composer of America at present. Other great influences in American music have been Stephen C. Foster, the chief American folk-song composer; Dr. Lowell Mason, the first great musical educator; Theodore Thomas, who built up the classical taste of the country by his orchestral leadership; Henry K. Hadley, Arthur Foote, E. R. Kroeger, F. G. Gleason, Dudley Buck, etc. Almost all the important compositions have been written within the last twenty-five years. At present, there are great conservatories of music in every large city of the United States, and many of the chief universities (Harvard, Yale, Columbia, etc.) have established chairs of music and admit the science to their regular curriculum.

Remarkable progress has also been made in orchestral performance during the last quarter-century. The beginnings of good orchestral music in the United States must be sought in the concerts of 1848, given by the Germania Orchestra, a band of German musicians who had emigrated on account of the political uprisings in their own country. It was not much later that Theodore Thomas began his orchestral career, and the New York Philharmonic Orchestra (which

gave its first concerts as early as 1842) was incorporated. But a higher standard than any of these was established in Boston in 1881, when, through the munificence of Mr. Henry L. Higginson, the Boston Symphony Orchestra was founded. Since that time there has been progress in this field in every part of the United States. Chicago, Cincinnati, Pittsburg, Philadelphia, and other cities have established symphonic orchestras, and have achieved such excellent results that the greatest works of European composers of the present are heard in America almost as soon as abroad, and the standard attained is not inferior to that of Germany. The influence of the Germans on American musical progress is not to be underestimated. Rheinberger, in Munich, has trained many of our prominent composers; German orchestral leaders, Thomas, Seidl, Paur, Gericke, Nikisch, Scheel, and others have led the advance. In the West, the influence of the German choruses (Maennerchöre) has been powerful in building up a musical taste, and Cincinnati, Milwaukee, St. Louis, etc., have given important festivals which have fostered this branch of music; and its purity and sweetness have greatly aided the advance of the musical art all over the country. See also the article MUSIC. LOUIS C. ELSON.

Musick, John Roy, an American novelist; born in St. Louis, Mo., Feb. 28, 1849. Among his numerous works may be named: "Calamity Row" (1887); "Brother Against Brother" (1887); "Mysterious Mr. Howard;" etc. He also wrote a series of 12 American historical novels, comprising the history of the United States; and several works on the new American possessions. He died in Omaha, Neb., April 14, 1901.

Musk (*Mimulus moschatus*), a garden-plant of musky odor from the region of the Columbia river. Also *Erodium moschatum*, musky stork's-bill, a rare plant, with pinnate leaves smelling of musk. Chemically it is an odoriferous, resinous substance obtained from the male MUSKDEER (*q. v.*). It is imported in the natural pods or bags from Bengal, China, and Russia, but the Tonquin musk is the most esteemed for its odor. It is found in commerce in brownish clots, often mixed with hairs, fat, and sand. Its taste is slightly bitter, and it is the most powerful, penetrating, and lasting of perfumes. Pure musk should contain from 5 to 6 per cent. of ash, and on being digested with boiling water should lose about 75 per cent. of its weight.

Muskallonge. See MASCALONGE.

Muskat. See OMAN.

Muskdeer (*Moschus moschiferus*), a ruminant Ungulate forming a special family of the *Artiodactyla*. According to Flower, it represents an ancestral type of the Pecora (*Bovidæ, Cervidæ, Giraffidæ*), but with nearest affinities to the deer (*Cervidæ*). As in the *Cervidæ*, the young is spotted, but it has no horns, and the canine teeth of the male project in the form of longish tusks; this latter fact has led to the association of *Moschus* with the *Tragulidæ* (Chevrotains), which is, however, not justified by its other characters. The muskdeer is an inhabitant of the mountainous regions of Central Asia from the extreme N. to as far S. as Cochin-China and Nepal. There is only one species, with perhaps four well-marked varieties. The muskdeer is much hunted on account of the odoriferous secretion which is found in a special gland on the hinder-part of the abdomen of the males. This substance was first introduced into the W. by the Arabs. It is spoken of in the pharmacologies of Serapion and Avicenna and by the traveler Marco Polo. The value of the substance used to be very great, as it figures among the costly objects presented by Saladin to the Greek emperor in 1189. It was used in the embalming of bodies as early as the 14th century.

Musk Duck (*Cairina moschata*), a South American wild duck. It is often reared in poultry yards, particularly in Germany and Brazil. Corrupted into Muscovy duck; called also Barbary duck. Also (*Biziura lobata*), an Australian duck. According to Ramsay, the musky odor, which is very powerful, is confined to the male. It is twice as large as the female.

Muskegon, a city and county-seat of Muskegon co., Mich.; on Lake Michigan at the mouth of the Muskegon river, and on the Toledo, Saginaw and Muskegon, the Chicago and West Michigan, and the Grand Rapids and Indiana railroads. Its harbor is one of the best on the lake, and steamboats daily ply between it and Chicago, Milwaukee, and other lake ports. Here are the Hackley Manual Training School, Hackley Public Library, Hendricks Hospital, Hauber Hospital, several national banks, electric lights, street railroads, county court house, and several daily and weekly newspapers. It has large lumbering interests, tanneries, woollen mills, marble and granite works, furniture factories, a piano factory, engine and boiler shops, iron and steel works, large celery farms, and an assessed property valuation of $6,500,000. Pop. (1900) 20,818; (1910) 24,062.

Muskingum, a river of eastern Ohio, the longest flowing wholly within the boundaries of the State. It is formed by the junction of the Tuscarawa and Walhonding (at Coshocton, county-seat of the county of that name, 69 miles east by north of Columbus), flows southward through Muskingum county, southeastward through Morgan and Washington counties, and empties into the Ohio

at Marietta. It is about 112 miles in length, and is navigable as far as Dresden, about 92 miles from its mouth. The region through which it flows is a rich agricultural country, the principal towns on its banks being Marietta, McConnelsville and Zanesville.

Muskingum College, an educational institution in New Concord, O.; founded in 1837 under the auspices of the United Presbyterian Church; has grounds and buildings valued at over $60,000; endowment, $100,000; volumes in library, about 6,000; scientific apparatus, etc., $15,000; average number of faculty, 25; average student attendance, 470; ordinary income, $20,000.

Muskmelon (*Cucumis melo*), a delicious melon of a musky fragrance, much liked in the United States. See MELON.

Muskoka, a county, lake and river of Ontario, Canada, the name being also extended to include the district reaching north and south from Lake Nipissing to Lake Simcoe, and east and west from the Ottawa river to Georgian bay. This district is 800 feet above sea level, and covers an area of approximately 10,000 square miles. Lake Muskoka is 20 miles in length and varies from 2 to 8 in breadth. The chief two other lakes, Rousseau and Joseph, are connected with Lake Muskoka, and the three have in summer a regular steamboat service. The Muskoka river rises in the highlands dividing the watersheds of the Ottawa and of Georgian bay, and flows in general in a southwesterly, then a westerly, direction, emptying into Georgian bay. Lake Muskoka is in its course. About 8 miles from its entrance to the lake, it divides, and about 2 miles beyond this point, on the east branch, are the High Falls, with a descent of 160 feet. It is estimated that there are in the region nearly 1,000 lakes and ponds, and the forests are extensive.

Musk-ox, the *Ovibos moschatus,* a curious animal generally included in the oxen family (*Bovidæ*), but has been also regarded by some naturalists as being more properly classified with the *Ovidæ* or sheep, and in general appearance the musk-ox somewhat resembles a large sheep. Its body is covered by a coat of tufted hair of great length and of a brownish color. The thick tufted appearance of the hair on the region of the neck and shoulders imparts a full or "humped" appearance to the fore part of the body. The hair of the back and hips is long, but of smooth and flowing description. The hair of the shoulders, sides, and thighs hangs down below the middle of the leg, while that of the body has interspersed among its fibers a layer of lighter colored wool. The tail is short and concealed by the fur. A brownish white patch situated in the center of the back and differing from the general color of the body has been by Parry termed the "saddle." The hair affords material for the manufacture of a delicate fabric of silky nature, but it cannot be obtained in sufficient abundance for commercial purposes of any extent. The legs are short and thick and the hoofs narrow, but it is described as being exceedingly active and agile, and as climbing mountainous places with ease and dexterity. The horns are broad at the base, covering the forehead and crown, they curve downward between the eye and the ear and then turn upward and slightly backward. The average size of the male is that of a small domestic ox. In habits these animals are gregarious, each herd numbering from 20 to 30 members. The musk-ox inhabits the Arctic regions of America. In past or geological epochs the musk-ox possessed a wider distribution and evidence of its having inhabited Europe during the recent or post-Tertiary epoch has been obtained by palæontologists. Its remains occur in French deposits of post-Tertiary age and in other European formations. When hunted these animals appear frightened by the report of the guns and crowd together in their herd, but if the presence of the hunters is discovered by sight or smell they seek safety in instant flight. The flesh is fat and pleasant to the taste and smells strongly of musk, the odor of which is also diffused from the living animal.

Muskrat, a name common to several rodents having little in common except the secretion of a musky substance, or the diffusion of a musky odor; specifically *Fiber zibethicus,* a beaver-like water rat. The toes are webbed, and the tail is flattened laterally. They inhabit the banks of lakes and rivers in this country, and construct dwellings somewhat resembling small haystacks. Their coloring is so much like that of the muddy banks on which they dwell, that they have been often mistaken for lumps of mud till their movements betrayed them. They are hunted for their fur, which is much valued. Called also musquash and ondatra. It is also a name sometimes given to *Crocidura myosura,* a common Indian insectivorous rodent. Its musky odor is exceedingly strong, and it is said to affect everything over which it passes. Called also the rat-tailed shrew and musk-shrew. The muskrat of Ceylon is *Sorex kandianus* or *serpentarius.* It is smaller than *Crocidura myosura,* but emits an equally strong musky odor.

Muslin, a bleached or unbleached thin cotton cloth, white, printed, or dyed. Varieties are known as Swiss, buke, mull, jaconet, lawn, saccharilla, harness, leno, nainsook, seerhand, foundation, cambric, cord, check, figured, long-cloth, tamboured, muslinet, organdie. Other very different

styles of fabric are also indifferently called muslins, and the term is used differently on the respective sides of the Atlantic, in England being confined exclusively to white goods. In entomology, "the Muslin" is *Nudaria mundana*, a moth with semi-transparent wings; it is of the family *Lithosiidæ*.

Muspelheim, in Scandinavian mythology, the S. part of the universe and the abode of fire, whence sparks were collected to make the stars. At the opposite pole to Muspelheim is Niflheim, where all is frozen, cold, and dark.

Muspratt, James Sheridan, an English chemist; born in Dublin, Ireland, March 8, 1821. He studied chemistry at the Andersonian University, Glasgow, and when only 16 years of age became chemist for a large manufactory at Manchester. He emigrated to the United States, but did not succeed in business. He then went to Germany and studied chemistry at Giessen. He made many discoveries in organic chemistry. Settling in Liverpool, he founded the Liverpool College of Chemistry. He wrote: "Outlines of Qualitative Anaylsis" (1849); "Dictionary of Chemistry" (1854); etc. He died in West Derby, England, Feb. 3, 1871.

Musschenbroek, Pieter van (mös'*h*enbrök), a Dutch philosopher; born in Leyden, Netherlands, March 14, 1692. He held professorial chairs successively at Duisburg, Utrecht, and Leyden. He visited England, became acquainted with Newton, and was made a fellow of the Royal Society. His principal works are: "Elementary Physics"; "Experiments"; "Physics"; "Experimental Physics." He died in Leyden, Sept. 19, 1761.

Mussel, an individual of the genus *Mytilus*. The fry are found in water a few fathoms deep, and grow to maturity in about a year. Knapp states that 40,000,000 *Mytilus edulis* are annually dredged in the Frith of Forth, to be used for bait in the deep sea fishery. Though prized and largely used for human food, mussels sometimes prove deleterious, and fatal effects have followed their consumption. Mussels, the family *Mytilidæ*.

Musset, Alfred de (mü-sā'), a French poet; born in Paris, France, Dec. 11, 1810. After completing his education at the College of Henry IV., where his fellow-pupil and intimate friend was the Duke of Orleans, son of Louis Philippe, he essayed the most diverse studies. The law, medicine, finance, painting, were in turn engaged in, in turn abandoned. In 1830, he put forth a small volume of poetry, entitled "Stories of Spain and Italy," which was received with great favor. A celebrity at 23, the young poet made a journey to Italy with George Sand, under the name of confidential secretary. At the revolution of 1848, he lost his post as librarian to the ministry of the interior, but regained it after the establishment of the empire, with the additional appointment of reader to the empress. During his last years, he gave himself up to play, and even grosser pleasures. His last volume of verse was published in 1850, and showed a premature decay of the author's powers. He was nevertheless elected a member of the French Academy, in 1852. His best works are his poems, "View from an Armchair"; "The Cup and the Lips"; "Of What do Young Girls Dream?"; "Namonna"; "Rolla"; and his two exquisite dramatic pieces, "A Caprice," and "A Door Should be Open or Shut." He died in Paris, May 2, 1857.

Must, the juice of the grape, which by fermentation is converted into wine.

Mustang, the small wild horse of Southwestern United States and Northern Mexico, where it is found in extensive herds, and is captured and domesticated as the "Indian pony." It is supposed that the mustangs are descendants of Spanish horses which escaped from domestication in Mexico, and became the parents of the immense herds which afterward occupied the plain and prairie regions of the N. Mustangs display a lofty crest and a proud carriage, are sturdily built, and have legs and feet of the most lasting character. They congregate in great herds, seemingly under the guidance of a single leader.

Mustard, various species of the cruciferous genus or sub-genus *Sinapis*. Also a condiment obtained by grinding and sifting the seeds of black and white mustard. The flour produced forms the genuine mustard of commerce. The seeds yield by pressure from 18 to 36 per cent. of a fixed oil, and, after macerating with water and distilling, a small quantity of a highly pungent and volatile oil. The latter has been shown to result from the decomposition of myronic acid in presence of water. The principal adulterants of mustard are starch and ground turmeric, but cayenne pepper is sometimes added. As a physic, mustard in small doses assists digestion; in large ones it causes vomiting. Both as seeds and flour it is a powerful stimulant. Externally, it is a powerful rubefacient and vesicant. It is sometimes added to local baths.

Mustard Oils, a yellow nearly inodorous fixed oil, sp. gr. .9145, at 15°, which boils at 167°, and does not solidify with cold; and black mustard seed, an oil, sp. gr. .917, which solidifies below 0°. Both oils give on saponification a solid crystalline fat, called erucic acid, together with stearic and an oil resembling oleic acid. The volatile oil

of black mustard seed possesses the properties and composition of sulpho-cyanate of allyl, $\begin{matrix}CN\\C_3H_5\end{matrix}\rangle S$. It unites with ammonia, forming the crystalline sulpho-cyanate of allyl-ammonium.

Mustelidæ, a genus of carnivorous mammals, section Arctoidæ, forming a large group, widely diffused in the N. temperate regions. They have broad flattened skulls, low vermiform bodies, short legs, and feet fitted either for running, digging or swimming. The family may be naturally divided into three sub-families: *Mustelinæ, Lutrinæ,* and *Melinæ.*

Muster, in a military sense, a review of troops under arms, to see if they be complete and in good order, to take an account of their numbers, the condition they are in, their arms and accoutrements, etc.

Muster Roll, a roll or register of the men in each company, troop, or regiment; or a roll or register in which the master of each vessel sets down the names of himself and the whole ship's company, together with particulars as to their places of birth, age, etc.

Mussulman, a Moslem or Mohammedan.

Musurus Pasha, Constantine, a Turkish statesman; born in Constantinople, Turkey, in 1807. He began his diplomatic career as secretary to the Prince of Samos (1832). When the rebellion in Samos broke out Musurus was chosen to pacify the islanders. He gave them reforms, and a constitution which reunited them to Turkey. In 1840 Musurus was sent as envoy-extraordinary and minister-plenipotentiary to Greece; in 1848 was promoted to the post of representative of Turkey at Vienna, afterward becoming envoy-extraordinary and minister-plenipotentiary to the court of St. James, retiring in 1885. He died Feb. 13, 1891.

Muta Nzige, a lake of equatorial Africa discovered by Stanley in 1876, and again seen by him in 1889, and renamed the Albert Edward Nyanza. It occupies the S. end of a vast natural depression, of which the Albert Edward Nyanza fills the N. extremity.

Mutazilites, or **Motazilites,** a rationalistic Mohammedan sect, founded in the 1st century of the Hegira by Wâsil ben Atá. They rejected certain opinions held by the ordinary Mussulmans regarding God, which they consider to be inconsistent with His justice and holiness, etc., rejected predestination, and admitted a purgatory. The Koran was allegorized to prevent its coming into collision with science or cramping the development of society. The Caliph al Mamun, son of Harun al Raschid (A. D. 813 to 833), embraced the Mutazilite faith. He encouraged learned men of all persuasions at his court at Bagdad, and gave an impulse, felt powerfully even in Christendom, to science. This brilliant rationalistic period of Mohammedanism lasted about 50 years, when the old orthodoxy came back with its accompanying stagnation of thought.

Mute, a small instrument used to modify the sound of the violin or violoncello. It is made of hard wood, ivory, or brass, and is attached to the bridge by means of a slit, its three legs standing between, but clear of, the strings. The use of the mute both softens the tone and imparts to it a peculiar muffled and tremulous quality, which is sometimes very effective. Its application is indicated by the letters *c. s.* or *con sordino* (with the mute), and its discontinuance by *s. s.,* or *senza sordino* (without the mute). A mute, consisting of a pear-shaped leather pad, is sometimes used for the horn and trumpet. It is inserted into the bell of the instrument, thereby subduing the sound and producing the effect of great distance.

Mutiny, the unlawful insurrection or revolt of soldiers or seamen against the authority of their commanders; open resistance of officers or opposition to their authority. A mutiny is properly the act of numbers; but by statutes and ordinances for governing the army and navy the acts which constitute mutiny are multiplied and defined; and acts of individuals, amounting to resistance of lawful commands of officers, are declared mutiny. Officers beginning or joining mutiny are guilty of the offense. Mutiny is punishable in the navy by fine or imprisonment, or both; in the army by death or such other punishment as a court-martial shall direct.

Mutius, Cælius. See Scævola.

Mutoscope, a device for exhibiting instantaneous pictures of moving objects taken by the kinetograph or similar instrument. Photographic prints from the series of pictures thus obtained are mounted in consecutive order around a cylinder standing out like the leaves of a book. When this cylinder is slowly revolved, the picture cards being held back by a stop, and allowed to snap past the eye one by one, as one thumbs the leaves of a book, an apparently moving picture is the result, and it is difficult to realize that the picture is not endowed with life. If the spectator is enthralled with any particular pose of any particular picture, he can stop the crank and study it. It is here that the mutoscope differs from its fellows in the pictorial machinery field.

Mutsu Hito (möt'sö shtō), **Mikado** (or Emperor) of Japan; born Nov. 3, 1852. He ascended the throne in 1867, and married Princess Haruko in 1869. His children are

Prince Yoshihito, born in 1879, and proclaimed Crown Prince in 1889, and three princesses. His reign has been marked by great reforms; and the feudal system, which had impeded the general progress of the country, has been abolished. Under the rule of the present Mikado, Japan has entered on an unprecedented era of prosperity. Civilization has made rapid progress, and the introduction of Western arts and ideas has secured for Japan a foremost place among the Asiatic nations. He has given the Japanese a parliamentary constitution based on European principles. See JAPAN.

Muttra (mut'trä), or **Mathura** (ma'thö-rä), a town of India, in the Northwest Provinces, on the right bank of the Jumna, 30 miles above Agra. For centuries it has been a center of the Buddhist faith; the surrounding country swarms with associations of Krishna and Balarama (see VISHNU). There are numerous temples and mosques; the river is lined with magnificent flights of stairs, leading down to the bathing places in the sacred river; large numbers of pilgrims resort to the city on the occasion of its religious festivals; and troops of monkeys and turtles are supported by the charity of the gentle-hearted people. The city was sacked by Mahmud of Ghazni in 1017; its temples were destroyed by a native sultan in 1500, and by Aurungzebe in 1669; and it was plundered by the Afghans in 1756. In 1803 it passed into the hands of the British. Pop. (1891) 61,195. The district has an area of 1,453 square miles, and a pop. (1881) of about 700,000.

Mutual Instruction. See MONITORIAL SYSTEM.

Mutule, in architecture, a projecting block worked under the corona of the Doric cornice, in the same situation as the modillions in the Corinthian and Composite orders. It is often made to slope downward toward the most prominent part, and has usually a number of small guttæ or drops worked on the under side.

Muzaffer-ed-Din (mö"za-fur-ed-dēn'), Shah of Persia, son of Nasr-ed-Din; born March 25, 1853. He held the post of governor-general of the Azerbaijan province, his elder brother, Zil-es-Sultan, being governor of Ispahan. On the death of his father he succeeded to the throne May 1, 1896. He died Jan. 8, 1907, and was succeeded by his son, Mohammed Ali Mirza (born June 21, 1872), who was forced to abdicate July 16, 1909, and was succeeded by his son, Ahmed Mirza (born in 1898). See PERSIA.

Muziano, Girolamo (möt-sē-ä'nō), an Italian painter; born near Brescia, Italy, in 1528. After studying the art of Titian he repaired to Rome about 1550, where he soon attracted attention by his landscapes. Subsequently he became an imitator of the style of Michael Angelo, and his picture of the "Raising of Lazarus" at once established his fame. He also made great improvements in mosaic working. The handsome fortune gained by his talents and industry he devoted in part to assisting to found the Academy of St. Luke at Rome. Many of his works are to be met with in Rome. He died in 1590 or 1592.

Muzzey, Artemas Bowers, an American Unitarian clergyman; born in Lexington, Mass., Sept. 21, 1802; was graduated at Harvard University (1824); at Harvard Divinity School (1828); pastor in Framingham, Cambridgeport, and Newburyport, Mass., and Concord, N. H.; interested in educational and political matters; in 1865 retired from ministerial work. Included in his numerous publications are: "The Young Man's Friend" (1836); "Man, a Soul" (1842); "The Higher Education" (1871); "Personal Recollections of Rev. Dr. Channing" (1874–1875); "Immortality in the Light of Scripture and Science" (1876); "Education of Old Age" (1884); "Movers of the Revolution Known to the Writer" (1890); etc. He died in Cambridge, Mass., April 21, 1892.

Myall Wood, the hard violet-scented wood of the Australian *Acacia homalophylla,* much used for making whip handles and tobacco pipes.

Mycale (mik'a-lē), in ancient geography, a promontory of Ionia, in Asia Minor, opposite the island of Samos, where the Persian army under Tigranes was defeated at this Ionian city of Asia Minor, by the Greeks, under Leotychines, King of Sparta, and Xanthippus, in September, 479 B. C. But few of the vanquished survived the contest; and the Greeks, after burning the Persian fleet and camp, retired with their booty to Samos. The battles of Mycale and Platæa were both gained by the Greeks on the same day.

Mycelium (-sē'-), the vegetative part of fungi which is not concerned in spore bearing. It may consist simply of a much-elongated cell growing from the spore, or of a chain of cells, but in the majority it is a tissue of interlaced branched filaments or hyphæ, loosely united in many molds, membranous in dry rot, compact and tuberous in mushrooms. See FUNGI.

Mycenæ, or **Mycene** (mī-sē'nē), an ancient city of Greece, nomarchy of Argolis, near the village Krabata, 22 miles S. W. of Corinth. It is said to have been founded by Perseus, 1457 B. C. It was the capital of the kingdom of Agamemnon, and was at that time the principal city of Greece. About 468, it was destroyed by the inhab-

itants of Argos, and never after regained its former prosperity. Its ruins are still to be seen in the neighborhood of Kharvati, and are specimens of Cyclopean architecture. The most celebrated is the "Gate of Lions," the chief entrance to the ancient Acropolis, and receiving its name from two immense lions sculptured on a block of bluish limestone above the gate.

Myconi (mik′ō-nē) (anciently Myconos), an island in the Grecian Archipelago, one of the Cyclades, about 21 miles in circuit; produces barley, raisins, and figs, with some wine. The inhabitants are chiefly employed in seafaring pursuits. Capital, Myconi, a seaport.

Myelitis (-ī′tis), inflammation of the spinal cord; (1) acute, (2) by ramollissement, (3) by undefined suppuration, (4) by abscess.

Myers, Ernest James, an English poet; brother of F. W. H. Myers; born in Keswick, in 1844. He was called to the bar (1874), but never practised. He published: "The Puritans" (1869); "Poems" (1877); "Defense of Rome and Other Poems" (1880); "Judgment of Prometheus and Other Poems" (1886); etc.; besides translating the odes of Pindar (2d ed. 1884).

Myers, Frederic William Henry, an English author; born in Duffield, England, Feb. 6, 1843. He was classical lecturer at Trinity College, Cambridge, 1865–1868. He wrote: "St. Paul" (new ed. 1879), in verse; "Wordsworth" (1880), in "English Men of Letters"; "Renewal of Youth, and Other Poems" (1882); "Essays, Modern and Classical" (1883); "Science and a Future Life" (1893), a volume of essays; etc. He was a foremost writer in English reviews. He died Jan. 17, 1901.

Myers, Peter Hamilton, an American author; born in Herkimer, N. Y., Aug. 4, 1812. Among his published works are: "The First of the Knickerbockers: A Tale of 1673" (1848); "The Young Patroon, or Christmas in 1690" (1849); "The King of the Hurons," republished in England as "Blanche Montaigne" (1856); and "The Prisoner of the Border: A Tale of 1838" (1857). He died in Brooklyn, N. Y., Oct. 30, 1878.

Myers, Philip Van Ness, an American historian; born in Tribes Hill, N. Y., Aug. 10, 1846; was graduated at Williams College, 1871; spent one year on a scientific mission to South America and two years in European travel; was president of Farmers' College, Ohio, 1879–1890; was Professor of History and Political Economy in University of Cincinnati, 1890–1900 (dean 1895–1897). He wrote: "Remains of Lost Empires" (1875); "Outlines of Ancient History" (1882); "Outlines of Mediæval and Modern History" (1886); "General History"; "History of Rome" (1890); "History of Greece" (1897); "Rome, its Rise and Fall" (1900); etc.

Mygale, a genus of spiders, the type of the family *Mygalidæ*, furnished with four pulmonary sacs and spiracles, four spinnerets, eight eyes, and hairy legs. Their nests, constructed of silk, are built in clefts of rock, trees, etc., and in the ground. The bird-catching spider of Surinam belongs to this species; other larger species frequently prey on small vertebrate animals, not by laying toils for them, but by regularly hunting them. They envelop their eggs in a kind of cocoon.

Mylabris, a genus of coleopterous insects nearly allied to the *Cantharides*, noteworthy because of the use made of some species as a blister-fly.

Mylæ (mī′lē), in ancient history, a town situated on a tongue of land S. W. of Pelorum, on the N. coast of Sicily. The Roman fleet, commanded by C. Duillius, defeated the Carthaginians near this place, 260 B. C. Near the same place, Agrippa, with the fleet of Octavius, defeated Sextus Pompey's squadron, 36 B. C.

Mylodon, in palæontology, a genus of edentate mammals, the best-known species being *M. robustus*, which reached a length of 11 feet, slightly less than that of the *megatherium*, which it much resembled. The dental formula of the two is the same, M $\frac{5}{4}$–$\frac{5}{4}$. The fore feet have five and the hinder four toes, the two external digits being nailless. From the Pliocene deposits of Central Brazil and the post-Pliocene near the Great Lakes and Oregon.

Myna (*Acridotheres* or *Gracula* of Cuvier), a genus of birds of the family *Sturnidæ*, of which there are seven species ranging over the whole Oriental region and Celebes. The head is more or less crested, and some have a naked space behind and under the eye; the bill is rather short, stout, and compressed; the tail is rounded; the feet are strong, the toes long, and the claws moderately curved. The common myna (*A. tristis*), which is found throughout India and extends into Assam and Burma, measures about 10 inches in length, and is of a glossy black color on the head, neck, and breast; the rest of the plumage is snuff-brown, darkest on the back and wing-coverts, and lightest beneath; the wing-quills are black, with a white spot at their base, forming a conspicuous wing-spot; the tail is black, with a white tip; the bill is deep yellow; and the legs are dull yellow. It is one of the commonest birds of India, where it is found in large numbers, being eminently sociable in its habits. It feeds chiefly on insects, grain, and fruit. It makes its nest in nooks and eaves of houses

and in holes in the walls of houses and ruins. The eggs, which usually number four or five, are pale bluish green in color. It has a variety of notes, some musical and pleasing, others harsh. It is often domesticated, when it becomes pert and familiar, and a good imitator of the human voice, in this respect excelling parrots. This bird was introduced into Mauritius to destroy the grasshoppers, which it did very effectively; but in its turn, when naturalized there, it became a pest through its ravages among fruit trees. The name hill mynas or grakles is given to four distinct races of birds belonging to the genus *eulabes* of Cuvier, or *gracula* of Linnæus, one from Southern India, another from Ceylon, a third from the Himalayas and Burma, and the last from Malaysia. They are birds of fine glossy plumage with prominent yellow wattles behind the ears. This genus comprises 13 species found in the Oriental region as far as Southwest China, Hainan, and Java, and in the Australian region in Flores, New Guinea, and the Solomon Islands.

Myology, the term applied distinctively in anatomical and physiological science to the description of the muscular system, both in its structural and functional aspects.

Myopy, or **Myopia,** near or short sight, a defect of the eye, produced generally by too great convexity of the cornea or crystalline lens, causing the focus to be placed not on the cornea, but in front of it. It occurs in early life from too great use of the eyes on minute objects, as the print in a book, especially by imperfect light. It is corrected by doubly-concave spectacles. As a rule the defect diminishes with the advance of age.

Myoxus, in zoölogy, dormouse; a genus of myomorphic rodents, typical of the family *Myoxidæ*. Three species are known: *M. avellenarius*, the common dormouse; *M. glis*, the loir; and *M. nitela*, the lerot. In palæontology, two species have been detected in the Upper Eocene (Gypseous series of Montmartre), and a third from beds of Miocene age. Several have been detected in post-Tertiary deposits, of which the most remarkable is *M. melitensis*, from the Maltese post- Pliocene. This form is described by Falconer as being "as big in comparison to a living dormouse as the bandicoot-rat is to a mouse."

Myrcia, a genus of trees of the natural order *Myrtaceæ*, to which belongs the wild clove or wild cinnamon of the West Indies (*M. acris*), a handsome tree of 20 or 30 feet high. Its timber is very hard, red, and heavy, capable of receiving a fine polish, and much used for cogs of wheels. Its leaves have an aromatic cinnamon-like smell, and an agreeable astringency and are used in sauces. Its berries are round and as large as peas, have an aromatic taste, and are used for culinary purposes. The leaves, berries, and flower-buds of *M. pimentoides* have a hot taste and fragrant smell, and are also used for culinary purposes.

Myrddin, Wyllt. See MERLIN.

Myriapoda, or **Myriopoda,** a class of annulose animals, division Arthropoda. The body is generally long, cylindrical, or flattened, and consists of more than 20 somites. There is no distinction between the thorax and the abdomen; there are antennæ, and the mandibles are often large and powerful; one or two pairs of legs are attached to each segment of the body. The sexes are separate; the internal anatomy like that of insects. The Myriapoda live under stones, dead leaves, the bark of trees, and other dark places. Some are luminous. The class is divided into four orders: *Chilopoda* (centipedes), *Chilognatha* (millepedes), *Pauropoda*, and *Onychophora*. The oldest known Myriapods are from the Coal Measures.

Myrica, sweet gale; bog-myrtle; the typical and only genus of the order *Myricaceæ*. *M. gale*, the sweet gale or Dutch myrtle, has a shrubby stem and lanceolate leaves, broader upward. It is found in bogs and moory ground. Its leaves have a pleasant smell, and the inhabitants of Islay and Jura scent their clothes with them, and in some places a tea is made from them; the twigs are used for beds. The plant yields a yellow ethereal oil, which after a time becomes slightly warm. Formerly its leaves were used against the itch, and by Swedish brewers as a substitute for hops. The root of *M. cerifera*, the wax myrtle or bay tree of North America, if eaten in quantities, is emetic. The Nepaulese eat the fruit of *M. sapida*, which is about the size of a cherry. Dr. Dymock says that the bark, treated with boiling water, yields an abundant, hard, brittle extract resembling kino. Dr. Buck states that this bark is valuable in rheumatism, and is occasionally used in the N. W. provinces of India for cough, etc. The fruit of *M. integrifolia* and *M. nagi* are eaten.

Myrioscope, a variation of the kaleidoscope, and, like the latter, depending on the multiplication of images which coalesce in such manner as to form a geometrical pattern. A square box has a sighthole in front, and at the rear are two plane mirrors which are arranged at a suitable angle. On horizontal rollers is a piece of embroidered silk or other ornate fabric, which is moved by means of a crank-handle on one of the rollers. This causes a pretty display when the ornamental figures are multiplied and thrown into geometrical apposition. The top of the box is of oiled muslin

or other translucent material which admits sufficient light.

Myristicaceæ, nutmegs; an order of diclinous exogens, alliance Menispermales. It consists of tropical trees, often with a red juice, alternate, entire, coriaceous, stalked leaves, and axillary or terminal racemes, glomerules, or panicles of minute flowers, each, as a rule, having cucullate bract. Flowers, unisexual; calyx, trifid or rarely quadrifid; filaments, separate or united; anthers, three to 12 or more. Carpels solitary or many, with a single, erect ovule; fruit, baccate. Common in the tropics of India and America.

Myrmidon (mur'mi-don), in Greek mythology, one of the followers whom Achilles led from Phthia to the Trojan war. According to one version of the myth, Zeus deceived Eurymedusa, daughter of Cleitus, in the form of an ant, murmex, and became the father of Myrmidon, the eponym of the Myrmidones. The Homeric poems exhibit the Myrmidons as warriors who cannot act except at the bidding of Achilles. When he appears, they rush forth like wolves. The simile which follows lays special stress on the fiery color of their cheeks, and the blood-red hue of their tongues and jaws.

Myrobalan, a dried fruit of various species of trees, brought from the East Indies, all slightly purgative and astringent. Myrobalans are used by the Hindus in calico-printing and medicine, and imported into the United States for dyers and tanners, especially the latter. They are the produce of several species of *Terminalia* (order *Combretaceæ*), the chief of which are the belleric myrobalan (*T. Bellerica*) and the chebulic (*T. Chebulica*). Written also myrobolan, myrobolam, etc.

Myron, a celebrated Greek sculptor; born in Elentheræ, Bœotia, about 480 B. C. He was a pupil of Ageladas, and the rival of Polycletus. He worked in marble, wood, and metal, and especially distinguished himself by his skillful representations of animals. His most admired work was the bronze figure of a "Cow Lowing," which was still extant at Athens in the time of Cicero.

Myrrah, the daughter of Cinyras, King of Cyprus, and the mother of Adonis, according to the legends.

Myrrh, in botany, *Balsamodendron myrrha;* also the genus *Myrrhis.* In chemistry, a gum resin which exudes from *Balsamodendron myrrha,* a shrub growing in Arabia and Abyssinia. It occurs in irregular, roundish masses, called "tears," varying in size from small grains to pieces as large as an egg, semi-transparent, and possessing a reddish-brown color. It has a peculiar and agreeable fragrance, with an aromatic, bitter, and acrid taste; slightly soluble in water and alcohol, but very soluble in chloroform. In pharmacy, there is a tincture of myrrh and a pill of aloes and myrrh. Myrrh is a stimulant, an antispasmodic, and an emmenagogue. It is given internally in amenorrhœa, leucorrhœa, chronic bronchitis, and phthisis. Externally it is applied to aphthous sore mouth, spongy gums, etc.

Myrtaceæ, myrtle-blooms; an order of epigynous exogens, alliance Myrtales. It consists of trees or shrubs, with opposite or alternate entire leaves, usually with transparent dots and a vein running parallel to the margin. Infloresence generally axillary; flowers red, white, or yellow, never blue; calyx valvate, four or five cleft, sometimes falling off in one piece; petals four or five, or wanting; stamens generally twice as many as the petals, rarely the same in number, sometimes indefinite; ovary inferior, one, two, four, five, or six-celled, with a simple style; placenta central or axile. Fruit dry or fleshy; seeds generally indefinite. Natives of South America, the East Indies, Australia, the South Sea Islands, with a few in Africa, etc. It is divided into two tribes — Leptospermeæ, with capsular, and Myrteæ, with baccate fruit. Known genera, 45; species, 1,300 (Lindley).

Myrtle, *Myrtus communis,* a native of Persia. By distillation it yields an essential oil, used in perfumery. About 100

MYRTLE.
a, branch in flower; b, vertical section of flower.

pounds of the leaves yield only five ounces of the perfume called in France *eau d'ange* (angel water). The leaves are used in cerebral affections, etc. The fruit, which is

carminative and emetic, is given in dysentery, diarrhœa, internal ulcers, and rheumatism. A gargle of the leaves is used in aphthæ, and a paste of the seeds in scorpion bites. In the Greek archipelago the berries, especially those of a variety with white fruit, are eaten, as were the buds and berries by the ancients. In Tuscany they are used for pepper, and also made into a kind of wine, there called myrtidanum. The powdered leaves have been used in Sicily as a substitute for sumac. The word rendered myrtle in Scripture is correctly translated.

Mysia (mish'iä), a district of ancient Asia Minor, having the Propontis (Sea of Marmora) on the N., the Ægean on the W., Lydia on the S., and Bithynia and Phrygia on the E. The Troad (Land of Troy) was one of its subdivisions.

Mysis, in zoölogy, opossum-shrimp; the typical genus of the family *Mysidæ*. *M. chamælcon,* or *vulgaris,* the common opossum-shrimp, is a native of the N. European seas, etc. *M. relicta,* from the great lakes of Sweden and North America, is the only known fresh water Stomapod.

Mysole (mi-sōl'), an island in the Indian Archipelago, between Ceram and the N. W. extremity of New Guinea; length about 50 miles, breadth 15 miles; it exports trepang, ambergris, birds of paradise, pearls, etc. It is inhabited by immigrant Malays and Papuans.

Mysore (mī-sōr'), or **Maisur** (mī-sör'), a native State of Southern India, bounded by districts of the Madras presidency; area 27,936½ square miles; pop. (1901) 5,538,482. Mysore is an extensive tableland much broken by hill ranges and deep ravines, and is divided into two portions, a little N. of lat. 13° N., by the watershed between the Kistna and the Kaveri rivers. Numerous isolated rocks (drugs), rising to 4,000 or 5,000 feet, are a peculiarity of the country, and have been mostly converted into hill fortresses. The rivers are used for irrigation purposes, but are not navigable. The climate of the higher districts is during a great portion of the year healthy and pleasant. The annual value of the exports, chiefly betel nut and leaves, coffee, ragi, gram, cotton, piece-goods, cardamoms, rice, silk, and sugar, is above $6,000,000. The imports, consisting mainly of piece-goods, cloth, wheat, silver, gold, cotton, rice, silk, betel leaves, and pepper, are over $7,500,000. The ruinous misgovernment of the native prince led the British to assume the administration in 1831; but in 1881 Mysore was restored to the native dynasty. The famine years (1876–1878) told with great severity on that state. Capital, Mysore, situated amid picturesque scenery on a declivity formed by two parallel ranges running N. and S., 245 miles W. S. W. of Madras, is a prosperous, well-built town, with broad, regular streets, and substantial houses and public buildings. On the S. side stands the fort, which encloses the rajah's palace; its chief object of interest is a magnificent chair or throne of fig-wood, overlaid with ivory and gold. Pop. (1901) 68,151.

Mysteries, certain rites and ceremonies in ancient, chiefly Greek and Roman, religions, only known to and practised by, congregations of certain initiated men and women, at appointed seasons, and in strict seclusion. The origin, as well as the real purport of these mysteries, is all but unknown. The mysteries, as such, consisted of purifications, sacrificial offerings, processions, songs, dances, dramatic performances, etc. The mystic formulas were held deep secrets, and could only be communicated to those who had passed the last stage of preparation at the mystagogue's hand. The hold which the nightly secrecy of these meetings, together with their extraordinary worship, must naturally have taken on minds more fresh and childlike than our advanced ages can boast of was increased by all the mechanical contrivances of the effects of light and sound which the priests could command. Mysterious voices were heard singing, whispering, and sighing all around, lights gleamed in manifold colors from above and below, figures appeared and disappeared; the mimic, the tonic, the plastic — all the arts, in fact, were taxed to their very utmost to make these performances (the nearest approach to which, in our time, is furnished by transformation scenes, or sensation dramas in general) as attractive and profitable (to the priests) as could be. As far as we have any knowledge of the plots of these mysteries as scenic representations, they generally brought the stories of the special gods or goddesses before the spectator — their births, sufferings, deaths, and specially their resurrections. Many were the outward symbols used, of which such as the phallus, the thyrsus, flower baskets, mystic boxes, in connection with special deities, told more or less their own tale. The most important mysteries were, in historical times, those of Eleusis and the Thesmophorian, both representing the rape of Proserpina, and Ceres' search for her: the Thesmophorian mysteries being also in a manner connected with the Dionysian worship. There were further those of Zeus of Crete (derived from a very remote period), of Bacchus himself, of Cybele, and Aphrodite — the two latter with reference to the Mystery of Procreation, but celebrated in diametrically opposed ways, the former culminating in the self-mutilation of the worshiper, the latter in prostitution. Further, there were the Mysteries of Orpheus, who in a certain degree was considered the

founder of all mysteries. Nor were the other gods and goddesses forgotten : Hera, Minerva, Diana, Hecate, nay, foreign gods like MITHRAS (*q. v.*), etc., had their due secret solemnities all over the classical soil, and whithersoever Greek (and partly Roman) colonists took their lares and penates all over the antique world. Eleusinian mysteries can be traced back to the 7th century B. C. In the time of Herodotus as many as 30,000 people attended them; and between 480–430 B. C., the period of Athens' highest power and of the Eleusinian mysteries' greatest fame, the number must have been much greater. When, toward the end of the classical periods, the mysteries were no longer secret, but public orgies of the most shameless kind, their days were numbered. The most subtle metaphysicians, allegorize and symbolize as they might, failed in reviving them, and in restoring them to whatever primeval dignity there might have once been inherent in them.

Mystery, a trade, an occupation, an employment, a profession. Also a kind of mediæval drama, or dramatic composition, the characters and events of which were drawn from sacred history. They were totally devoid of invention or plot, following the sacred narrative or the legends tamely and literally. They were also called MIRACLE PLAYS (*q. v.*). Mysteries were succeeded in the 16th century by moralities, in which we find the first attempts at dramatic art, as they contain some rudiments of a plot, and even attempted to delineate character and to paint manners. Many of these mysteries still exist. They were played by members of the different crafts or trading companies. Thus the collection known as the Chester Mysteries were acted in that city in the year 1327, and contains "The Fall of Lucifer," acted by the Tanners; "The Creation," by the Drapers; "The Last Supper," by the Bakers; "The Resurrection," by the Skinners, etc. See MORALITY.

Mystical Babylon, a name of reproach by which Protestants often refer to the Roman Catholic Church. The term is taken from the 17th and 18th chapters of Revelation, where St. John foretells the speedy overthrow of a world power, which he likens to Babylon, once mighty, but now ruinous and desolate.

Mysticism, a term used to denote the knowledge of God and intercourse with God through internal light and the operation of grace, in opposition to revealed faith on the one hand and speculative rational knowledge on the other. Its leading idea is that perfect holiness and spiritual knowledge are to be attained by devout contemplation rather than by outward means of grace and theological study. The word is often used to imply not a religious devoting of the heart and will to the divine direction, but only the spiritual errors into which the mind may fall under such circumstances. Mysticism is thus regarded as the inclination to indulge in dark and bewildering fancies — a state produced when the mind, instead of resting in a truly religious manner in the mystery of its existence, indulges in vain and aimless desires to see that which cannot possibly be seen, to comprehend that which is incomprehensible, or by some special and extraordinary means to hold intercourse with the inhabitants of higher worlds. The distinction between mysticism and theological speculation consists in this, that the latter, under the guidance of reason and experience, ventures into the territory of the uncertain and mysterious only so far as reason and experience seem to lead the way, whereas the former, turning a deaf ear to these guides, indulges in dreaming with waking thoughts, in peopling empty space with the creations of fancy, and in mixing up imaginary with actual existence. Ancient philosophy did not steer clear of mysticism. At first it adopted mystical fancies only by way of accommodation, as was the case with Pythagoras and Heraclitus, but on the introduction of the New Platonism it applied the impress of the mysteries to the Platonic philosophy, adapted to it the forms of devotion learned in the mysteries, and became, as appears in Iamblichus and the writings attributed to Hermes Trismegistus, altogether visionary and fantastical. Christianity, in consequence of its special tendency to practical good as well as of its submission to a system of doctrine expressly revealed, afforded less scope for the extravagances of mysticism. Mysticism soon, however, made its appearance, forming a kind of profane mixture, and reached its extreme in the writings of the so-called Dionysius the Areopagite, in which Christianity receives many fantastic additions, chiefly from New Platonic fancies. This Dionysius obtained an extensive influence, especially through Hugo St. Victor, in the 12th century and was held in high respect till the time of the Reformation.

In opposition to scholasticism, which labored in the construction of a systematic and almost demonstrative theology, this system embodied a theology of devotion, of feeling, and immediate illumination which attached very little importance to intellectual effort, and laid so much the more weight on purification of heart and ascetic morality. Of this class were Hermann von Fritzlar, Eckhardt, Tauler, and Thomas à Kempis. Inasmuch as their opposition to scholasticism included in it an indirect protestation against the corruptions prevalent among the clergy they have been regarded as forerunners of the Reformation.

In the philosophy of the 15th and 16th centuries, in Paracelsus, Bruno, Campanella, and others, mysticism presented itself in extravagant flights of fancy in speculations concerning nature and the general constitution of being and took a direction which at a later period gave rise, on the side of philosophy, to the alchemists and Rosicrucians, and on the side of theology to a number of religious sects of which such men as Jacob Böhmen and Swedenborg may be considered the representatives. The "Quietism" of Madame Guyon and her adherents (such as Fénelon) in France in the 18th century was a product of the same nature. Very different opinions may be entertained as to the intrinsic value of the writings of the Mystics, but they are undoubtedly of importance in the history of the human mind as exhibiting one of its most remarkable phases under particular circumstances of development. Islamism, though at the outset it was little favorable to mysticism in consequence of its warlike tendencies, at a later period took a mystical form under the name of Sufism and even carried it to a very extravagant height. See Vaughan's "Hours with the Mystics" (1888); Inge's "Christian Mysticism" (1899), etc.

Mythology, (from Greek *muthos* or *mythus*, a tale or fable, and *logos*, a discourse), the collective name for the whole body of fables, legends, or traditions (myths) that take their rise at an early period of a nation's existence and of its civilization, and which embody the convictions of the people among whom such fables arise as to their gods or other divine personages, their origin and early history, and the heroes connected with it, the origin of the world, etc, Such fabulous narratives seem to grow up naturally among all early peoples and are found among the ruder races at the present day, but the mythologies which have been most studied, and the tales belonging to which are best known, are those of ancient Greece and Rome, Scandinavia, the Hindus, and ancient Egypt. Though speculations as to the origin of mythology have been put forth from a very early period it is only in recent times, by the help of comparative philology and by comparing the myths of different peoples (comparative mythology), that any real advance has been made and the study of mythology placed upon a scientific basis. The mythologies of Greece and India have been most fruitful for this purpose, and that of Greece in particular must always be largely drawn upon in any exposition of the results arrived at by modern investigators.

Myths are of course believed in by the bulk of the people among whom they are current, and it is only when speculative and reflective spirits arise and when science and philosophy have made some advances that their truth is called in question. Thus, Zeus, Apollo, Athene, Heracles, and the other divinities of ancient Greece, were believed by the bulk of the people to have a real existence and the stories regarding them were looked on as true; but even in Greece in early times the absurdities and monstrosities of some of the myths attracted the attention of philosophers and led to attempts at explaining the stories in such a way as that they should not shock common sense or moral feeling. By some authors the stories that represent the gods as guilty of gross immorality, as impure, cruel, and deceitful, were flatly denied, and those authors in whose writings such stories are found were accused of having invented them themselves. Homer and Hesiod were severely censured by Xenophanes and Heraclitus on this account; and Plato would not endure the idea that the Homeric poems should be admitted into his ideal republic. Others did not take the rough and ready method of simply denying the truth of the obnoxious stories, but attempted to explain their origin. In doing so they followed three chief systems of interpretation, called respectively by Max Müller the ethical, the physical, and the historical. Those who adopted the first explained that the stories of the power and omniscience of the gods, of their rewarding good and punishing evil, were invented by wise men for the purpose of maintaining law and order in communities — leaving it to be supposed that the immoral representations of the gods were the inventions of foolish poets.

Though this theory was supported by no evidence it obtained a wide currency. The interpreters of the physical (also called the allegorical) school held that the myths contained explanations of natural phenomena, or of certain views regarding natural phenomena, under a peculiar phraseology, which disclosed its hidden wisdom when rightly understood. For instance, Zeus, Hera, Aïdoneus, and Nestis were explained by some as standing for fire, air, earth, and water; and others, up to our own time have endeavored to find astronomy or some of the other physical sciences hidden under the mythology of Greece. Creuzer may be classed as belonging to this school, his work on the "Mythology of the Ancients" ("Symbolik und Mythologie der alten Völker," 1819–1821) being written to prove "that Greek mythology was composed by priests born or instructed in the East who wished to raise the semi-barbarous races of Greece to a higher civilization and a purer knowledge of the Deity. There was, according to Creuzer and his school, a deep mysterious wisdom and a monotheistic religion veiled under the symbolical language of mythology, which language, though unintelligible to the people, was understood by the priests, and may be interpreted even now by the

thoughtful student of mythology" (Max Müller). The third or historical school, identified with the name of Euhemerus, represented the gods as having been originally kings or chiefs, great warriors, sages, or benefactors of the human race, who, being exalted above their fellow men in life, after their death gradually came to be looked on as deities. By disciples of this school Jupiter, for instance, is said to have been an ancient ruler of Crete, Æolus (the god of the winds), a skillful mariner; Atlas, a great astronomer, and so on. The Euhemeristic school is not even yet extinct, and at the present day it includes some who find in the sacred Scriptures prototypes of mythological personages.

The most common theory of mythology, that which has been already mentioned as based on comparative philology, and on a comparison of the myths of the different Indo-European nations, if it has not been generally accepted to the full extent to which some of its advocates would carry it, has at any rate established a great many of its conclusions on a firm basis. Its chief exponents and supporters in Great Britain, those by whom, indeed, it has been mainly worked out, are Max Müller and the Rev. Sir G. W. Cox. This system of mythical interpretation may also be called physical inasmuch as it maintains that all myths have their origin in physical phenomena; but it differs from the older physical or allegorical school in explaining myths as an unconscious product of the popular mind. whereas an allegory (such as the older physical school represented myths to be) is a conscious product of some individual mind. The exponents of this school tell us that in order to understand how myths grow up naturally we must carry our thoughts backward to an early stage of language and civilization, when men have little or no real knowledge of the external world, when they use themselves as the gauge of all phenomena, and endow every object of sense with a conscious life similar to their own, applying to inanimate objects the language which they use when speaking of their own feelings or actions. In early times men would speak quite naturally of the sun as the child of the night, as the destroyer of the darkness, as the lover of the dawn, and as deserting her, as the lover of the dew and also as killing (drying up) the dew, as the benefactor of man, as traveling over many lands, as the child of the morning, as her husband, as her destroyer, and so on. This language, which we should call poetical, was the natural language of early times, and was perfectly understood as descriptive simply of natural phenomena, and nothing else. In course of time, however, men came to take a more prosaic view of nature, so to speak, and while one or two epithets would be retained as simply naming the sun, for instance, a multitude of phrases once applied to him would lose their special meaning as descriptive of solar phenomena, and after lingering for a time with a half-physical, half-mythical application — as we find in the hymns of the Rig Veda — would end by becoming the germs of myths pregnant with human feeling. In this way it is explained that Phœbus, Apollo, Endymion, Phaëthon, and Heracles are all personifications of the sun, and all or most of the legends which constitute their mythological history are essentially pictures of natural phenomena in which the sun plays an important part; but these names were originaly significant epithets applied to the sun from his brilliancy or other characteristic, and it was only in later times when their true meaning was forgotten, as well as that of the phrases of which they formed part, that they became the names of divinities, who were regarded as quite distinct from each other. So Zeus originally meant the sky, Athene and Daphne the dawn, Hermes the wind, and so on.

Professor Müller and Sir G. W. Cox trace the vast majority of myths to phenomena in which the sun plays a principal part. To quote the words of the former: "I look on the sunrise and sunset, on the daily return of day and night, on the battle between light and darkness, on the whole solar drama in all its details that is acted every day, every month, every year, in heaven and in earth, as the principal subject of early mythology. I consider that the very idea of divine powers sprang from the wonderment with which the forefathers of the Aryan family stared at the bright powers that came and went, no one knew whence or whither; that never failed, never faded, never died, and were called immortal, that is, unfading, as compared with the feeble and decaying race of man. I consider the regular recurrence of phenomena an almost indispensable condition of their being raised through the charms of mythological phraseology to the rank of immortals, and I give a proportionately small space to meteorological phenomena, such as clouds, thunder, and lightning, which though causing for a time a violent commotion in nature and in the heart of man, would not be ranked with the immortal bright beings, but would rather be classed either as their subjects or as their enemies." Others, including some of the most eminent mythologists of Germany, assign the sun a subordinate position in mythology, and attribute the origin of the majority of myths to phraseology referring to clouds, storms, rains, winds, lightning, and thunder, maintaining that "originally the sun was conceived implicitly as a mere accident in the heavenly scenery, and assumed importance only in a more advanced

state in the contemplation of nature and the formation of myths."

We shall now give a few examples to show how the theory is applied in the explanation of myths. The well-known story of Apollo slaying the children of Niobe with his arrows is nothing more than a mythological way of telling how the morning clouds are dispersed before the rays of the rising sun; and the story of Apollo and Daphne is the story of the love of the Sun for the Dawn, who flies at his approach, and dies away as he is about to touch her. Heracles, again, is the sun laboring throughout his life for the benefit of others: soon after birth he strangles the serpents of darkness, and after performing innumerable toils in many lands, he dies on the funeral pyre, as the sun sinks in the fiery West. Perseus also is the sun, and the Gorgon Medusa whom he slays is the night, which disappears at sunrise. Like other solar heroes, such as Phœbus, Theseus, Philoctetes, Achilles, Bellerophon, and Sigurd in Northern mythology, he receives invincible weapons, which enable him safely to carry out all his exploits. The sun which scatters the darkness may also be called the child of the darkness, and so as Perseus unintentionally kills his father Acrisius, Œdipus, another solar hero, kills his father Laius, and Theseus causes the death of his father Ægeus. Endymion, as his name implies, is the setting sun, who is courted by the moon, and who sinks to sleep in the West. The story of Phaëthon recalls the language that men made use of when they saw the herbage burned up by the fiery rays of the sun in a season of drought. "Some one," they said, "is driving the chariot of the sun who cannot guide the horses."

Even the tale of the Trojan war is traced to a solar origin, and is made out to be but "a repetition of the daily siege of the East by the solar powers that every evening are robbed of their brightest treasures in the West" (Max Müller). The Dawn, or evening twilight (Helen) is stolen from the West by the dark powers of night (Paris and his friends), and the children of the sun (Agamemnon and his friends) go to fetch her back. For 10 years (10 hours of darkness) they assail the citadel of the robbers, and only after a weary course of fighting do they succeed in capturing it (when the sun bursts forth in the morning). So also the story of Ulysses and his return from the Trojan war "had its origin in phrases which described the general phenomena of daytime from the rising of the sun to its setting. The sun leaves his bride, the twilight, in the sky when he sinks beneath the sea to journey in silence and darkness to the scene of the great fight with the powers of darkness. The 10 weary years of the war are the weary hours of the night; in the 10th the fortress falls, as the dark shades are scattered at break of day. The victory is won; but the sun still longs to see the fair and beautiful bride from whom he was parted yester eve" (Cox); and so he begins his long and toilsome journey, which occupies another 10 years. In his W. course he encounters, among other adventures, the one-eyed monster Polyphemus, a personification of the "shapeless vapors which rise from the waters, and through which the sun, like a huge eye, sheds a sickly light"; his followers kill the cattle of the sun, 350 in number, that is, they waste the passing days, and so they can never reach their homes; he is cajoled by the goddess Calypso (Greek *kalupto*, to conceal) to stay with her in her island cave, and forgets for a time his journey, that is to say, the sun is hidden by the night, and is only relieved from its dominion by the approach of morning (Hermes or Mercury in the myth); and so the whole journey of Ulysses is explained by a reference to solar phenomena.

But, as already intimated, though the sun plays a most important part in Greek mythology, some of the most important mythological personages are derived from other natural objects. Zeus, for instance, the supreme god, the same as the Jupiter of the Romans and the Dyaus of the early Hindus, is not the sun, but the bright sky, and thus it is Zeus who is the cloud-gatherer, the god of the dark clouds, the thunderer, the sender of rain, the giver of bounteous harvests, the eternal and unchangeable, like the sky. Hermes again is the wind, and the cattle of Phœbus that he thievishly drives away are the bright clouds driven through the air by the breeze, "his twistings and turnings, his shifty evasions, his downright lies, his gentleness and his rage, the gigantic strength which he can put forth at will, the sweet repose to which he can return at pleasure, all stand out with lifelike fidelity as characteristics of the wind." Demeter, who loses her child Persephone, is the earth, who for six months every year has to mourn the loss of the summer. And turning to the mythologies of other Indo-European nations, we find among the Hindus the sky god Dyaus (from *dyu*, to shine), whose name, however, always retained its meaning of sky, so that Dyaus had only an indistinct personality as a deity. Dyaus, as already mentioned, is the same as Zeus, and also the same as the *Ju* of the Roman Jupiter, the latter part of this name signifying simply father. *Deus*, god, is also from the same root; as is also the name of the god Tyr, of Northern mythology, the god of war and athletic sports.

The Hindu Varuna, a sky god, is clearly the same as the Greek Ouranos, which word, besides being the name of a deity,

had the ordinary signification of sky or heaven. The Vedic god Indra again, whose name is derived from *indu*, Sanskrit drop or sap, and therefore would mean the giver of rain, corresponds closely to Zeus in his attributes; like him, and like the Norse god Thor, he is the wielder of the thunderbolt. So the bright Vedic goddess Ushas, the dawn, is the Greek Eos, the dawn; while Ahana, another name for the dawn, is the Greek Athene. Odin or Woden (see NORTHERN MYTHOLOGY), the highest of the gods, the All-Father, whose name is connected with the Latin *vadere*, to move, is a counterpart of Zeus and Jupiter, and as such is the god of the sky and of the sunlight, the giver of rain, etc. Thor, the god of thunder, is called the son of Odin, and, as was natural, considering the origin of both of them, they are in some of their attributes identical. Balder, the bright and beautiful god, is the sun, and the delight of the world in the presence of Balder is the joy inspired by the bright sunlight; and as the "Iliad" and "Odyssey" are claimed as solar myths in their origin, so the Norse "Volsunga Saga," and the German "Nibelungenlied," are explained in the same way, and the similarity in the main incidents of all of them is pointed to as proof of the fact.

Such is a brief outline of the theory which has been so ably and eloquently expounded and advocated by Prof. Max Müller and Sir G. W. Cox; and that they have established a certain number of their propositions, and have brought forward many plausible if not entirely convincing interpretations of myths, must be admitted. Thus it may be held established that as there was a common language spoken by the different Indo-European races when dwelling together in Asia or in Europe, so among these ancient Aryans there was a common store of more or less developed myths, which contained at least the germs of what afterward became the mythologies of the Hindus, Greeks, and Teutons. Yet as a whole the "solar theory" cannot be accepted as conclusively proved, and when it is brought in to explain not only such simple stories as those of Daphne, Endymion, and Phaëthon, but also such long and complicated tales as the Trojan war, the return of Ulysses, or the "Nibelungenlied," readers are apt to become skeptical as to its value. Moreover, there are numerous myths for which the solar theory is unable to account satisfactorily. For instance, it fails to account for many of the wild and monstrous myths told of deities, of the creation of the world, of the state of the dead, etc.; and it thus proves quite insufficient when myths as a whole are investigated. Andrew Lang, among others, is emphatic in pointing this out, and he finds a key to mythology in the study of the myths and mental habits of savage races. He maintains that "the savage and senseless element in mythology is for the most part a legacy from ancestors of the civilized races who were in an intellectual state not higher than that of Australians, Bushmen, Red Indians, the lower races of South America, and other worse than barbaric peoples," and that the monstrous myths current in Greece, Egypt, and India were thus inherited. He points to the currency of such myths among savages at the present day, and to the fact that in general savages are eager to arrive at some explanation of the natural phenomena around them, and are quite satisfied with explanations that to civilized men may seem even imbecile. When a phenomenon presents itself the savage requires an explanation, and that explanation he makes for himself or receives from tradition in the shape of a myth. But no one theory, indeed, can be expected to explain the origin of all myths, for though we may admit that many, perhaps most, of them are physical in origin, it is impossible to deny that others may be pure fabrications, tales invented by early bards or minstrels to beguile a weary hour, while in others fragments of real history may be hidden. To decide what class any myth is to be referred to, we must trace it if possible, back to its earliest and most rudimentary form, and then, by the aid of the science of language, we may be able to say whether it is physical in origin or not; but as this will in many cases be impossible, there must always remain a number of myths whose origin cannot be settled. Cox's "Tales of Ancient Greece, and Mythology of the Aryan Nations"; Max Müller's "Lectures on the Science of Language" (second series); "Chips from a German Workshop"; and "Contributions to the Science of Mythology" (1897); Kelly's "Indo-European Folklore"; Grimm's "Teutonic Mythology" (English trans. 1879–1889, 4 vols.); Andrew Lang's "Custom and Myth" (London, 1884); and his "Myth, Ritual, and Religion" (1887); etc.

Mythology, Northern, the mythology of the Scandinavian peoples inhabiting Denmark, Norway, Sweden, and Iceland. According to the Scandinavian mythical cosmogony there were originally no heavens above nor earth below, but only a bottomless deep (*Ginungagap*), N. of which was a world of mist (*Niflheim*), and S. of which was the world of light or fire (*Muspelheim*). A warm wind blowing from the latter on the ice of Niflheim melted it, and from the drops sprang Ymir, the ice-giant. Ymir was fed by the cow Audhumbla, which arose in the same way. As she was one day licking blocks of ice, human hair grew out of them, and then an entire man, called Buri. His son was Bor, who had three sons, Odin, Vili, and Ve, who became the rulers of

heaven and earth. The children of Bor were good, those of Ymir wicked; and they were constantly at war with each other. The sons of Bor finally slew the ice-giant, dragged his body into the deep, and from it created the world. Out of two trees Odin, Vili, and Ve created a man, called Askur, and a woman, Embla. The earth was supported by a large ash, called Ygdrasil, whose branches extend over the world, while its top reaches above the heaven. The residence of the gods was Asgard, whence the bridge Bifröst led to the earth. The giants dwelt in Jötunheim or Utigard, and men in Midgard. As in Greek mythology there was an older and a newer dynasty of the gods. The ancient and modern systems seem to have their connecting point in Odin, as with Zeus in the Greek system. Aesir or Aser is the name for the new race of gods. They are Odin, or Woden, the god of gods, the *Alfadur* (All-father), who lives for ever; from him and his wife Frigga are descended the other gods. Among their sons are Thor, god of thunder, the strongest of gods and mortals, whose hammer, Miölnir, crushes the hardest objects, and Baldur, the youthful and beautiful god of eloquence. Niord is the god of winds, of sailors, of commerce, and of riches; his son Frei is the ruler of the sun, and on him depend rain and sunshine, plenty or dearth. Freya is the goddess of love. The mildest and most bountiful of the gods, she is a friend of sweet song, and loves to hear the prayers of mortals. Tyr, a son of Odin, the fearless god, who wounds by a look, is lofty as a fir, and brandishes the lightnings of battle. He is not properly the god of war, but rather of power and valor. His brother Braga is the god of wisdom and poetry. Braga's wife is Iduna, who preserves the apples of immortality, which she offers in vessels of gold to the heroes at their entrance into Valhalla. The Valkyrias or "choosers of the slain" are awful and beautiful beings, neither daughters of heaven nor of hell. Mounted on swift horses, they conducted the heroes to Valhalla. Another striking figure is Loki, as beautiful as he is malignant. By the giantess Angerbode he had Hela, the goddess of the lower regions, the wolf Fenrir, and the terrible serpent of Midgard, Jormungandur, which surrounds the whole earth. Hela rules in Niflheim. All who die of sickness and old age, and not in war, descend to her dark mansion. Other mythical personages were the Norns or fates, and Heimdall, who keeps watch on the bridge Bifröst. The popular belief was all would perish in a final crash of doom.

Mythras (mith'ras), or **Mihir** (mihēr'), the sacred being enthroned in the sun whom the Ghebers worship.

Myxinidæ, a family of cyclostomatous fishes with two genera, *Myxine* and *Bdellostoma.* The fishes of this family are popularly known as hag-fish, glutinous hags, or borers; they are marine, and their distribution is similar to that of the *Gadidæ,* in the abdominal cavity of which they are frequently found buried. They secrete an immense quantity of glutinous slime, and are considered by the fishermen as a great nuisance, as they seriously damage the fisheries where they abound.

Myxœdema, the name generally accepted for a diseased condition first described by Sir William Gull in 1873. It occurs in adults, generally females, and is characterized by a thickening of the sub-cutaneous tissue, most noticeable in the face (which becomes enlarged, swollen-looking, and expressionless) and the hands, with a simultaneous dulling of all the faculties and slowing of the movements of the body. A precisely similar condition occurs in many cases where the thyroid gland has been removed for disease. Myxœdema is very slow in its progress, but undoubtedly tends to shorten life. It greatly resembles cretinism, except that the mental condition is much less affected, and that the deformities resulting from arrested development are not present.

Myxomycetæ, or **Myxomycetes,** a doubtful order of fungals. Alone among plants they have three cells, without a cell wall, in their vegetative period, and not combined into a tissue. They live on decaying animal and vegetable substances.

N

n, the 14th letter and 11th consonant of the English alphabet; an articulation formed by placing the point of the tongue against the root of the upper teeth and forcing out the breath. It is a liquid or semi-vowel, because part of its articulation may be continued for any length of time. It is a nasal letter, the articulation being accompanied by a sound through the nose, caused by the position of the tongue, which forces part of the air in the expiration through that organ. It is a lingual, because produced chiefly by the above mentioned position of the tongue, which, as the reader will see from the article L, is nearly the same as in the pronunciation of that letter; in consequence of which, persons, who, from neglect or natural defect, are unable to inflect the tongue so as to pronounce l, often substitute an n instead of it. In English and most other languages n has a pure nasal sound; in French and Portuguese, after a vowel in the same syllable, as on, un, etc., it has the effect of giving a semi-nasal sound to the vowel preceding, that is to say, the vowel is sounded by an emission of the breath partly through the nose and partly through the mouth. For the etymologist n is important on account of its ready union with other letters, and its frequent omission or insertion between other letters. The same word in the same language often has the n, in some of its modifications, before the palatic sounds g and k, and in others omits it. Thus the original *frago, tago, pago,* became in later Latin *frango, tango, pango,* yet *fregi, fractum, tetigi, tactum, pepigi, pactum,* etc., were retained. Thus also *fingere* and *figura, fictus, figmentum; stringere, strictus.* From the Latin *lynx,* the German forms *luchs,* the Danes *los,* the Swedes *lo;* for the German *danken* (to thank), the Swedish has *tacka,* and the Icelandic *thakka.* It often associates also with the labials d and t, while other idioms omit it in the corresponding words; thus in Latin, *scindo, scidi; findere, fidi.* In German the introduction of the n before d is extremely frequent, thus *jugend* (youth); in Low Saxon *jögd* only; *tugend* (virtue), for the ancient *taugde; nackend* (naked) for the old *nacket.* The Italian, on the other hand, frequently drops an n, which was found in the original Latin, as in *isola* from *insula, istituzione* (as well as *instituzione*) from *institutio.* Before labials n is frequently changed into m, as in the Latin *impar, immittere;* Greek, *symballo, embolimos.* We often find n omitted by the Greeks and by the Romans when not final; thus Cicero writes Foresia, Megalesia, for Forensia, Megalensia. On inscriptions we find *impesa* for *impensa* and *mesibus* for *mensibus.* In Plautus we find *stas* for *stans.* With the Greeks *ν′* stood for 50, and *,ν* for 50,000. As a Latin abbreviation N signifies *noster, natus, nomine, nefastus dies, numine,* etc., and on medals of the Lower empire D N signifies *Dominus noster.* The Spanish alphabet has a character ñ, called n with the tilde, and pronounced like ni in onion, minion; for instance, España, Nuñez, *niñez*: n preceded by g in Italian is pronounced in the same way. See ABBREVIATIONS.

Nabal, a rich and influential Israelite of the tribe of Judah. David, having afforded protection to Nabal and saved his flocks and herds, his property, and even his life when in danger, some time after sent to him to supply his troops with provisions, his forces being in want of immediate provender. This Nabal refused; on which David, stung with the ingratitude of the man to whom he had shown so much favor, and to whom he had been of such signal use, vowed to take summary justice on the ungrateful Jew and exterminate his family; and taking with him 400 men, set out for the residence of the mercenary Hebrew. Abigail, Nabal's wife, hearing of her husband's conduct and David's resolve, collected such provisions as the army required, and, attended by a train of servants, set out to meet the approaching king. Her beautiful person, combined with the excuses she made for her husband's conduct, so softened the heart of David, that he accepted her gifts, averted his wrath, and Nabal having been "smitten by the Lord" a few days after, David married his widow.

Nabatæans, a people of Northern Arabia, generally considered to have been of pure Arab blood, though some authorities, identifying them with the Ishmaelite tribe of Nebaioth, regard them as having been closely akin to the Edomites. They took possession of the country once occupied by the Edomites; and in the beginning of the 3d century B. C. they were one of the most powerful among the Arab tribes, warlike, with a force of 10,000 fighting men, nomadic, and busy carriers of merchandise between the East and the West. In 312 B. C. Antigonus, the general of Alexander, made an attack unsuccessful, on their desert fastness of Sela or Petra. By the 1st century B. C. they had shaped their power into a kingdom; in the time of St. Paul their king Aretas, who died in A. D. 40 after a reign of 48 years, was master of Damascus and Cœle-Syria. They were in antagonism successively to the Syrian monarchs, the Maccabæan rulers of Judea, and the Romans, but eventually acknowledged the supremacy of these last. Nevertheless Trajan, in 105, captured their stronghold and put an end to their kingdom. They possessed a certain measure of culture, derived from the Syrians.

Nablus (the ancient Shechem) (corrupted from the Greek Neapolis), a town of Palestine, on the highest part of the pass, between Mounts Ebal and Gerizim, that leads from the Mediterranean to the Jordan. In the same valley or gap are Jacob's Well, the Tree of the Sanctuary, and Joseph's grave. At first a Canaanite city, it was destroyed by Abimelech, a son of Gideon the Judge. Here Rehoboam was crowned King of Israel. The place became the religious center of the Samaritans. The Greek city gave birth to Justin Martyr, and suffered during the Crusades.

Nabob, a popular name formerly much used, with a touch of contempt, for an Englishman, especially an English merchant, who had made a fortune in India, and returned to spend it in his own country, but now indiscriminately applied to any rich man.

Nabonassar, Era of, in astronomy, an era followed by Hipparchus and Ptolemy, and adopted from the Chaldean astronomers, who had been in the habit of referring the observations of eclipses to the beginning of the reign of Nabonassar, or NEBUCHADNEZZAR (*q. v.*), the alleged founder of the Babylonish empire. This era Niebuhr regards as "firmly established in history," while he looks on Nabonassar as a prince who shook off the Assyrian yoke, and reëstablished the independence of Babylon. But while Niebuhr regards this fact as placed beyond all doubt, Sir G. C. Lewis regards the astronomical canon for the period before Cyrus as "a complete historical puzzle," and states that "the name of Nabonassar is unknown to us from any other source." His conclusion is that the canon is referred to an arbitrary date, altogether beyond the evidence of history. Grote states that "the earliest Chaldean astronomical observation, known to the astronomer Ptolemy, both precise and of ascertained date to a degree sufficient for scientific use, was a lunar eclipse of March 19, 721 B. C., the 27th year of the era of Nabonassar, which begins with February 26, 747 B. C."

Naboth, an Israelite of the city of Jezreel, who had a vineyard near the palace of Ahab. Ahab coveted the inheritance of his subject, and, to gain possession of it, caused Naboth to be stoned to death.

Nabuco de Araujo, José Tito (nä-bō′-kō dā är-ä-ö′zhō), a Brazilian dramatist; born in Rio Janeiro, Brazil, Jan. 4, 1836; wrote "The Son of Chance," a drama which has been successfully represented in several of the South American cities; "Maxims and Thoughts" (1876); "Life of Lamartine" (1877); "Life of General Gurjao" (1878); and "Poems" (1879).

Nachi, or **Nadches,** sometimes called NAHY, or NAGNATEZ, a tribe of North American Indians who formerly lived on St. Catherine's creek, near the present city of Natchez, Tenn. The name was also applied to a confederacy of towns, of which in 1699 there were eight. Owing to numerous conflicts with the French the confederacy was broken up in 1729, and the people scattered. A few still live among the Creeks and Cherokees in the Indian Nation.

Nachtigal, Gustav (näh′tē-gäl), a German traveler; born in Eichstedt, Germany, Feb. 23, 1834. He studied medicine, and served as army surgeon till 1863. In that year he went to North Africa, suffering from a chest disease. In 1868, through the influence of Rohlfs, he was selected to carry presents from the King of Prussia to the Sultan of Bornu. Starting from Tripoli in 1869, he traveled by way of Fezzan and Tibesti to Bornu, made excursions into the states of Borgu and Bagirmi, and returned home by way of Wadai, Dar-Fûr, Kordofan, and Cairo, where he arrived Nov. 22, 1874. This long and successful journey, in the course of which he visited, the first of Europeans, the native states of Tibesti, Borgu, and Wadai, put him in the forefront of modern travelers. His vast collection of most valuable information was written down in the three volumes of "Sahara and Sudan" (1879–1889). In 1884 Nachtigal was commissioned to annex for Germany Togoland, Kameruns, and Lüderitzland (Angra Pequena) on the W. coast of Africa. He died on the return journey off Cape Palmos, April 19, 1885, and was buried on

that rocky promontory; but in 1887 his bones were removed to German soil in the Kamerun region.

Nack, James, an American poet; born in New York city, Jan. 4, 1809. He labored under the disability of being deaf and dumb. His popular verses include "Spring is Coming," "Here She Goes and There She Goes," and the volumes "The Legend of the Rocks" (1827); "The Immortal, and Other Poems" (1850); "Poems" (1852); and "The Romance of the Ring, and Other Poems" (1859). He died in New York city, Sept. 23, 1879.

Nadab, a King of Israel, and son of Jeroboam, whom he succeeded 954 B. C. In the second year of his reign, he led "all Israel" against Gibbethon, but was slain during his siege of that city, by Baasha, son of Ahijah, who mounted the throne, and reigned 23 years, during which he "smote all the house of Jeroboam; he left not to Jeroboam any that breathed," as was prophesied by Ahijah the Shilonite.

Nadal, Ehrman Syme, an American author; born in Lewisburg, W. Va., Feb. 13, 1843. He was graduated at Yale College in 1864; secretary of the United States legation at London, 1870–1871 and 1877–1884; a frequent contributor to magazines. His chief works are: "Impressions of London Social Life" (1875); "Essays at Home and Elsewhere" (1882); "Zwiebak, or Notes of a Professional Exile" (1887).

Nadaud, Gustave (nä-dō′), a French composer; born in Roubaix, France, Feb. 20, 1820. He published: "Songs" (1849); "More Songs" (1873); "Unpublished Songs" (1876); and "New Songs" (2d ed. 1892). He composed the music for many of them. He also wrote a novel called "An Idyll" (2d ed. 1886). He died in Paris, April 28, 1893.

Nadches. See NACHI.

Naden, Constance C. W., an English poet; born in Birmingham, England, in 1858. She studied sociological problems, and lectured with effect; but is chiefly remembered for her volumes of "Songs and Sonnets of Springtime" (1881), and "A Modern Apostle," etc. (1887). She died in London in 1889.

Nadir Shah, Shah of Persia; born in the province of Khorasan, about 1688. At an early age he obtained great notoriety as the chief of a band of robbers, gradually rising to power and distinction by his ambitious daring, and through the blind tools who flocked to his victorious banners. In 1720, assuming a mask of patriotism, he raised a body of 5,000 men, and, after several dashing achievements, succeeded in driving the Afghans from Persia, and ultimately in conquering the whole of their country, which he added to his own possessions; and having taken the capital city of Kandahar, because the inhabitants fled to Delhi, and claimed, and ultimately obtained, protection from the sovereign, he waged war on the Great Mogul; then, after beseiging the imperial city, in 1738, entering Delhi, he put the inhabitants to the sword, and carried off a vast accumulation of treasure. After slaughtering thousands of the people, destroying their city, and inflicting frightful suffering, he returned to Persia, where he consolidated his power, and established absolute sway over an empire reaching from the Oxus in the N. to the ocean in the S., and from Bagdad in the W. to the Indus in the E. For the first years of his reign justice and moderation were the principles of his power; but as he advanced in years he gradually threw off all consideration, and ruled by his selfish, arbitrary, and unbridled will; while in regard to his captives the most inhuman and barbarous conduct marked his career. He put out the eyes of his own son, simply because he was beloved by the people; and exercised such malignant cruelty on all, that his officers, discovering he meant to destroy them all, formed a league to save their lives and rid the world of an intolerable monster, entering his tent by night, murdered him as he slept, and placed his nephew Ali on the musnud in June, 1747.

Nænia, the goddess of funeral songs.

Nævius, Cneius, an early Roman poet; born probably in Campania, but resident at Rome for the greater part of his life. He wrote a poem on the first Punic war, in which he had personally served, and from this poem Vergil adopted some passages in the "Æneid." Nævius wrote also several comedies, and by the freedom of his attacks on leading men subjected himself to imprisonment, and afterward to exile. Some fragments of his writings are extant. He died in Utica, Africa, in 204 B. C.

Nævus Maternus, in physiology, a mother's mark; a mark on the skin from birth, the effect, as is said, of the mother's longing for or aversion to particular objects, or of some accidental occurrence affecting her own person during pregnancy; also known as birth-mark.

Naga, in Hindu mythology, the name of deified serpents. Their king is Sesha, the sacred serpent of Vishnu.

Naga Hills, a district of British India, the S. E. extremety of Assam; area 6,400 square miles approximately; pop. 130,300. It consists of a mountainous region, covered with jungle and forest, the haunt of various wild animals, and is inhabited by the aboriginal Nagas and other semi-savage people, whose incessant raids into the more orderly British provinces occasioned much trouble 1832–1881. In that year their country was

made an adminstrative district, and garrisoned with a native regiment.

Nagar. See BEDUAR.

Nagasaki, a seaport of Kyūshū, Japan, and for more than two centuries the only gate of communication for that empire with the outer world. Its harbor, famous for its beauty, is a narrow inlet about 3 miles in length. Near its head, beside the native town, is the low, fan-shaped island of Deshima, where the Dutch factory was situated. From 1637 to 1859 the Dutch traders were immured in this prison of 250 x 80 yards, the monotony of their lives being varied by the arrival of the yearly ship from Batavia, and the annual journey to Yedo, when presents were made to the Shôgun. Chinese traders were also permitted to carry on a limited trade. In 1859 Nagasaki became one of the five open ports. The great Takashima coal mine, on an island 8 miles seaward of the entrance to the harbor, serves to give importance to Nagasaki as a coaling station. Nagasaki also possesses a fine dockyard and patent slip. The foreign settlement is situated on the flat land at the E. side of the harbor. The Roman Catholic Church has a strong mission here, and in one of the valleys in the neighborhood is a community of historical native Christians. Protestant missions are represented by the English Church Missionary Society, and the American Methodist, Episcopal, and (Dutch) Reformed Church missions. At the mouth of the harbor is the small island of Pappenberg (Takaboko), from which 300 Christians are said to have been hurled in the frightful persecutions of the 17th century. Pop. (1908) 176,480.

Nagelflue, or **Nagelfluh,** in geology, the conglomerate of the molasse in Switzerland. It has pebbles derived from the granite, studding it like nail heads. It is sometimes 6,000, if not even 8,000 feet thick. It is very conspicuous on the Righi, and the neighborhood of Lucerne, as well as in the Speer, near Wesen. The lower part of it, containing terrestrial plants, fluviatile shells, and the bones of extinct land quadrupeds, is considered by Esched as a freshwater formation; the upper part contains marine shells. Sir Charles Lyell considered the lower part at least Miocene, and the upper part perhaps Pliocene.

Nagoya, a city of Honshu, Japan, 75 miles E. by N. of Kioto, capital of Aichi ken (formerly of province or kuni of Owari); it has a celebrated castle, erected in 1610 by 20 great feudal lords, and regarded as one of the wonders of the town, noted manufactures of porcelain, cloisonné, and fans. The town is connected by a nearly continuous street of 20 miles with Gifu, every house in which was overthrown in a terrible earthquake that visited the district in the autumn of 1891. Pop. (1908) 378,231.

Nagpur, a city of British India, the seat of administration for the Central Provinces, 450 miles E. N. E. of Bombay. It lies embosomed in trees, has several handsome tanks, gardens, and temples, and extensive suburbs, but is not a healthy city, the mean temperature being 78.7°. Fine cloth fabrics are woven, and there is an active trade in wheat, salt, spices, and European goods. Here, on Nov. 26 and 27, 1817, a British force of 1,350 men, commanded by Colonel Scott, defeated a Mahratta army of 18,000 men. Pop. (1901) 124,599.

Nagyrarad. See GROSSIRARDEM.

Nahr=el=Asi. See ORONTES.

Nahuas, or **Nahuatlecas,** a collective name given to the Indian tribes which were the most powerful in Mexico at the time of the Spanish conquest. They had many pueblos, or towns, knew how to cultivate the ground, were skilled in gold and feather work and used hieroglyphics in writing. They were quarrelsome and were constantly at war among themselves. They offered human sacrifices and had other degrading customs. After the fall of Mexico in 1521 they lost much of their independence and drifted into a state of semi-slavery to the Spaniards. About 2,000,000 Indians of that region are now classed as Nahuas. They are sometimes called Aztecs.

Nahum, a prophet called the Elkoshite, from Elkosh where he was born or where he labored, but whether it was in Galilee or in Assyria has not been determined; the time when he flourished is also uncertain. The most probable opinion is that his prophecies were spoken in the reign of Hezekiah a short time after Sennacherib's invasion. In ii. 2 there seems to be an allusion to the captivity of the Ten Tribes which took place in that reign. Also the 7th of the Minor Prophets: *i. e.,* of the minor books of prophecy. The theme is "The burden of Nineveh," the utter destruction of which is predicted, the reference probably being to its capture by the combined forces of the Medes and Chaldeans about 625 B. C. Nahum i: 15 closely resembles Isa. lii: 7. The style of the book has been highly commended, and its canonical authority has never been doubted.

Naiad, in Greek and Roman mythology, one of certain inferior deities, who presided over rivers, wells, springs and fountains, and are represented as young, graceful, and extremely beautiful nymphs, to whom great veneration was paid and sacrifices offered. The oblations usually presented on the altars of the Naiads consisted of milk, fruits, and flowers, and libations of wine, honey, and oil. They are usually represented leaning on an urn, from which flows a stream of water, and when draped, which is seldom,

their vesture is of a thin greenish hue, sufficiently light to show the contour of the limbs beneath. On gems they are sometimes represented with large flowing veils, their only general vestment. In zoölogy, one of the *Unionidæ*. In botany, the order NAIADACEÆ (*q. v.*).

Naiadaceæ, an order of endogens, alliance Hydrales. It consists of plants living in fresh or salt water. The leaves, which are very cellular, have parallel veins and membranous interpetiolar stipules. Flowers small, often in terminal spikes; the perianth generally of two or four pieces, deciduous or wanting; stamens definite, hypogynous; stigma simple; ovaries, one or more, superior; ovule oblong, erect, or pendulous; fruit dry, one-celled, one-seeded. The naiadaceæ are of low organization. Found in temperate and tropical countries. There are nine known genera, and 16 species.

Naididæ, a family or group of water worms, some of them of common occurrence in the mud of ponds and streams.

Nails, flattened, elastic, horny plates, which are placed as protective coverings on the dorsal surface of the terminal phalanges of the fingers and toes. Each nail consists of a root, or part concealed with a fold of the skin; a body, or exposed part attached to the surface of the skin; and a free anterior extremity called the edge. The skin below the root and body of the nail is termed the matrix, from its being the part from which the nail is produced. This is thick, and covered with highly vascular papillæ, and its color is seen through the transparent horny tisue. Near the root the papillæ are smaller and less vascular; hence the portion of nail corresponding to this part of a whiter color; from its form, this portion is termed the lunula. It is by the successive growth of new cells at the root and under the body of the nail that it advances forward, and maintains a due thickness, while at the same time its growth in a proper direction is ensured. According to the observation of Beau, the finger nails grow at the rate of about two-fifths of a line a week, while the toe nails only grow about one-fourth of that rapidity. When a nail has been removed by violence, or has been thrown off in consequence of the formation of matter (pus) beneath it, a new nail is speedily formed, provided the matrix has not been seriously injured.

There is a very common and troublesome affection popularly known as ingrowing nail. Its most usual seat is by the side of the great toe. It does not in reality arise from any alteration of the nail, but from the adjacent soft parts being constantly pressed by the use of tight shoes against its edge. These parts become swollen and inflamed; suppuration ensues, and an intensely sensitive ulcer is formed, in which the nail is embedded. Surgical advice should at once be resorted to in these cases, as there is no probability that the ulcer will heal spontaneously, especially if the patient continue to move about, and thus keep up irritation. In obstinate cases it is not unfrequently necessary to remove a portion of the nail, an operation attended with much pain, though quickly performed.

Nails, slender pieces of metal, usually tapering and having a head, used for fastening together pieces of wood, metal or other substances. There are numerous varieties, but the most important are the cut, wrought, horseshoe, and wire. Cut nails are manufactured from iron or steel rolled into plates of a thickness corresponding to the desired size of the nail. The wire nail consists of a cylindrical piece of wire, of the desired length, sharpened at one end, and upset at the other to form a firm head. Owing to its great holding power, and the numerous new inventions which have been made to facilitate its output, the wire nail is fast taking the place of the cut variety. The horseshoe nail is made by a hammering device, which mechanically pounds it into the rough shape, and by a finishing machine which smooths it into its final form. The various other varieties, such as garden nails, screw nails, shoe nails and ornamental nails are merely modifications of the four styles enumerated.

Naini Tal, the summer resort of the lieutenant-governor of the Northwest Provinces, India, between spurs of the Himalaya, beside a beautiful lake 6,409 feet above sea-level, 70 miles N. of Bareilly. By a disastrous landslip here in 1880, 150 lives were lost. There is a military convalescent depot. Pop. over 10,000 in the season (September).

Nain Rouge (na*ng* rözh), a Lutin or goblin of Normandy, kind to fishermen. There is another called Le petit homme rouge.

Nairs, a Mohammedan caste in Malabar, who have peculiar marriage customs.

Naissant, in heraldry, a term employed to signify rising or coming forth, and applied to any living creature represented as issuing out of the middle of a fesse or other ordinary.

Naja, a genus of serpents, including several that are among the most dangerous of all the venomous snakes. The best-known examples of the genus are *N. tripudians,* the cobra de capello of India, and the *N. haje* of Egypt, which is tamed by native jugglers, and is identified by many writers with the asp employed by Cleopatra to bring about her death. See COBRA: ASP.

Najac, Count Emile de (nä-zhäk'), a French dramatist; born in l'Orient, Morbihan, France, in 1828. He produced:

"Caged Birds" (1863); "The Last Doll" (1875); "Madam Is Served" (1874); and "Let Us Divorce!" (1880). He also collaborated with Meilhac, Sardou, and Hennequin. He died in Paris in 1869.

Nakoo, a name sometimes given to the gavial, or gangetic crocodile.

Nala, a legendary king of ancient India, whose love for Damayantî, the daughter of Bhîma, King of Vidarbha, and the adventures arising therefrom, forms a celebrated episode of the "Mahâbhârata," as also of a separate poem, the "Nalodaya," attributed to Kalidasa as its author.

Namaqualand, Great, or **Namaland,** the extensive region in South Africa N. of the Cape Colony, extending from the Orange river to DAMARALAND (*q. v.*) N., and stretching inland from the W. coast to the borders of British Bechuanaland; area estimated, 460,000 square miles. It is mainly a sterile and barren region, and along a coast line of upward of 400 miles does not present a single running stream; but a few little bays along the coast, such as Angra-Pequeña, Sandwich Harbor, and Walvisch Bay, afford safe anchorages. The Rhenish Mission, which has long been active here, has six stations in Namaland with over 2,500 converts. There has often been war between Namaquas and Hereros (see DAMARALAND). Since 1885 it has been a German possession, with the exception of the small British coast territory of Walvisch Bay.

Namaqualand, Little, a barren district of Cape Colony, S. of the Lower Orange river; much copper is mined here.

Namaquas, the principal existing tribe of the race generally known under the name of HOTTENTOTS (*q. v.*). They inhabit the region called Great Namaqualand, N. of the Gariep or Orange river, and the country a few miles S. of it, as far as the Kamiesbergen. They are a pastoral people of rather predatory habits, and live under the rule of their chiefs.

Namaycush, the *Salmo namaycush,* a fish nearly allied to the salmon, inhabiting the great lakes and rivers of North America. Good-sized specimens weigh from 20 to 40 pounds and it is much esteemed for the table.

Names. Among the Greeks, with the exception of a few families at Athens and Sparta, there were no family names. Among the Romans, each person had three names: first, the prænomen, or distinction of the individual; second, the nomen, or name of the clan, and third, the cognomen, or family name. A surname was sometimes added, which was borrowed from some exploit or remarkable event; as in the case of Scipio Africanus. The prænomen was always placed first, and usually written with one or two letters; as M. Marcus, C. Caius, P. Publius, etc. The nomen was second; as Julius Fabius, for the Julian and Fabian clan. The cognomen came last; as Cæsar, Cicero. Thus in the name of M. Tullius Cicero, M. is the prænomen, distinguishing him from his brother Quintus; Tullius the nomen, distinguishing the clan; and the cognomen Cicero, which shows the family. Among the Celtic and German nations, each person was denoted by one word. This was also the case in the early and primitive states of society. Among the ancient Hebrews, the names of Abraham, Aaron, David, Solomon, were employed individually and singly. In the other nations which preceded European civilization, the same feature is to be observed. One word denoted one person in Egypt, Syria, and Persia.

Among the Saxons the same primitive system was prevalent not only when they were first established, but during the whole period when they held dominion in Britain. The names of Alfred, Harold, Edwin, etc., each signified a single individual. At the present day, the system of personal nomenclature is to have one name for the individual prefixed to another name which distinguishes the family to which he belongs. Probably one of the oldest methods of distinguishing different individuals of the same name was by adding their father's name to their own. Hence originated many English, German, and Danish names which end in son, sohn, and sen; for example, Williamson, Andersohn, Thorwaldsen. With feudalism new names were introduced, derived from the districts conferred on the nobles, or from the feudal relations. Another class of names are those of locality, which are either derived from places of generic names, as Hill, Dale, Cliff, etc., or from some specific place. Everywhere the nobility had family names before the commoners. But among the latter is a class of names derived from their occupation and trades; such as Smith, Miller, Fisher, Barber, etc. The number of this class is very great, and includes the names of several lost trades, or trades which have changed their names: thus we have Furbisher, Foster, Fletcher, Pargetter, Taverner, Webster, Page, Reeve, etc. Sometimes striking external peculiarities or mental qualities have given origin to names, which have descended to the posterity of those on whom they were bestowed: such are Swift, Brown, Long, White, Black, Good, Wise, and others. There are only 53 names of men which can be used without some appearance of singularity. Of these there are 25 of Hebrew origin, 19 derived from the dialects of Western Europe, 5 from the Greek, and 4 from the Latin. Out of the whole there are 12 more in use than any others: these are Charles, Edward, Francis, George, Henry, James, John, Richard, Robert, Samuel, Thomas, and William.

Nameless City, ancient Rome. This city possessed a name of much greater antiquity and of mysterious meaning, which it was death to pronounce, believed to have been Valentia, subsequently turned into the Greek Ῥώμη — Rome.

Namouna, in Persian mythology, an enchantress, born long before any other created thing, yet still as young and beautiful as ever.

Namous, the envoy and familiar minister of Mahomet in Paradise.

Namur (nä-mür′), a city of Belgium, at the confluence of the Sambre with the Meuse, 35 miles S. E. of Brussels; is noted for its cutlery, and also manufactures firearms, leather, paper, and tobacco. With the exception of the picturesque citadel (1784), the old fortifications have been razed since 1866, their place being taken by a cordon of seven forts. The town itself has suffered so much by war that it offers little of interest — the cathedral, completed in 1772, with the grave of Don John of Austria; the Jesuit Church of St. Loup (1653), a large military school, an antiquarian museum, monuments of Leopold I. and the geologist Omalius d'Halloy (1783–1875), etc. Namur was captured by Louis XIV. in 1692, but recaptured in 1695, after a 10 weeks' siege, by William III. and "my uncle Toby." Pop. (1909) 32,047.

Nana Sahib, the name under which Dundhu Panth, adopted son of the expeshwa of the Mahrattas, became known as the leader of the Indian Mutiny in 1857; born about 1825. He was the son of a Brahmin in the Deccan, and educated as a Hindu nobleman, he was bitterly disappointed that when the peshwa died in 1851 the latter's pension was not continued to himself; and, industrious in fanning discontent with the English rule, on the outbreak of the mutiny he was proclaimed peshwa, and was responsible for the massacres at Cawnpur (see India). After the suppression of the rebellion he escaped into Nepal. He died about 1860 (?).

Nanche, a town in China, province of Chekiang, 40 miles W. of Yen-chow-foo. It is neat and clean, and about 3 miles in circuit. Pop. about 200,000.

Nancrede, Charles Beylard, an American physician; born in Philadelphia, Pa., Dec. 30, 1847; was graduated at the medical department of the University of Pennsylvania in 1869; practised in Philadelphia till 1889, when he removed to Michigan; served as chief surgeon of the 3d Division, 2d Army Corps, and with the 5th Army Corps in the Santiago campaign of 1898, where he was recommended for promotion for gallantry on the field. He was author of "Principles of Surgery" (1899) and of articles in various technical publications.

Nancy (no*ng*-sē′), a town of France; capital of the department of Meurthe-et-Moselle, on the Meurthe, 220 miles E. of Paris. It comprises, besides several suburbs, the old and new towns, and contains many fine squares and imposing edifices. Here are statues of Stanislas Leszczynski (1677–1766), twice King of Poland, General Drouot, Thiers, and others, and among its noted institutions are the city hall, bishop's palace, theater, cathedral (1742), numerous churches, the 16th-century ducal palace, a university, etc. Nancy, which has grown much in importance since the German annexation of Alsace-Lorraine, has manufactures of cotton and woolen goods, artificial flowers, iron, tobacco, etc.; but its staple industry is embroidery on cambric and muslin. Dating from the 12th century, Nancy was the capital of the duchy of Lorraine. Here occurred the death of Charles the Bold (1477), and the birth of Callot and Claude Lorraine. Pop. (1906) 110,570.

Nancy Hanks, a celebrated fast-trotting mare owned in the United States. In 1892 she trotted a mile in 2.05¼, thus beating the record of "Sunol" (2.08¼). In October, 1892, she broke her own record by making a mile in 2.04. She was by "Happy Medium" by "Hambletonian" (10), dam by "Dictator," brother to "Dexter."

Nandi, in Indian mythology, the goddess of joy.

Nankeen, or **Nanking, Cloth,** a fabric made of a kind of cotton grown in China which is naturally of a buff-yellow color, and this is also the color of the cloth. The plant which yields it is a mere variety of *Gossypium herbaceum*. In the first half of the 19th century nankeen cloth was much used for ladies' and children's attire, and also for men's trousers, but now the name, when applied to certain kinds of cotton goods, is not confined to fabrics resembling genuine nankeen cloth.

Nanking, capital of the province of Kiangsu, formerly the capital of China, on the Yangtse river, 130 miles from its mouth. Its name signifies the southern capital. Since the removal of the seat of government to Peking (northern capital), in the beginning of the 15th century, the official name has been Kiangning, though the old name is preferred popularly. From 1853 to 1864 it was the capital of the Taiping rebels, who destroyed nearly all the magnificent public buildings for which the city was once famous. Previous to that time the walls enclosed an area nearly 20 miles in circumference, and reached in many places an elevation of 70 feet. The most memorable of the ruined buildings were the Porcelain Tower, the summer palace, and the tombs of the kings, with remarkable sepulchral statues. After its recapture by

the Chinese imperialists, Nanking resumed its position as the seat of the viceregal government, and an arsenal was established. In 1842 it was captured by the British. Though specified in the treaty of Tient-sin (1858) as a river port to be opened to foreign trade, little has come of this concession. Pop. (1908) est. 267,000.

Nanna, in Scandinavian mythology, wife of Balder. When the blind god slew her husband, she threw herself on his funeral pile and was burnt to death.

Nannacus, or **Nannakos,** in Greek legend, the king who predicted Deucalion's flood.

Nannarelli, Fabio (nä-nä-rel'le), an Italian poet; born in Rome, Italy, Oct. 25, 1825. His early studies were elaborate, and he held a professorship of literature at the University of Rome for years. His poetry shows the influence of classic models, particularly the collections entitled "Poems" (1853), and "New Poems" (1856). His essays and studies appear in various volumes, and his later poems include "New Lyrics" (1881). He died in Corneto Tarquinia, May, 1894.

Nanosaurus, or **Nanosaur,** a fossil lizard-like animal belonging to the group Deinosauria, discovered in North America, and about the size of a cat.

Nansen, Fridjof, a Norwegian scientist and explorer; born in Great Fröen, near Christiania, Norway, Oct. 10, 1861. At the age of 19 he entered Christiania University, giving his attention there chiefly to biological investigations, in the pursuit of which, in 1882, he made a voyage in a sealer to the North Atlantic sealing grounds, and in 1888 crossed the continent of Greenland, returning in 1889. Following 1884, he matured a plan for a polar journey, a vessel (the "Fram") was built, designed especially for encountering the drift ice, and on June 24, 1893, with a crew of 11 men, he set sail from Christiania for the polar regions — the design being to reach the North Pole by letting the ship get frozen into the ice N. of Siberia and drift with a current setting toward Greenland. They reached the New Siberian Islands in September, and in 1895 were in lat. 84° 4′. There, accompanied by Johansen, Nansen left the "Fram" in charge of his other companions and pushed across the ice to Franz-Josef Land, where he wintered. Here, on June 17, 1896, he met the Jackson-Harmsworth Expedition, with which he returned to Vardö, having in his cruise penetrated to lat. 88°, circumnavigated the Nova Zembla, Franz-Josef, and Spitzbergen archipelagoes, and reached a point about 225 miles from the Pole. One week later the "Fram" reached Vardö. He was appointed Professor of Zoölogy in the University of Christiania. He wrote: "Across Greenland"; "Esquimaux Life"; "Farthest North" (1897).

FRIDJOF NANSEN.

Nantes (n*ongt*), the 7th largest city of France, capital of the department of Loire-Inférieure, on the right bank of the tidal Loire (here 2,000 yards wide, and joined by the navigable Erdre and Sèvre-Nantaise), 35 miles from the sea, and 248 S. W. of Paris. The natural beauties of the site have been much improved by art, and, the old town having been demolished 1865–1870, Nantes is one of the handsomest cities in France, with its noble river, quays, bridges, shady boulevards, squares, and statues. The unfinished cathedral (1434–1852) contains Colomb's splendid monument (1507) to the last Duke and Duchess of Brittany, and another (1879) to General Lamoricière. The ducal castle, founded in 938, and rebuilt in 1466, was the occasional residence of Charles VIII. and most of his successors, the prison of Cardinal de Retz and Fouquet, and the place where on April 15, 1598, Henry IV. signed the famous Edict of Nantes. Other notable buildings are the splendid Church of St. Nicholas (1854), the court house (1853), the theater (1787), and the new postoffice (1884), besides a museum, a picture gallery, and a library of 50,000 volumes. Between 1831 and 1887 $900,000 was expended on harbor works, but the rise since 1845 of the port of St. Nazaire, near the mouth of the Loire, and the increasing difficulty in the navigation of the river, have combined with depression of trade to reduce the commercial importance of Nantes; to restore which is the object of the ship canal (1891) between the two places. The chief exports are hardware, cereals, and preserved provisions; the chief imports sugar, iron, cocoa, and wines. Shipbuilding also has greatly fallen off, but still is one of the leading industries, together with the preparation of sardines, and the manufacture of sugar, leather, iron, nets, soap, machinery, etc.; while 10 miles below Nantes is the vast government steam engine factory of Indret, employing from 2,000 to 3,000 hands. The Portus Namnetum of the Romans, and the former capital of Brittany — a rank it disputed with Ren-

nes — Nantes has witnessed the marriage of Anne of Brittany to Louis XII. (1499), the embarkation of the Young Pretender (1745), the "NOVADES" (*q. v.*) of the execrable Carrier, the fall of the Vendéan leader Cathélineau (1793), and the arrest of the Duchess of Berri (1832). Fouché was a native. Pop. (1906) 133,247.

Nantes, Edict of. See EDICT OF NANTES.

Nanticoke, a borough in Luzerne co., Pa.; on the Susquehanna river, and on the Lackawanna, the Central of New Jersey, and the Pennsylvania railroads; 8 miles S. W. of Wilkesbarre. It has daily and weekly newspapers, a drill factory, a planing mill, and several coal mines with an annual output of about 500,000 tons. The assessed property valuation is nearly $1,000,000. Pop. (1900) 12,116; (1910) 18,877.

Nantucket, an island, county, town, and county-seat of Massachusetts; off the coast of Cape Cod, 30 miles from the mainland. The island is about 15 miles long by ¾ of a mile wide; is triangular in shape; and with several small adjacent islands has an area of about 30 square miles. The most populous part of the town is on the N. shore of the island, about 56 miles E. of New Bedford. It contains the Nantucket Athenæum Library, a high school, Coffin Academy, waterworks, National and savings banks, gas and electric lights, and weekly newspapers. In summer a daily line of steamboats connects the island with New Bedford, Martha's Vineyard, and Wood's Holl. The equable climate and dry soil of the island make it very healthful, and a favorite summer resort. It has an assessed property valuation of nearly $3,000,000. Pop. (1900) 3,006; (1910) 2,962.

Nantucket, The, an iron, single-turreted monitor of the United States navy; displacement, 1,875 tons; horse power, 340; batteries, two 15-inch smooth-bore guns; speed, 7 knots an hour; cost, $408,091. The keel of this boat was laid in 1862.

Nantwich, a market-town of Cheshire, England, on the Weaver, 4 miles S. W. of Crewe. It has some quaint old timber houses; a fine cruciform parish church, with a central octagonal tower, 110 feet high; a Gothic town hall (1858); a market hall (1867); a grammar school (1611); and brine baths (1883). The Halen Gwyn ("white salt town") of the Welsh, Nantwich, was once the second largest town in Cheshire, the seat of 300 salt works in Leland's day, a number reduced to 100 through the discovery of better brine pits in other parts of the Weaver's valley in 1624, since which date the industry has gradually quite died out. Boot and shoe making now is the principal industry. A great fire (1583), and its siege by the royalists under Lord Byron (1644) are the chief events in its history. Pop. (1901) 7,722.

Nanuk, the founder of the Sikh religion; born near Lahore, in 1469. He taught men to worship the One Almighty Invisible God, to live virtuously, and to be tolerant of the failings of others. He died in 1539.

Nap (an abbreviation of Napoleon), a game of cards played for stakes, usually by three, four, or five players, with an ordinary pack. Five cards are dealt to each player, and each, beginning with the eldest hand, is entitled to call as many tricks as he believes he can win with the cards in his hand, making whichever suit he wishes trumps. Should he win the number of tricks he has called, he receives payment for that number from each of the other players; should he fail, he pays each for that number. To "go nap" is to declare to win the whole five tricks. "Nap" is also applied to the taking of the pool by winning all the five tricks after declaration.

Naphegi, Gabor, an American-Hungarian writer; born in Budapest, in 1824. He became a naturalized American citizen in 1868. Among his works are: "Among the Arabs" (1868); "An Album of Language" (1869); "Ghardia; or, Ninety Days in the Desert" (1871); "The Grand Review of the Dead," poems. He died in 1884.

Naphtali (Hebrew = my wrestling), the 6th son of Jacob, and the head of one of the 12 tribes. The tribe had its full share in repelling the incursions of the Canaanites during the first centuries of the conquest, but disappears from history when Tiglath-pileser overran the N. of Israel and bore away the whole of the population to Assyria. Under the title of Galilee the district occupied by the tribe became in New Testament times more famous than it had ever been before.

Naphtha, a word derived from the Persian word *nafata,* "to exude," and originally applied to liquid hydrocarbons which exude from the ground in the neighborhood of the Caspian Sea. It was applied also to the natural oils found more or less plentifully in nearly all countries of the world, and to the oil distilled from Boghead mineral in Scotland. But the inconvenience and danger of classing all these oils indiscriminately as naphthas became apparent after the Scotch paraffin and the American petroleum refined oils began to be used for domestic illumination. The word naphtha is still used in a very general and vague sense, and has no specific application either scientifically or commercially to any particular liquid; but since the more general application of the words paraffin and petroleum to mineral oils the sense in which the word naphtha is used has been narrowed

considerably. A wise distinction is now made between the heavier and safe hydrocarbon oils on the one hand, and the volatile and unsafe hydrocarbon spirits or naphthas on the other.

Commercially, naphtha is now understood to apply to the inflammable distillates of crude mineral oils and coal-tar. For trade convenience the volatile distillates of petroleum and shale oil are known respectively as petroleum spirit and shale spirit, to distinguish each from the other, and both from coal-tar naphtha. The term naphtha also embraces distillates of india-rubber, bones, peat, and wood, the last of these being known as wood spirit or methyl alcohol.

Petroleum spirit is obtained from crude petroleum in the process of refinement by distillation. The first or lightest portion of the oil which passes over from the still being highly inflammable, is not allowed to mix with the burning oil, but is run into a separate or naphtha tank. American crude petroleum yields from 15 to 20 per cent. of crude naphtha, which in some of the refineries is separated into gasoline, sp. gr. .640 to .650; benzine, sp. gr. .670 to .710; and benzoline or deodorized spirit, sp. gr. .710 to .730. Russian crude petroleum yields a comparatively small proportion of naphtha, about 5 or 6 per cent., which is separated into light benzine and heavy benzine, varying in sp. gr. from .730 to .775. Shale spirit is a product of the crude oil distilled from shale, which is one of the important mining and chemical industries of Scotland. This crude oil contains 4 to 5 per cent. of naphtha, having a sp. gr. of .715 to .740; but some of the shale oil works produce a small quantity of gasoline with a sp. gr. of .640 to .680. Coal-tar naphtha is distilled from the tar obtained from coal in gas works. The production of tar is 10 to 12 gallons per ton of coal put through the retorts. This tar on distillation yields from 5 to 20 per cent. of naphtha, according to the quality of coal used. Gas-tar from Newcastle coal gives only 5 per cent. of naphtha, while the tar from some cannel coals yields as much as 20 per cent. Coal-tar naphtha has a sp. gr. varying from .850 to .950, and is thus much heavier than the naphthas obtained from crude mineral oils. Coal-tar naphtha may be fractionated into a variety of hydrocarbons with boiling points ranging from 175° to 350°; but the two of the greatest commercial importance are benzole and ordinary naphtha. Caoutchine is a naphtha obtained by the destructive distillation of caoutchouc or india-rubber. It also may be fractionated into a number of hydrocarbons of different densities and boiling points. Bone naphtha is obtained by the distillation of bones in the manufacture of animal charcoal. It is known also as bone oil, or Dippel's animal oil. Owing to some neutral or nitrogenous substance as yet unknown, it possesses a peculiarly offensive smell, and till some easy means is discovered of removing this very objectionable feature, bone oil can never become of much use as a naphtha. The crude naphthas obtained from these various sources are all refined or purified by similar processes — viz., simple redistillation by means of steam, as in America, for the lightest fractions; but for the heavier spirits a treatment with sulphuric acid and then with caustic soda, and a subsequent washing with water are necessary previous to redistillation.

The uses to which in the industrial arts the different qualities of naphtha are applied are very numerous. The lighter spirits, such as benzole and benzine, being solvents of grease and oil, are used for detergent purposes. Benzoline was for some years burned pretty generally by the poorer classes in cheap benzoline or sponge lamps; but its use in this way has happily been greatly restricted, if not quite superseded, by the low price at which petroleum and paraffin oils have for some years been obtainable. The light naphthas are also used for extracting the perfumes of flowers and plants, and the oil from various seeds. Gasoline is employed exclusively for carburetting air-gas. The bulk of the coal-tar naphtha, and much of the shale and petroleum spirit, are employed as solvents in the manufacture of india-rubber and gutta-percha goods. They are also solvents of wax, and fatty and resinous bodies generally, and are so used in refining the best qualities of paraffin wax. Large quantities are consumed in naphtha, torch, and other flaring lamps for outside use. They are also used as a substitute for turpentine in the preparation of paints; and in Scotland the solvent action of shale spirit is turned to account in the preparation of an anti-damp or stone and timber-preserving fluid called alexinoton. A considerable percentage of paraffin wax is dissolved and held in solution by the spirit; and if this liquid be applied to freestone, brick, or wood, it passes into the pores of the material, and the spirit rapidly evaporating leaves the wax permanently in the stone or wood, so that water cannot be absorbed by it. While for these various purposes all the naphthas produced in Great Britain find a ready market in America, and Russia petroleum spirit is made in such quantities that it is impossible to find profitable outlets for it all; and though large quantities in many petroleum refineries are consumed as fuel under the stills, yet much of the crude naphtha has to be burned in waste pits to get rid of it.

Naphthalene, in chemistry, $C_{10}H_8 = C_{10}H_7H$, naphthalin, or naphthaline. A frequent product of the dry distillation of organic substances, occurring to a considerable extent in that portion of coal-tar distilling between 180° and 220°, from which it crystallizes on cooling. It forms colorless shining, leafy crystals of peculiar odor and burning taste; melts at 79° to a liquid as clear as water; boils at 216°–220°, and burns, when inflamed, with a highly luminous but smoky flame. Its sp. gr. is .977 at the fusing point, and its vapor density = 4.53. It is insoluble in water, but dissolves readily in alcohol, ether, chloroform, carbon disulphide, benzine, and fixed and volatile oils. Naphthalene unites directly with chlorine and bromine, forming a large number of substitution products. On passing dry chlorine gas into naphthalene, a heavy pale yellow oil is formed (naphthalene dichloride, $C_{10}H_8Cl_2$), and this, uniting with more chlorine, is converted into a crystalline substance (naphthalene tetrachloride, $C_{10}H_8Cl_4$), which melts at 182°. Monochlor-naphthalene, $C_{10}H_7Cl$, obtained by heating naphthalene dichloride with alcoholic potash, is a colorless oil, boiling at 263°. Dichlor-naphthalene $C_{10}H_6Cl_2$, is prepared by boiling naphthalene tetrachloride with alcoholic potash. It is a crystalline mass, melting at 35°–36°, and boiling at 280°. The substitution products with bromine are far less stable than those of chlorine.

Naphthyl, a hydrocarbon obtained, together with other products, by heating naphthalene with a mixture of manganese dioxide and sulphuric acid diluted with twice its weight of water. Naphthol, or naphthyl alcohol, is a derivative of naphthyl. Dinitronaphthol is produced from naphthol, and is one of the most beautiful and permanent of yellow dyes, coloring silk and wool in all shades from light lemon to deep gold-yellow.

Napier, Sir Charles, an English naval officer; born near Falkirk, England, March 6, 1786. He entered the navy as midshipman in 1799, was promoted lieutenant in 1805, and sent to the West Indies, where he served in the operations against the French. He was promoted commander by Admiral Cochrane in August, 1809, and in 1811 was employed in Portugal and along the coast of S. Italy. In 1813 he was attached to the North American squadron, and in August of the following year he led the expedition up the Potomac river. At the conclusion of the war he was made a C. B. In 1833 he accepted the command of the Portuguese constitutional fleet, and effected the establishment of Donna Maria on the throne. Returning to England, he was appointed in 1839 to the command of the "Powerful," and ordered to the Mediterranean, where, on the outbreak of the war between Mehemet Ali and the Porte, and the coöperation of Great Britain with Russia and Austria on behalf of the latter power, Sir Charles Napier performed some of his most gallant exploits, including the storming of Sidon and the capture of Acre. Having blockaded Alexandria, he concluded on his own responsibility a convention with Mehemet Ali, by which the latter and his family were guaranteed in the hereditary sovereignty of Egypt on resigning all claim to Syria. On his return to England he was created K. C. B. In 1841 he was elected member for Marylebone. In 1847 he received the command of the Channel fleet as rear-admiral; and in 1854, on the commencement of the Russian war, he was nominated to the command of the Baltic fleet, being now a rear-admiral. In this capacity he accomplished little beyond the capture of Bomarsund. He sat in Parliament as member for Southwark from 1855 till his death. He published a series of Letters to Lord Melville on the State of the Navy; an account of the War in Portugal and of the War in Syria; and numerous contributions to the "United Service Magazine." He died Nov. 6, 1860.

Napier, Sir Charles James, a British military officer; born in London, England, Aug. 10, 1782. He entered the army in 1794, and served in Ireland and Portugal, being present at Corunna, where he was wounded and taken prisoner in 1809. In 1811, when again at liberty, he returned to the Peninsula, and served through the war, being severely wounded in several battles. In 1812 he was made lieutenant-colonel, and in the following year served in the expedition to the Chesapeake. He missed the battle of Waterloo, which took place three days before he reached the scene of action. On the peace a period of inactivity ensued, varied only by his appointment as governor of the island of Cephalonia, and by a short command of the military district of the N. of England. In 1837 he was made Major-General; in 1838 K. C. B. In 1841 he was appointed to the chief command in the presidency of Bombay, with the rank of Major-General, and was shortly afterward called to Scinde. Here he gained the splendid victories of Meanee and Haidarabad, and was afterward made governor of Scinde, which he administered till 1847. He had quarreled with the directors of the East India Company, but during a panic caused by the want of anticipated success in the war with the Sikhs in 1849 his services were again required, and he sailed once more for the East, as Commander-in-Chief of all the forces in India. Before he arrived Lord Gough had brought the Sikh war to a triumphant termination, and no special work remained for Sir Charles Napier to per-

form. Having returned to England, he died in Portsmouth, Aug. 29, 1853.

Napier, Henry Edward, an English naval officer and historian, brother of Sir C. J. Napier; born March 5, 1789. His best-known work is "Florentine History from the Earliest Authentic Records" (1847). He died Oct. 13, 1853.

Napier, John, a Scotch mathematician; born in Merchiston, near Edinburgh, Scotland, in 1550. He was educated at St. Andrews, traveled on the Continent, and ultimately settled down at the family seats of Merchiston, near Edinburgh, and Gartness, in Stirlingshire, as a recluse student. In 1614 he published his book of logarithms ("Logarithmorum Canonis Descriptio"; Edinburgh, 4to). The invention was very soon known over all Europe, and was everywhere hailed with admiration by men of science. Napier followed it up, in 1617, by publishing a small treatise, giving an account of a method of performing the operations of multiplication and division by means of a number of small rods (see NAPIER'S BONES). He died in Merchiston, April 4, 1617.

Napier, Robert, Lord, an English military officer; born in Ceylon, Dec. 6, 1810. He entered the Indian army in 1826, and served with distinction in the campaigns of the Sutlej and the Punjab. In 1854, he was appointed Chief Engineer of Bengal, and planned the operations at the siege of Lucknow in 1857. He also served with high credit as second in command in the war with China, receiving general rank, the Grand Cross of the Bath, and a military membership of the Indian Council therefor. In 1865, Sir Robert was made Commander-in-Chief of the British army sent out to Abyssinia for the rescue of the English captives, held there by its semi-barbarous ruler, King Theodore. After successfully accomplishing his mission, Sir Robert was raised to the peerage as Lord Napier, of Magdala, and also made a Knight Grand Cross of the Star of India. In 1869, he was appointed Commander-in-Chief of the British Indian army; and governor of Gibraltar in 1876. He died in London, England, Jan. 14, 1890.

Napier, Macvey, a Scotch editor and author; born in Glasgow, Scotland, April 11, 1776. He was educated there and in Edinburgh, and in 1799 became a writer to the Signet, in 1805 Signet librarian (which post he retained till 1837), and in 1824 first Professor of Conveyancing. He edited the supplement to the 7th edition of the "Encyclopædia Britannica" (6 vols. 1816-1824), and in 1829 succeeded Jeffrey as editor of the "EDINBURGH REVIEW" (*q. v.*). He published "Correspondence" (1879). He died in Edinburgh, Feb. 11, 1847.

Napier, Sir William Francis Patrick, a British military officer, brother of Sir. C. J. Napier; born near Dublin, Ireland, Dec. 17, 1785. At the age of 14 he entered the army, served at the siege of Copenhagen, and with his brothers Charles and George took a distinguished part in the Peninsular campaigns, became lieutenant-colonel in 1813, and colonel in 1830. Some years after the conclusion of peace he commenced his celebrated "History of the Peninsular War" (1828–1840). In 1841 Colonel Napier was advanced to the rank of Major-General; he was appointed lieutenant-governor of Guernsey the following year, and in 1848 created a K. C. B. He also wrote "History of the Conquest of Scinde"; "History of the Administration of Scinde"; "Life of Sir Charles James Napier," etc. He died in London, England, Feb. 10, 1860.

Napier's Bones, or **Napier's Rods,** a set of rods contrived by Baron Napier, and first described by him in 1617, for the purpose of facilitating the numerical operations of multiplication and division. They consist of pieces of bone, or ivory, in the shape of a parallelopipedon, about three inches long and three-tenths of an inch in width, the faces of each being divided into squares, which are again subdivided on 10 of the rods by diagonals into triangles, except the squares at the upper ends of the rods. These spaces are numbered as shown in the diagram. To show the manner of performing multiplication by means of the rods, let it be required to multiply 5978 by 937. Select the proper rods, and dispose them in such a manner that the numbers at the top shall exhibit the multiplicand, and on the left of these rods place the rod of units. In the rod of units seek the right hand figure of the multiplier, which, in this case, is 7, and the numbers corresponding to it on the other rods. Beginning on the left add the digits in each parallelogram, formed by triangles of adjacent rods, and write them down as in ordinary multiplication; then take the sum of the several products as in ordinary multiplication, and it will be the product required. From the outermost triangle on the line with 7, write out the number there found, 6; in the next parallelogram on the left add 9 and 5 there found; their sum being 14, set down the 4 and carry the 1 to be added to 3, and 4 found in the next parallelogram on the left; this sum being 8, set it down; in the next parallelogram on the left occur the numbers 5 and 6, their sum being 11, set down 1, and carry 1 to tne next number on the left; the number 3 found in the triangle on the left of the row, increased by 1, gives 4, which set down; proceed in like manner, till all of the partial products are found, and take

41846
17934
53802
5601386

their sum as in the example. See NAPIER, JOHN.

Naples, formerly a separate European State, but since 1860 incorporated with the kingdom of Italy. It formed a political and administrative division of the kingdom of the Two Sicilies, comprising the continental portion of that State. It occupied the S. part of the Italian peninsula, being bounded on the N. by the (former) Pontifical States and Terra di Lavoro; on the E. by the Adriatic, on the S. and W. by the Mediterranean. The coasts are high and bold, especially on the W. coast, and deeply indented. The interior may be generally characterized as mountainous, being traversed by the Apennines. Several of the loftiest summits of the latter are situated in Naples: Monte Corno, or Gran Sasso d'Italia, the culminating point of the whole range, is 9,541 feet; Majella, 9,131 feet; and Mount Velino, 8,174 feet. Toward the coast, both on its E. and W. side, the hills disappear, and are succeeded by extensive plains. The chief isolated mountains are the volcano of Vesuvius and Mount Gargano, near the Adriatic. The rivers are numerous, the principal being the Vomano, Pescaro, Sangro, Trigno, Biferno, Fortore, Candelaro, Cervaro, Carapella, and the Ofanto, flowing into the Adriatic; and the Garigliano, Volturno, Sele, Basento, and Bredano, flowing into the Mediterranean. The only large lake (Fucino) was drained in 1862.

The climate is divided into three regions; in the lower region the temperature is so mild that vegetation is never interrupted; in the middle region snow occasionally falls, but does not usually lie long; in the upper regions of the Abruzzi cold is sometimes severe and protracted; snow lies on Mount Corno nine months in the year. The flora has, in addition to the plants common to Italy, several tropical products, including cotton, the sugar cane, pistachio, and dates. The wolf, wild boar, porcupine, and game of all kinds abound in the forests; the coasts have always been celebrated for fish, and the domestic animals comprise sheep, goats, mules, pigs, etc. Wheat, barley, maize, and rye are the principal crops, and the mulberry and olive are extensively cultivated. Cotton, lint, hemp, licorice, and tobacco are leading crops in some districts, and many varieties of fruit, especially figs, lemons, and oranges, are very abundant. The wines of this region are the best in Italy. The celebrated Lacrimæ Christi, a red wine, is grown in vineyards on the slopes of Vesuvius. The minerals have not been properly explored; there are few indications of metals, but beds of rock salt are found, chiefly in Calabria; sulphur in the volcanic region, and alum and saltpeter in several districts. The quarries furnish excellent marble and lava, which are extensively used both for building and pavement. Manufactures are numerous but unimportant; the chief are silks, linens, and woolens at Naples, Soro, and Isola; and glass, cutlery, and paper to a small extent. Commerce is mostly confined to the capital. The chief exports are silk, hemp, wool, olive oil, wine, grain, macaroni, and coral; imports, colonial and manufactured goods, iron, and cutlery.

History.—Continental Naples corresponds nearly in its N. part to Campania and Samnium, and in its S. part to Apulia, Lucania, Messapia, and the territory of the Bruttii. The last four were often comprehended under the name of Magna Græcia, given to them because long occupied, if not originally peopled, by colonies from Greece. The frugal lives and independent and warlike spirit of the natives have been celebrated by classic historians and poets; but their resistance to Rome proved ineffectual, and shortly after the defeat of Pyrrhus they were annexed to the Roman republic. On the breaking up of the Roman empire the country was overrun by hordes of barbarians, and passed successively under the domination of Goths, Lombards, Arabs, and Normans. In more modern times, also, it has been subjected to numerous vicissitudes. In the early part of the 16th century it came into the possession of Spain, which retained it for nearly two centuries and governed it by viceroys. In 1734 it was erected into an independent monarchy in favor of the Infante Don Carlos, or, as he is sometimes called, Charles of Bourbon. His reign was not without vigor, and much good was done; but on his accession to the throne of Spain in 1759 he was succeeded by his son Ferdinand IV., then only in his eighth year. A regency was accordingly established, and the nation experienced all the evils of a long minority. The king himself, indeed, even after he became major, showed little inclination to exercise his rights; and the Marchese Tanucci, who had long been at the head of the regency, continued virtually sovereign. Ferdinand, though not devoid of natural talents, gave himself up to the pleasures of the table and the chase, pursuing a course which, to say the least of it, was very unkingly. His queen was animated by a very different spirit; and having succeeded in obtaining Tanucci's dismissal, took the reins into her own hand, and managed them with great talent, though too often in a capricious, tyrannical, and vindictive spirit.

The French Revolution now broke out, and extending its influence in all directions, ultimately established its ascendancy even in Naples. The king, who had at first shown symptoms of reviving spirit, soon relapsed into pusillanimity, and fled across the straits, leaving his Neapolitan subjects to their fate. Strange to say, the strongest

resistance which the enemy experienced proceeded from a quarter where it might least have been expected. When the court and the greater part of the nobility had fled, and the great body of the upper and middle classes were either treacherous or cowardly, the lazzaroni of Naples, composed of the very dregs of society, homeless wretches who could neither gain nor lose by political changes, raised the patriotic standard, and fought like heroes, or rather demons, for, as may be supposed, the atrocities of the warfare were hideous. Napoleon ultimately succeeded in placing first his brother Joseph, and on Joseph's removal to Spain, his brother-in-law Murat, on the throne of Naples. During Napoleon's reverses Murat sought to secure his crown by abandoning him, but by subsequent proceedings forfeited both the crown and his life. Ferdinand regained his throne, and made many liberal promises which were not fulfilled. His successor Francis II. continued the abuses of the old régime. The discontent of his subjects broke out in 1860, on the arrival of Garibaldi, in universal rebellion. The king was deposed, and Naples declared part of the kingdom of Italy Dec. 17, 1860.

Naples, a city in Italy, formerly capital of the kingdom and now of the province of same name, on the W. coast, 117 miles S. E. of Rome, magnificently situated on the N. side of a nearly semicircular bay, partly stretching along the shore and partly climbing the adjacent heights, bounded on the W. by the picturesque heights of Posilipo, and on the E. by the lofty mass of Vesuvius, while the surrounding country is rich in natural beauty and in historic interest. The best distant view of Naples is obtained in approaching it from the sea. A fine view is also obtained from the heights to the W. of the city. Naples has three chief forts or castles, no longer serving as defense works — St. Elmo, the largest, occupying a hill on the W. side; Castello Nuovo, quite close to the sea; and Castello dell' Ovo, on a rocky islet connected by a jetty with the land. The city is divided into two unequal parts by a steep ridge extending from the castle of St. Elmo to the islet surmounted by the Castello dell' Ovo. Immediately adjoining the Castello Nuovo is the arsenal and the military or government harbor, having a breakwater on the S. and the mercantile harbor on the N. The mass of buildings of which the city mainly consists covers an irregular area, the length of which, from N. E. to S. W. is about 3 miles; the breadth from E. to W. about 2 miles. By including the suburbs, which encroach so closely on the town that they can hardly be distinguished from it, this area will be greatly extended, especially along the shores of the bay. Of the gates, some of which are now near the center of the city, that of Capua, with reliefs by Benedetto da Majano, is the only one deserving of notice.

Naples

The city is now well supplied with water. The streets are tolerably regular, generally clean, and admirably paved with square blocks of lava, exactly fitted together, but are for the most part narrow in fact, and still narrower in appearance, both from the number of booths and other obstructions which are allowed to encumber them, and from the general construction of the houses. These are large, substantial, and lofty, averaging not less than five or six stories. The roofs are flat, and by the number of plants crowded upon them converted into a kind of domestic shrubberies to which the inmates often resort to enjoy the breeze. Though generally displaying little architectural taste, the houses are abundantly provided with balconies and other projections, crowded, like the roofs, with plants and shrubs, and attended with the worse effect of excluding both light and air. The best street is the Toledo, now Via di Roma, which runs S. in a straight line from the Piazza Dante, a small square on the N., and terminates at the royal palace, not far from the shore. Under other names it is continued N., to terminate at the royal palace of Capodimonte, overlooking the city. It forms the principal thoroughfare, but both in its buildings and its shops, is far inferior to the leading streets of most European capitals. The squares are numerous, though generally of small dimensions, irregular in form, and lined by buildings in which uniformity of design appears to have been altogether forgotten. The largest and most handsome is the Piazza del Plebiscito, or Largo del Palazzo, abutting on which are the royal palace, the commandant's residence, and the modern Church of St. Francesco di Paolo, in imitation of the Pantheon at Rome. Other squares are the Piazza del Municipio and the Piazza del Mercato or market place. Many fountains, well supplied with excellent water, and often ambitiously but not very tastefully ornamented, are scattered over the different quarters of the city; and there are fine promenades along the shore, many improvements here having been carried out in recent years. The chief of these promenades is the Riviera di Chiaja and Villa Nazionale gardens adjoining, the latter fine pleasure grounds with an esplanade in front. This promenade is of great length, is adorned with numerous marble statues, and on fine evenings is crowded with equipages.

The W. part of Naples, which has the Chiaja on its sea front, is the modern and fashionable quarter; it has a superior position, and commands fine views. The chief street and line of communication here is the Corso Vittorio Emanuele. The city is traversed in various directions by tramways. The public edifices of Naples are

Naples

not very remarkable and suffer much in the estimation of strangers who have come from the N. of the peninsula from being contrasted with much more noble structures. The most deserving of notice is the cathedral, a large Gothic building erected on the site of two temples dedicated to Neptune and Apollo, from the ruins of which it probably derived its numerous granite pillars and ancient marbles. The present building dates from 1272, and is held in high veneration in consequence of possessing the relics of St. Januarius or Gennaro; among others, the phial of his blood which is miraculously liquefied on certain occasions. Other buildings include the Church of San Domenico Maggiore, one of the finest in Naples, in the Gothic style, 249 feet long, with 27 chapels, 12 altars, and numerous fine monuments; the Church of S. Francesco di Paolo, a handsome edifice, internally faced with marble; the Churches of Sta. Chiara, St. Martin, St. Lorenzo, San Severo, St. Philip Neri, and other churches, to the number in all of about 350, several of them of architectural merit and almost all of them richly decorated; the Palazzo Reale (Royal Palace), an immense building of three stories, each of a different order of architecture, only partially completed according to the original design, but richly fitted up, and adorned with good paintings; the palace of Capodimonte, on an eminence outside the town on the N., formerly the usual summer residence of the kings, and commanding magnificent views, containing a collection of modern paintings and sculptures, the former chiefly by Neapolitan painters, and surrounded by beautiful gardens; the old palace, where the courts of justice now hold their sittings; the Palazzo dei Pubblici Studj, originally built for the university, and occupied by it till 1790, but now converted into the Museo Nazionale, a museum of which any nation might be proud, containing not only a valuable library of 360,000 volumes, and many rare MSS., but also the Farnese collection of paintings and sculptures from Rome and Parma, and an unequaled collection of gems, bronzes, vases, etc., chiefly obtained from the excavations of Pompeii and Herculaneum; numerous theaters, of which that of San Carlo is remarkable for its magnificence, and is one of the largest in existence; and the Municipio, or town hall, a handsome building.

The principal educational establishments are the university, which, since its removal from the Palazzo dei Studj, occupies the buildings of the Jesuits' College, and is attended by several thousand students; two royal lyceums, college of medicine and surgery, the military, navigation, veterinary, agricultural, technical, engineering, theological, normal, and other schools, male and female, a well-known conservatory of music, etc. Among literary and scientific institutions are a royal society of arts, science, and antiquities, an observatory, a botanical garden, a zoölogical station with marine aquarium and laboratory, several large libraries, besides that of the Museo Nazionale. The benevolent endowments include several large hospitals, particularly the general hospital, the foundling hospital, the Reclusorio or Albergo dei Poveri, an orphan asylum and house of refuge for the poor, on a very extensive scale; a deaf and dumb institute, etc.

The manufactures are much more numerous than important. At the head of them stands that of macaroni and vermicelli, constituting the principal food of the great body of the people. The other leading articles are silk, cotton, woolen and mixed goods, pottery and porcelain, tobacco and cigars, castings and machinery, gloves, soap, carriages, violins and other musical instruments, hats, leather, chemicals, perfumes, articles in coral and lava, cameos, etc. Notwithstanding the large extent of the bay, the actual harbor is of small dimensions, but new works have been carried out to better accommodate the extensive trade. In 1900 the value of goods imported was about £4,784,000; exports, £2,403,000. The exports consist chiefly of wine, olive oil, perfumery and chemicals, hemp and flax, cattle, gloves, macaroni, etc. The chief imports are cereals, cotton and cotton goods, metals, sugar, coffee, fish, etc. The environs, apart from their surpassing beauty of scenery, are extremely interesting. The locality embracing the tomb of Vergil, the excavated cities of Herculaneum and Pompeii, the grotto of Posilipo, remains of Roman temples, villas, palaces, and tombs, together with the volcano of Vesuvius, possesses an inexhaustible source of interest to the scientific antiquarian and classical investigator. The modern villas are splendid and luxurious. One of the most peculiar features of the city is its unique population, and the universal publicity in which life is passed. The inhabitants swarm incessantly in the thoroughfares, where throngs of sellers, buyers, and idlers intermingle with asses, mules, hand carts, and vehicles, dazzling the eye with their brilliant variety of costume, and the expressiveness of their frantic gestures and attitudes, while the ear is stunned by the shrill cries of the itinerant dealers, the songs of the improvisatore, and the high-pitched patois of the seething crowds. The Marinella, an open beach fronting the E. part of the city, was formerly the abode of the lazzaroni, a class which has now lost its distinctive features, the term being now generally applied to the fishermen.

Naples was founded many centuries before the Christian era by a colony of Greeks who had settled at Cumæ. It took the

name of Neapolis (New City) as opposed to the older Greek city of Parthenope adjoining, and is said to have retained strong traces of its Grecian origin to a late period of the Roman empire. It was indebted to the Emperors Hadrian and Constantine the Great for numerous embellishments, and became a luxurious retreat to which many of the wealthier Romans were accustomed to resort. In 536 it was pillaged by Belisarius, and a few years after, when it had been rebuilt, the same disasters again befell it at the hands of Totila (542). It was afterward successively under the sway of the Normans, the Emperors of Germany, and the Kings of France and Spain. Under the latter it became the capital of an independent kingdom, but having been brought within the vortex of the French Revolution, was handed over by Napoleon, first to his brother Joseph, and then to his brother-in-law Murat. The Congress of Vienna having restored the legitimate sovereignty, Naples received back its former masters. After a long period of misrule they were ejected by Garibaldi in 1860, and Naples was then incorporated into the kingdom of Italy. Under the new régime much has been done to improve the city both in sanitary and in other respects. Pop. (Jan. 1, 1909) 596,000.

Naples, Bay of (the ancient Crater Sinus), an arm of the Mediterranean, on the W. coast of Italy, extending for about 35 miles from the Capo di Miseno, its N. W. boundary, to the Punta della Campanella, its S. E. limit. It is separated from the open sea by the islands of Procida, Ischia, and Capri. Its shores have for ages been the scene of powerful volcanic agency, and the scenery has long been celebrated for its beauty and grandeur. Mount Vesuvius is the most striking and distinctive feature.

Napoleon Bonaparte, or **Napoleon I.,** Emperor of the French; born in Ajaccio, capital of the island of Corsica, Aug. 15, 1769; was the son of Charles Marie Bonaparte, an advocate of considerable reputation, and of Letizia Ramolino, a woman of rare intelligence and personal charms. (See BONAPARTE.) In his 10th year he was sent to the military school of Brienne, where he remained till 1784. The celebrated Pichegru was one of his teachers. His school companions regarded him as taciturn and morose; but as he was a Corsican, speaking very little French, and poor as well as proud, his conduct is doubtless to be ascribed as much to his circumstances as to his temperament. Toward those who, like Bourrienne, showed him sympathy, he was susceptible of strong and lasting attachments. We learn from the annual report of the school that he "distinguished himself in mathematics, was tolerably versed in history and geography, weak in Latin, general literature, and other accomplishments; of regular habits, well behaved and studious, and enjoying excellent health." His favorite author was Plutarch, whose romantic biographies are so captivating to the imagination of youth. In October, 1784, he repaired to the military school at Paris to complete his studies for the army; and in September, 1785, received his commission as 2d lieutenant in the artillery regiment of La Fère. Soon afterward he was promoted to be 1st lieutenant in the regiment of Grenoble, then stationed at Valence. While here he devoted some attention to literature, gaining the prize offered by the Lyons Academy for an essay, "What Are the Principles and the Institutions Necessary to Make Men Happy?" He had the intention of describing an excursion he made to Mount Cenis in the style of Sterne's "Sentimental Journey," then much in vogue on the Continent. A much more suitable task was a "History of Corsica," which he began and communicated to Paoli, then living in exile in London.

Meantime the Revolution was rapidly developing itself. Many of Napoleon's fellow officers at Valence openly took part with the royalists; he, however, took the popular side, but in a quiet and undemonstrative way, as he had scant liking for the loud enthusiasm of ungovernable mobs. On Feb. 6, 1792, he became captain of artillery by seniority, and being in Paris the same year he witnessed the insurrections of June 20 and Aug. 10. He was accompanied by his friend and biographer Bourrienne, who relates that on one of these occasions, when Napoleon saw the mob break into the Tuileries, and force the king to don the red cap, he exclaimed, "It is all over with that poor man! A few discharges of grape would have sent all those despicable wretches fleeing!" Soon after he left for Corsica, where General Paoli then held the chief command. The excesses of the Septembrists and Terrorists, however, induced Paoli to break with the Convention and seek the assistance of England. This brought him into conflict with Napoleon, who adhered to the Convention, which so exasperated the Corsicans against him that after a few skirmishes he was driven from the island along with his whole family. He made a short stay at Marseilles, where he published a small pamphlet, "Le Souper de Beaucaire," Republican in sentiment, it is true, but not Jacobinical, as has been asserted; he then set out for Paris, where he spent a part of the summer of 1793; and in September of that year he was sent, with the commission of lieutenant-colonel of artillery, to assist in the reduction of Toulon, then in the hands of the English. The place was captured (Dec. 19) entirely through his strategic genius; and in the following February he was made a brigadier-general of artillery. Later in the year he was sent to

Genoa to examine the state of the defenses of that city and to ascertain the political disposition of its inhabitants.

In the beginning of 1795 he was again in Paris in search of employment, but in spite of his known abilities he was not at first successful. In his letters to his brother Joseph, written about this time, he complains of poverty and ennui, and seems to have thought of offering his services to the Sultan of Turkey. On the 13th Vendémiaire IV. (Oct. 4, 1795), when the sections of Paris rose against the Convention, Napoleon was made commander of the 5,000 troops provided for its defense, on the suggestion of Barras. He had only a night to make arrangements for the dispersion of the populace. On the morning of the 5th, when the National Guards, as the defenders of the sections were called, advanced to the number of 30,000 along the quays of the Seine, the Rue St. Honoré, and the other approaches to the Tuileries, they found every point securely guarded. To their feeble musketry fire Napoleon replied by murderous discharges of grape. In less than an hour of actual fighting victory was secured for the Convention, which recognized the value of the young victor's services by appointing him to the command of the Army of the Interior. About this time he made the acquaintance of the graceful, amiable, and accomplished Josephine Beauharnais, who made such an impression on him that he proposed marriage to her and was accepted. The ceremony took place March 9, 1796, and in less than a week after he had to depart to assume the command of the army of Italy, which for three or four years had been carrying on a desultory warfare against the Sardinians and the Austrians amidst the defiles of the Alps and the Ligurian Apennines. His army consisted of only 40,000 men, and even those were badly fed and clothed, while the allies could oppose him with a well-appointed force of about double that number. In the end of March he set out from Nice and came up with the allies at Montenotte, and inflicted on them a crushing defeat (April 11). This victory separated the Sardinian from the Austrian army, and Napoleon, determined to crush them in detail, pursued the former and beat them at Millesimo (13th and 14th), and then fell on the latter at Dego (14th and 15th).

This opened up for him both the route to Turin and to Milan. Napoleon lost no time; the Sardinians, who were retiring upon Turin, were overtaken and crushed at Mondovi (22d), which compelled them to sue for peace; and the Austrians, who were falling back on Milan, were signally defeated at the battle of Lodi (May 10). On the 15th he entered Milan, where heavy contributions were levied on the State, and the principal works of art were seized and sent

Napoleon Bonaparte

to Paris. Naples, Modena, and Parma hastened to conclude a peace; the Pope was compelled to sign an armistice; and the whole of Northern Italy was in the hands of the French. Mantua was the next object of attack. Wurmser, at the head of large Austrian reinforcements, advanced through the Tyrol to its defense; he was defeated at Castiglione Aug. 5, and again at Bassano, Sept. 8, which compelled him to take refuge behind the walls of Mantua. Not yet disheartened, Austria sent a third army in two divisions under Marshal Alvinczy and General Davidovich. This for a while held the French in check; but on Nov. 15 a battle was fought at Arcole, which, after three days of hard fighting, gave the victory again to the French, and decided the result of the campaign. In January, 1797, Alvinczy opened a fresh campaign by advancing at the head of 50,000 troops from Roveredo to the relief of Mantua, but was completely routed by Napoleon on the 14th at Rivoli; and on Feb. 2 Wurmser was compelled by famine to surrender at Mantua. On the same day Napoleon put an end to the armistice with the Pope, and invaded the States of the Church, beat the papal troops on the Senio, and took in quick succession the towns of Faenza, Ancona, Loretto, and Tolentino. On the 19th the Pope was compelled to conclude a peace by which he surrendered Avignon, Bologna, Ferrara, and the Romagna to France. Meanwhile the Austrians were preparing for another descent on Italy under the Archduke Charles, and Napoleon determined to anticipate them before they could be joined by reinforcements from the Rhine. He entered the Tyrol, driving the archduke before him, and had reached Judenberg, but a few days' march from Vienna, when an armistice was accepted (April 7), and preliminaries were signed on the 18th at Leoben by which Austria gave up her territories in the Netherlands and Lombardy to France and received in return the province of Venetia. This closed the great Italian campaigns, in which Napoleon, in ingenuity of plan, celerity of movement, and audacity in assault, far outshone all his antagonists. It is but fair to him to add that while in the main he made little scruples in carrying out the rapacious orders of the Directory, he does not appear to have appropriated anything to himself.

In December, 1797, Napoleon returned to Paris; the enthusiasm of the Parisians was immense, and the festivals in his honor innumerable. About this time the Directory seems to have had the intention of invading England, and had brought an army together for that purpose. The command was conferred on Napoleon, who at first professed to favor the design, but who well knew its impracticability. It has been thought by many that this proposal was merely a feint

to cover the real design of the Directory, namely, the invasion of Egypt, as a preliminary step to the conquest of British India. By May 10 an army of 36,000 men was collected and embarked at Toulon in a fleet commanded by Brueys. A body of scientific and artistic explorers accompanied it. On June 9 the French landed at Malta, and the next day took possession of the island, in which they left a garrison. Ten days after the fleet resumed its voyage, reaching Alexandria on July 1, which being taken, Napoleon and the army advanced on Cairo. Here they encountered a large body of Mamelukes, under Mourad Bey, which, after a long and sanguinary struggle, known as the battle of the Pyramids, was repulsed. Many of the surrounding tribes thereupon submitted to the French, who thus for a while held a seeming possession of the whole of Egypt. Thinking himself secure in his conquest Napoleon immediately set about reorganizing the civil and military organization of the country; but fortune was preparing for him a terrible reverse. The English admiral Nelson, who had long been in pursuit of his fleet, found it moored in the bay of Aboukir, and, with the exception of four vessels which contrived to escape, utterly destroyed it.

All means of return to Europe for the French were thus cut off, and to add to their misfortunes the sultan declared war against them, and a short time after serious disturbances broke out in Cairo which were only suppressed by horrible massacres. Napoleon resolved to meet the Turkish forces assembling in Syria. In February, 1799, he crossed the desert with about 13,000 men; took El Arish and Gaza, and stormed Jaffa, where a great number of Turkish prisoners were deliberately massacred. On the 17th he reached Acre, which was defended by a Turkish garrison under Djezzar Pasha, assisted by Sir Sydney Smith and a small body of English sailors and marines. After 60 days' siege he was compelled to relinquish the attempt to capture this place and return to Egypt, leaving the whole country on fire behind him. He reëntered Cairo on June 14, having lost 4,000 men in the Syrian expedition. About the middle of July the sultan landed a force of 18,000 at Aboukir which Napoleon attacked and almost annihilated on the 25th. His position was far from agreeable, however; he had signally failed in the great objects of his expedition, and besides news had reached him of disaster to the French arms in Italy and onfusion in Paris. On Aug. 22 he abandoned the command of the army to Kléber, and embarking in a frigate landed at Fréjus, Oct. 9, narrowly escaping capture several times by the British Mediterranean cruisers. He arrived in Paris in time to take advantage of the political intrigues then rife. The credit of the government was wholly gone, and it was ill obeyed by its generals. A revolution had taken place in the government on June 18, but the new directors were as incompetent as the old. Another change became necessary. Napoleon secured the coöperation of Moreau and the other generals then in the capital, and abolished the Directory on the 18th and 19th Brumaire (Nov. 9–10). A new constitution was then drawn up chiefly by the Abbé Siéyès, under which Napoleon was made First Consul, with Cambacérès and Lebrun as second and third consuls. As, however, he had the power of appointing to all public offices, of proposing all public measures in peace and in war, and the entire command of all administrative affairs, both civil and military, he was virtually ruler of France.

From this time Napoleon's policy developed itself more distinctly; its objects were to establish order at home and to humiliate the enemies of the nation; but unfortunately personal aggrandizement was an end scarcely less conspicuous. In the same summary manner in which he ordered his troops, with equal sagacity, activity, and boldness he undertook to reform civil affairs. He recruited the national treasury by various sagacious expedients, repealed the more violent laws passed during the Revolution, such as punishment for matters of opinion, reopened the churches, and suppressed the Vendean insurrection by a series of decided but conciliatory measures. But he was well aware that his genius was essentially military, and that his most striking triumphs were those won on the battlefield. He offered Austria, England, and Turkey, in theatrical phrases, terms of peace, which were rejected. He resolved to strike a blow first at Austria by a renewal of the glories of his former Italian campaign. An army of 36,000 men was concentrated with unparalleled rapidity and secrecy on the shores of the Lake of Geneva. On May 13, 1800, he began his daring march across the Great St. Bernard, and almost before the Austrian General Melas was aware, had entered Milan (June 2). After several unimportant skirmishes he encountered the Austrians at Marengo (June 14), where he achieved another brilliant victory, which put all the Piedmontese fortresses, for the second time in the possession of the French.

Having established provisional government at Milan, Turin, and Genoa, he returned to Paris on July 3. As his general, Moreau, had defeated the Archduke John in the decisive battle of Hohenlinden (Dec. 3) Austria was reduced to sue for peace, and on Feb. 9, 1801, signed the treaty of Lunéville, which was mainly based on that of Campo Formio. Treaties were subsequently concluded with Spain, Naples, the Pope, Bavaria, Portugal, Russia, Turkey, and finally,

Napoleon Bonaparte

on March 27, 1802, the treaty known as that of Amiens was signed by England. Thus it seemed as if a universal cessation of hostilities was about to mark the history of Europe, and allow Napoleon the opportunity to crush the insurrection of the blacks in San Domingo. An army was sent out under General Le Clerc, some 20,000 of which were swept away by disease or the sword; the blacks were provoked by brutal cruelties to still more brutal massacres, in which about 60,000 whites perished. Toussaint l'Ouverture, an able and courageous negro who had made himself the leader of his unfortunate countrymen, was seized during a truce and carried to France, where he died in prison.

But the great occupation of Napoleon was the improvement of the interior affairs of the nation. A general amnesty allowed all the *émigrés* to return home; the Legion of Honor, a new order of knighthood, was established. Considerable attention was paid to such departments of education as tended to promote efficiency in the public service. Mathematics and physical science were encouraged at the expense of philosophy, ethics, and social and political science. All prefects of departments and all mayors of cities were appointed by Napoleon, so that not a vestige of provincial or municipal freedom remained. On Aug. 2, 1802, Napoleon was proclaimed by a decree of the senate consul for life, a step confirmed by a plebiscite of 3,000,000 votes. A *senatus consultum* issued some days after, reconstructing the electoral bodies and reducing the tribunate to 50 members, showed, however, that Napoleon was not yet satisfied with the authority he was clothed with, and many persons saw in the movement a step toward still more absolute power. It is to this period that the greatest of his services to France belongs. He assembled the first lawyers in the nation, under the presidency of Cambacérès, to draw up a code of civil laws, and frequently took part in their deliberations. The results of their labors were the "Code Civil des Francais," "Code de Procédure," "Code Pénal," and "Code d'Instruction Criminelle," together with commercial and military codes, all of which are loosely spoken of as the "Code Napoléon."

Meanwhile the state of Europe was beginning to look serious. Disturbances in Switzerland in the early part of 1802 induced Napoleon to resort to an armed mediation in its affairs; in August of the same year Elba was incorporated with France, which was followed by the annexation of Piedmont (Sept. 11), and of Parma in October. England regarded these proceedings as an infringement of the treaty of Amiens, and as remonstrances were ineffectual, there was in a short time a resumption of hostilities. On May 18, 1803, England declared war against France and laid an embargo on all French ships in her ports. France retaliated by a decree that all Englishmen found on her territory should be detained as prisoners of war; and General Mortier was sent to occupy Hanover, as belonging to Great Britain. While these events were taking place a conspiracy for the overthrow of the First Consul and the reëstablishment of the Bourbons was discovered. The most distinguished of the plotters were Georges Cadoudal, the Chouan chief Pichegru, and Moreau. Cadoudal was executed, Pichegru was found dead in prison and Moreau was condemned to perpetual exile. Napoleon pretended to see an accomplice in the Duc d'Enghien, and caused him to be arrested in neutral territory, brought to Vincennes, and after a mock trial, shot. Napoleon now seems to have thought it necessary that he should assume the imperial dignity. An appeal was made to the nation, and upward of 3,000,000 votes were given in favor of conferring the title and prerogatives of emperor on Napoleon; while only between 3,000 and 4,000 were against it. As, however, the appointments to all government offices were in the hands of the autocrat, not much value can be placed on such votes. On May 18 he assumed the imperial title, and in order that due solemnity should not be wanting requested Pius VII. to perform the cermony of his coronation. The Pope assented and went to Paris on Dec. 2. He was only allowed to perform part of the ceremony, however, as Napoleon snatched the crown from the pontiff's hands and placed it on his own head, performing a like office for his consort Josephine. On May 26, 1805, he was also crowned King of Italy in the Cathedral of Milan; and Eugène Beauharnais, his stepson, was appointed viceroy. He created a nobility with sounding titles; he surrounded himself by a brilliant court; he established all the pompous etiquette of royalty; and in many ways endeavored to impose on the vulgar by ostentation and parade.

Meanwhile the Northern powers listened to the solicitations of England and united in a coalition against the new emperor. Russia, Austria, and Sweden all joined in the charges of aggrandizement laid against Napoleon by the English government; but Prussia, tempted by him with the promise of Hanover, could not be brought to enter the coalition. The emperor abandoned his design of making a descent on England, broke up the camp at Boulogne, and concentrating his widely scattered forces at Mainz (September, 1805) he marched at once across Bavaria at the head of 180,000 men, and compelled the Austrian General Mack to capitulate at Ulm, with 23,000 men (Oct. 20). On Nov. 13 he had reached Schönbrunn, near Vienna, where he received news of the victory of Nelson at Trafalgar

over the united fleets of France and Spain. Entering the Austrian capital, he made rapid preparations to meet the combined armies of Russia and Austria, then concentrating on the plains of Olmütz. On Dec. 2 the three armies, each commanded by an emperor, met at Austerlitz. The struggle was desperate and long but at last victory declared for Napoleon. The rout of the allies was complete. The Austrian emperor instantly sued for peace, giving up to France all his Italian and Adriatic territories. The Russian emperor retired behind his own frontiers, and Hanover was handed over to Prussia. As the King of Naples had received English and Russian troops into his dominions, Napoleon construed this act into one of direct hostility. In February, 1806, a French army occupied the continental part of the Neapolitan States, of which Joseph Bonaparte was declared king on the deposition of their former sovereign. The Batavian republic was transformed into a kingdom dependent on France and given to another brother of the emperor, Louis, who took the title of King of Holland. Various districts in Germany and Italy were erected by the conqueror into dukedoms and bestowed on his most successful generals.

But the most important change of all was the formation of the Confederation of the Rhine on July 12, and the dissolution of the old German empire. On the death of the English minister, Pitt, and the accession of Fox, negotiations were entered into for the cessation of hostilities between France and England, and as propositions were entertained toward the restoration of Hanover, the eyes of the Prussians were at once opened and war was determined on regardless of the hazardous circumstances under which it was undertaken. War was declared on Oct. 8. The emperor was already at Bamberg directing the movements of his troops, which had never left Germany. On the 14th Napoleon met the enemy at Jena, and inflicted on them a severe defeat; while his general, Davout, added on the same day to the French triumph by the brilliant victory of Auerstädt. On the 25th Napoleon entered the Prussian capital. After garrisoning all the important fortresses and reducing such towns as made a show of resistance, he issued the celebrated Berlin decrees, directed against English commerce. The British Islands were declared in a state of blockade, all correspondence or trade with them was forbidden, all their productions and manufactures were considered contraband, British subjects on the Continent were to be treated as prisoners of war, and their goods as lawful prize. This policy nearly ruined the commerce of France and the other European nations, while it increased the prosperity of England. Her fleets and cruisers swept the seas; nothing could be obtained from the colonies save through her, and the continental merchants engaged in an extensive smuggling trade with the British, which it was impossible to prevent.

Napoleon Bonaparte

After the capture of Berlin Napoleon marched N. against the Russians, who were advancing to assist the Prussians. He called on the Poles to rise but was answered with little enthusiasm. At Pultusk (Dec. 28), and at Eylau (Feb. 8, 1807), he met with severe checks, and retired on the line of the Vistula; in the course of a few months, however, having received heavy reinforcements, he once more took the offensive. On June 14 was fought the battle of Friedland which was so disastrous to the Russian arms that Alexander was compelled to sue for an armistice. On July 7 the peace of Tilsit was concluded, by which the King of Prussia received back half of his dominions, and Russia undertook to close her ports against British vessels. The duchy of Warsaw was erected into a kingdom and given to the King of Saxony; out of the Prussian territories W. of the Elbe the kingdom of Westphalia was formed and bestowed on Jerome, Napoleon's youngest brother; and Russia obtained a part of Prussian Poland, and by secret articles was allowed to take Finland from Sweden. Soon after the treaty of Tilsit Napoleon entered into a war against Portugal, as that nation had refused to respect the Berlin decree, and Junot was sent to occupy Lisbon (Nov. 30, 1807). The Pope being unwilling to carry out the continental blockade and to recognize Joseph Bonaparte as King of Naples, Rome was occupied (Feb. 2, 1808). The administrative affairs of Spain having fallen into inextricable confusion, Napoleon sent an army under Murat into that kingdom, which took possession of the capital with serious obstacles, and by the treaty of Bayonne Charles IV. resigned the Spanish crown, which was given to Joseph Bonaparte, Murat receiving the vacant sovereignty of Naples.

The great body of the Spanish people rose against this summary disposal of the national crown, and England assisted them with immense supplies. Thus was commenced the Peninsular war which lasted seven years. The Spaniards were at first successful; a French squadron was captured by the English at Cadiz (June 14); General Dupont surrendered at Baylen with 18,000 men (July 22); Junot was defeated by Sir Arthur Wellesley at Vimeira (Aug. 21). But Napoleon rushed to the scene of action in October at the head of 180,000 men, and entered Madrid in spite of all resistance by the Spaniards on Dec. 4. The British troops which had advanced to the aid of the Spaniards were driven back on Coruña, where they made a successful stand, but lost their general, Sir John Moore (Jan. 16,

Napoleon Bonaparte

1809). In the meantime Austria, alarmed at the aggressive policy of Napoleon, who had seized Tuscany and the Papal States, and determined to profit by his absence in Spain, again declared war and got together an army in splendid condition under the Archduke Charles. Napoleon hurried into Bavaria, encountered the archduke at Eckmühl (April 22), and completely defeated him; on May 13 he again entered Vienna. Reorganizing his shattered army, Charles likewise advanced toward Vienna on the opposite bank of the Danube. The French seized the island of Lobau, threw a bridge across the river, and attacked the enemy at Aspern and Essling on the 21st and 22d, but were repulsed and thrown back on the island, which they proceeded to fortify, awaiting the arrival of Eugène with the army of Italy. On July 5 they debouched on the left bank of the Danube, and on the 6th the Austrians were crushed at Wagram, which enabled Napoleon to dictate his own terms of peace which were agreed to on Oct. 14 at Schönbrunn. On the preceding day an unsuccessful attempt was made to assassinate him by a young German enthusiast named Staaps. Whether the subsequent marriage with the daughter of the Austrian emperor was in course of negotiation at Schönbrunn is doubtful, but soon after his return to Paris he informed Josephine of his determination to divorce her. He seems to have arrived at the conclusion that he could only put an end to the machinations of the old legitimate dynasties by intermarriage. Josephine, too, had born him no children, and he was ambitious of perpetuating his power in his family. On Dec. 16 an act of divorce was passed by the commissioners of the Senate, and on April 2, 1810, he was married to the Archduchess Maria Louisa. The fruit of this union was a son, Napoleon François Charles Joseph, born March 23, 1811, and proclaimed in his cradle King of Rome.

The years 1810 and 1811 were the period of Napoleon's greatest power. On the N. he had annexed Holland, Friesland, Oldenburg, Bremen, and all the coast line as far as Hamburg, and on the S. Rome and the S. papal provinces. His empire thus extended from the frontiers of Denmark to those of Naples, with Paris, Rome, and Amsterdam as its first, second, and third capitals; and was divided into 130 provinces, having a total population of 42,000,000. He may also be said to have exercised almost unlimited control in Spain, the Italian kingdoms, Switzerland, and the Confederation of the Rhine. But now the tide began to turn. Russia found it impossible to carry out the continental blockade without permanent injury to her great landowners; Sweden, who had accepted Bernadotte, one of Napoleon's generals, as king, was in a like predicament. The Berlin decree was frequently evaded, which involved Russia particularly in fresh complications, and in view of the war now inevitable, that nation formed an alliance with Sweden. In May, 1812, Napoleon declared war against the former power, and determined in spite of the dissuasion of his most prudent generals, to invade the country. Austria and Prussia, now fairly cowed, entered into an unwilling alliance with France. On the 16th Napoleon was in Dresden making arangements for the great Russian campaign. The army he organized for it has been estimated at from 640,000 to 680,000 men, inclusive of Prussian, Austrian, German, Polish, and Swiss auxiliaries. An army of 300,000 Russians, under Barclay de Tolly and Bagration, assembled on the banks of the Niemen to oppose him. On June 24 he crossed that river at Kovno, and the Russians retired step by step before him, deliberately wasting the country, and carrying off all supplies, and avoiding as far as possible general engagements. The French, however, pushed rapidly forward, overtook and routed the rear guard of Barclay's army at Ostrovno (July 25), and occupied Vitebsk on the 28th. On Aug. 16 the Russians made a stand at Smolensk against an advanced division of the French army, and when the latter entered the city on the 18th it was in ruins.

Both the opposing armies now took up their march toward Moscow. Kutusoff, who had succeeded Barclay, resolved to dispute the passage of the Borodino. An obstinate and sanguinary battle ensued, which cost the French 30,000 men, and their opponents about double that number (Sept. 7). On the 15th Napoleon entered Moscow, but during the night the city, which had been deserted by its inhabitants, was found to be on fire. The conflagration lasted five days, and destroyed the greater part of the city. The baffled French were compelled to seek shelter in the desolate surrounding country. Napoleon attempted to negotiate with the czar, but without result. It was impossible to pursue the Russians further, and nothing now remained but retreat. The French army was now reduced to 120,000 men. For some time the weather was unexceptionally favorable, but eventually the winter set in earlier than usual, and with unparalleled severity.

The line of retreat too, led through the very districts which had been wasted on the advance. Swarms of mounted Cossacks incessantly harassed the French, now sadly demoralized by cold, famine, disease, and fatigue. When the invaders left Smolensk (Nov. 14) they numbered only 40,000 fighting men, and when they had fought their way over the Berezina (27th) there remained but 25,000. At Smorgoni Napoleon quitted the army on Dec. 5, leaving Murat in command.

Napoleon Bonaparte

He reached his capital on the 18th, and immediately ordered a fresh conscription, still determined on prosecuting the war. But the spirit of Europe was now fairly roused; kings, ecclesiastics, and peoples rose unanimously against the devastator of the Continent, the terror of whose name had been destroyed by his terrible reverse. A sixth coalition, consisting of Prussia, Russia, England, Sweden, and Spain was formed, which early in 1813 sent its forces toward the Elbe. Napoleon had still an army of 350,000 in Germany. For some months he was everywhere victorious. He defeated the allies at Lützen (May 2) and at Bautzen (21st). On June 4 he concluded at Breslau a six weeks' armistice which gave the allies time to reorganize and concentrate their forces, and what was of equal consequence, to gain over Austria. The campaign was opened on Aug. 16. The allies advanced on Dresden, where Napoleon had his headquarters. The three days' battle which ensued (Aug. 26 to 27) was another dearly bought victory for the French, who were now so outnumbered that their chief was compelled to fall back on Leipsic. There he was completely hemmed in, and in the great Battle of Nations (Völkerschlacht), which was fought on Oct. 16, 18 and 19, he was completely defeated. The retreat was almost as disastrous as that from Moscow; when he recrossed the Rhine he had only 70,000 or 80,000 men left. The fortresses held by the French in Germany and Poland were gradually reduced.

On Napoleon's arrival at Paris on Nov. 9 he succeeded in obtaining from the Senate, in spite of the opposition in the legislative body and the prevalent discontent of the people, a decree for a conscription of 300,000 men. With a fertility of resource and a genius for combination almost miraculous, he was able to enter on another campaign, which was this time to be conducted in France. From January to March he confronted the combined hosts of the allies, inflicting defeat after defeat on them. But numbers were against him; a new and formidable enemy, Wellington, was rapidly advancing on the capital from the South. On March 30 the allies captured after a severe engagement the fortifications of Paris, and on the 31st Alexander and Wellington entered the city amid the acclamations of the people.

On April 4 Napoleon abdicated at Fontainebleau. He was allowed the sovereignty of the island of Elba, with the title of emperor, and a revenue of 6,000,000 francs. After bidding his army adieu he departed for his new abode, landing from the British frigate "Undaunted" at Ferrajo (May 4), and Louis XVIII. was restored. After a residence of 10 months, most of which were spent in intriguing with the Republicans and his own adherents he made his escape from the island, and landed at Fréjus on March 1, 1815, with an escort of 1,000 of his old guard. As soon as his arrival was known Ney and a large part of the army joined him, and he made a triumphal march on Paris which he reached on the 20th. Louis was driven from his throne without a shot having been fired. The allies were startled at the astounding event. Their armies once more marched toward the French frontier. Napoleon, hastily reorganizing the government on a rather more liberal basis than that of the empire, and having made vain attempts to open negotiations for peace, advanced to meet them. On June 15 he crossed the Sambre at the head of 130,000 men to attack the English and Prussians under Wellington and Blücher, who were preparing to invade France on the Belgian frontier, while the Austrians attacked it on the Rhine. On the 16th he defeated Blücher at Ligny, while Ney held the English in check at Quatre-Bras. The Prussians made an orderly and leisurely retreat, pursued by a division of the French army under Grouchy.

In order to preserve his communication with the Prussians Wellington fell back upon Waterloo, where he was attacked by Napoleon on the 18th. The British held their ground obstinately during the greater part of the day and in the evening when Blücher, who had outmaneuvered Grouchy, came up, the French were completely crushed, and Napoleon's power forever broken. The retreat was a disorderly flight. The allies marched without opposition on Paris. Napoleon again abdicated in favor of his son on the 22d; but being threatened by Fouché, who had assumed the direction of the government, and seeing no hope of escape from France, he surrendered at Rochefort to Captain Maitland of the British warship "Bellerophon," claiming in pompous phrase the hospitality and protection of the British government. Captain Maitland was instructed to detain him as a prisoner, and then transfer him to the "Northumberland," which was to convey him to the island of St. Helena, where he was to be confined for the rest of his life, according to a convention signed at Paris on Aug. 20, between Great Britain, Austria, Russia, and Prussia. In July, 1816, General Sir Hudson Lowe was sent out as governor of the island. From the very first Napoleon seems to have cherished a strong antipathy against this officer, and endeavored to gain the sympathy of the world by spreading reports of the ill treatment he was subjected to. One of his great grievances was that he was always styled General Bonaparte; another that he was not allowed to stroll about the island unaccompanied by a British officer. The governor had no power to remedy these subjects of complaint. In September, 1818, Napoleon's

health began to be affected; but he would take no medicine, nor ride out, as advised, because he would not submit to the attendance of an officer. Toward the end of 1820 he grew worse, and at last on May 5, 1821, he died. On the 8th his remains were interred in Slane's Valley, and in 1840 they were transferred to Paris.

Napoleon II. (Napoleon François Bonaparte), titular Emperor of France, son of the Emperor Napoleon I. and of Maria Louisa of Austria; born in Paris, France, March 20, 1811. From his birth he was styled "King of Rome." After his father's first abdication in 1814 he went with his mother to Vienna, where he was brought up at the court of his grandfather, the Emperor Francis, who created him Duke of Reichstadt. His education was carefully attended to, and he was early trained up to the military profession. After passing through the various subordinate grades he was made a lieutenant-colonel in June, 1831, and he took the command of a battalion of Hungarian infantry, then in garrison at Vienna. He was extremely assiduous to his military duties, but his constitution was weak; he had grown very tall and slender, and symptoms of a consumptive habit had early shown themselves. His physician advised a removal to Schönbrunn, which had at first a beneficial effect, but a relapse soon followed, and after lingering for several months, young Napoleon died, July 22, 1832, in the palace of Schönbrunn, attended by his mother, who had come from Parma to visit him.

Napoleon III. (Charles Louis Napoleon Bonaparte), Emperor of the French; born in Paris, France, April 20, 1808. He was the youngest son of Louis Bonaparte, brother of Napoleon I. and King of Holland, and of Hortense de Beauharnais. His early life was spent chiefly in Switzerland and Germany. By the death of his cousin the Duke of Reichstadt (Napoleon II. see above) he became the recognized head of the Bonaparte family, and from this time forward his whole life was devoted to the realization of a fixed idea that he was destined to occupy his uncle's imperial throne. In 1836 an attempt was made to secure the garrison of Strasburg, but the affair turned out a ludicrous failure. The prince was taken prisoner and conveyed to Paris, and the government of Louis Philippe shipped him off to the United States. The death of his mother brought him back to Europe, and for some years he was a resident of England. In 1840 he made a foolish and theatrical descent on Boulogne; was captured, tried, and sentenced to perpetual confinement in the fortress of Ham. After remaining six years in prison he escaped and returned to England. On the outbreak of the revolution of 1848 he hastened to Paris, and securing a seat in the National Assembly, he at once commenced his candidature for the presidency. On the day of the election, it was found that out of 7,500,000 votes Louis Napoleon had obtained 5,434,226; Cavaignac, who followed second, had but 1,448,107. On Dec. 20, the prince-president, as he was now called, took the oath of allegiance to the republic. He looked forward to a higher position still, however, and pressed for an increase of the civil list from 600,000 francs first to 3,000,000, then to 6,000,000, with his term of office extended to 10 years and a residence in the Tuileries. At last, on the evening of Dec. 2, 1851, the president declared Paris in a state of siege, a decree was issued dissolving the assembly, 180 of the members were placed under arrest, and the people who exhibited any disposition to take their part were shot down in the streets by the soldiers. Another decree was published at the same time ordering the reëstablishment of universal suffrage, and the election of a president for 10 years. When the vote came to be taken, Dec. 20 and 21, it was discovered that 7,439,216 suffrages were in favor of his retaining office for 10 years, with all the powers he demanded, while only 640,737 were against it.

As soon as Louis Napoleon found himself firmly seated he began to prepare for the restoration of the empire. In January, 1852, the National Guard was revived, a new constitution adopted, and new orders of nobility issued; and at last, on Dec. 1, Louis Napoleon Bonaparte was proclaimed emperor under the title of Napoleon III.

On Jan. 29, 1853, the new sovereign married Eugénie Marie de Montijo, Countess de Teba. In March, 1854, Napoleon III., in conjunction with England, declared war in the interest of Turkey against Russia (see CRIMEAN WAR). In April, 1859 war was declared between Austria and Sardinia, and Napoleon took up arms in favor of his Italian ally, Victor Emanuel. The allies defeated the Austrians at Montebello, Magenta, Marignano, and Solferino. By the terms of the peace of Villafranca Austria ceded Lombardy to Italy, and the provinces of Savoy and Nice were given to France in recognition of her powerful assistance (March 10, 1860). In 1860 the emperor sent out an expedition to China to act in concert with the British; and in 1861 France, England, and Spain agreed to dispatch a joint expedition to Mexico for the purpose of exacting redress of injuries, but the English and Spaniards soon withdrew. The French continued the quarrel, and an imperial form of government was initiated, Maximilian, Archduke of Austria, being placed at its head with the title of emperor. Napoleon, however, withdrew his army in 1867, and the unfortunate Maximilian, left

to himself, was captured and shot. On the conclusion of the Austro-Prussian war of 1866, Napoleon, jealous of the growing power of Prussia, demanded a reconstruction of frontier, which was peremptorily refused. The ill-feeling between the two nations was increased by various causes, and in 1870, on the Spanish crown being offered to Leopold of Hohenzollern, Napoleon demanded that the King of Prussia should compel that prince to refuse it. Notwithstanding the subsequent renunciation of the crown by Leopold war was declared by France, July 19, (see FRANCO-PRUSSIAN WAR). On July 28, Napoleon set out to take the chief command, and on Sept. 2, the army with which he was present was compelled to surrender at Sedan. One of the immediate consequences of this disaster was a revolution in Paris. The empress and her son secretly quitted the French capital and repaired to England, where they took up their residence at Camden House, Chislehurst. Here they were rejoined by the emperor (who had been kept a prisoner of war for a short time) in March, 1871, and here he remained till his death, Jan. 9, 1873.

Napoleon, Prince (Napoleon Eugéne Louis Jean Joseph Bonaparte), Prince Imperial of France, son of Napoleon III.; born in Paris, France, March 16, 1856. He joined the British army in South Africa as a volunteer and was killed by the Zulus, June 2, 1879.

Napoleona, or **Belvisia,** a tropical African genus of myrtaceous plants, of which the one known species *N. imperialis* has showy red, white, or blue flowers, and a fruit resembling a pomegranate.

Napoleon's Cocked Hat. See SABA.

Napoli di Romania. See NAUPLIA.

Naquinoneis. See CHIQUITOS.

Naraka, or **Nuruk,** in Hindu mythology, a term equivalent to the English word hell; it consists of 28 divisions, in which sinners of as many different classes are confined and subjected to tortures corresponding to the gravity of their offenses.

Narbada. See NERBUDDA.

Narbonne, a town of France; department of Audé, on the La Robine branch of the Canal du Midi; 8 miles from the Mediterranean and 93 E. S. E. of Toulouse. The removal since 1865 of the fortifications has been an improvement, but the place remains dirty and unattractive, with only three noteworthy buildings. These are the Romanesque Church of St. Paul (1229); the quondam cathedral of St. Just (1272–1332), only the fine Gothic choir of which, 131 feet high, has been completed; and the former archbishop's palace, now the city hall, in one of whose three old towers Louis XIII. in 1642 signed the order to arrest Cinq Mars, and in which are a good museum, a library, and a picture gallery. The white heather honey of Narbonne maintains its ancient celebrity; the wine is chiefly used for blending purposes. Norbonne is the Narbo Martius of the Romans, their earliest colony (118 B. C.) beyond the Alps; and, situated on the highroad to Spain and the basin of the Garonne, was a place of great commercial importance. Under Tiberius it flourished greatly, its schools for a long time rivalling those of Rome. About 309 A. D. it became the capital of Gallia Norbonensis, and had its capitol, forum, theater, aqueducts, triumphal arches, etc. In 412 it was taken by the Visigoths, in 719 by the Saracens, from whom it was recovered by Pepin in 759, to fall just a century later to the arms of the Northmen. During the 11th and 12th centuries it was a prosperous manufacturing city, but subsequently it deteriorated. Varro and Montfaucon were natives. Pop. commune (1901) 28,852.

Narcissus, in Greek mythology, the beautiful son of Cephisus and the nymph Liriope. The legends connected with his

NARCISSUS.

name are by no means consistent. According to one version, he was insensible to the feeling of love, and Echo, failing to win his affection, died in grief. As a punishment, Nemesis made him fall in love with his own image, reflected in water; and Narcissus in his turn pined away from unsatisfied longing. The story of his metamorphosis into the flower so called (see NARCISSUS) is given only in the version adopted by Ovid; and this version says that he killed himself, and that the flower sprang from his blood; while Pausanias, earnestly combat-

ing the proposition that Narcissus was so stupid as to be unable to distinguish a man from a man's shadow or image, maintains that he looked at his image in a well to remind himself of a sister whom he had loved, and who had died. He is sure, however, that the flower existed before Narcissus, because Persephonê was gathering narcissi in the fields of Enna when she was stolen away by Hades.

Narcissus, an extensive genus of bulbous plants, mostly natives of Europe, natural order *Amaryllidaceæ*. The species are

NARCISSUS.
a, Narcissus Pseudonarcissus; b, Narcissus Tazetta; c, Narcissus Poeticus; d, Narcissus Jonquilla.

numerous, and from their hardiness, delicate shape, gay yellow or white flowers, and smell, have long been favorite objects of cultivation, especially the daffodil (*N. Pseudonarcissus*), the jonquil (*N. Jonquilla*), polyanthus narcissus (*N. Tazetta*), and white narcissus (*N. poeticus*). Some of the more hardy species grow wild in our woods and under our hedges.

Narcotics, remedies which produce stupor if the dose be increased beyond a certain point. Opium is the most important member of the group, and the type from which most descriptions of the action of this class of medicines have been drawn; but it includes substances of very various properties. Some, as alcohol, produce intoxication in lesser doses; some, as belladonna, delirium; most have a primary stimulating effect; in fact, almost every one presents some peculiarity in the way in which it affects the system, and no satisfactory general description of their minor effects is possible. Their power of inducing sleep has procured for them the names of hypnotics and soporifics; while many of them are termed anodynes, from their possessing the property of alleviating pain. Next to opium, henbane, Indian hemp, and chloral may be regarded as the most important narcotics. Numerous artificially-produced organic compounds have been introduced during the last few years, some of which (*e. g.*, paraldehyde, sulphonal as hypnotics; antipyrin, exalgin — an aniline derivative — as anodynes) will probably take a permanent place among useful remedies. Narcotics are usually administered either with the view of inducing sleep or of alleviating pain or spasm. As, however, their action is much modified by a variety of circumstances — such as age, idiosyncrasy, and prolonged use — they should be administered with extreme caution, and, as a general rule, only under competent advice. The various quack medicines for children which are known as carminatives, soothing syrups, etc., almost always contain some form of opium, and are a fertile cause of the great mortality that occurs in early life, especially among the poorer classes. All the narcotics when taken in excess are poisonous. See Poisons.

Narcotine, in chemistry, $C_{22}H_{23}NO_7$, one of the alkaloids of opium, and the first base extracted from that substance, discovered by Derosne in 1803. It forms lustrous rhombic prisms, which melt at 170°, and decompose at 220°. Insoluble in water and alkalies, but soluble in alcohol and ether. It is less poisonous than morphine, and its salts are very unstable.

Nardoo, *Marsilia macropus*, a clover-like acotyledonous plant of Australia, occupying extensive tracts of inundated land. Its dried spore-cases are eaten by the natives.

Nares, Edward, an English author; born in London, England, in 1762. He was a clergyman, who held the professorship of modern history at Oxford for a time. His writings include: "Thinks I to Myself" (1811), a novel; and "Life and Administration of Lord Burghley" (1828–1831). He died in Biddenden, England, Aug. 20, 1841.

Nares, Sir George Strong, a British Arctic explorer; born near Aberdeen, Scotland, in 1831. He entered the navy and took part in the Arctic expedition of 1852–1854. From 1872 to 1874 he commanded the "Challenger" during her scientific expedition, and in 1875 was first in command of the North Polar expedition. He afterward was engaged in a survey of the South Pacific. He was the author of "Seamanship," "Reports on Ocean Soundings," "Voyage to the Polar Sea," etc.

Nargal, in astrological mythology, the guardian of hidden treasure, to be approached by offerings only.

Narghile, or **Nargileh** (när'gē-luh), a kind of Eastern tobacco pipe, the chief fea-

ture of which is that when used the smoke is made to pass through water.

Narragansett Bay, an inlet of the Atlantic Ocean on the coast of Rhode Island; length about 28 miles (including the N. part called Providence Bay); width about 12 miles (at the N. part only 2 miles). It forms the E. boundary of the counties of Kent and Washington, and encloses several islands. The city of Newport is on the shore of this bay near its entrance or S. end. Large vessels can ascend it from the sea to Providence.

Narragansett Pier, a summer resort in Washington, Co., R. I.; on the W. shore of Narragansett bay; 7 miles S. W. of Newport. It has an excellent beach, and a number of large hotels and handsome residences. The facilities for fishing and boating are excellent, and there are some notably fine drives amid charming scenery. At a distance of 3 miles are Narragansett Heights, 400 feet above the bay. The Pier has regular steamboat communication with Providence. The assessed property valuation exceeds $3,000,000. Pop. (1900) 1,523; (1910) 1,250.

Narragansetts, a tribe of North American Indians which, in the early history of the United States, occupied the part of Rhode Island W. of Narragansett Bay. They were nearly destroyed during King Philip's war.

Narses, a general of the Byzantine empire; born in Persamenia, about 478. He was a eunuch, entered into the service of the Emperor Justinian at the court of Constantinople, rose by his merit to the highest dignities of the state, and distinguished himself by military exploits. After vanquishing Totila the Goth, he captured Rome; rescued Italy from the Ostrogoths and other barbarians; was appointed governor of the country, and ruled it 15 years, but was at length deposed, and died in Rome about 573.

Nars, a divinity of the ancient Arabs, represented under the form of an eagle.

Narthex, a division in the early Christion churches in which the catechisms were recited, and penitents admitted; it was near the entrance, and separated from the rest of the church by a railing or screen.

Naruszewicz, Adam Stanislas (närös'uh-vich), a Polish historian and poet; born in Lithuania in 1733. He entered the Jesuit order and became a bishop, devoting his leisure to literature. His masterpiece is a "History of the Polish People." His idyls and satires are the best of his poetic pieces. He made a good Polish version of Tacitus. He died in 1796.

Narva, a town of Russia; 101 miles W. S. W. of St. Petersburg, on the Narova, 10 miles from its mouth in the Gulf of Finland. The navigation of the Narova is impeded by a waterfall near Narva, 14 feet high, which is taken advantage of for driving cotton mills, sawmills, etc. Charles XII. won a great victory here in 1700.

Narvaez, Ramon Maria (när-vä-eth'), a Spanish general and statesman; born in Loja, Andalusia, Spain, Aug. 5, 1800. When very young he served in the war of liberation against the French. In 1822, when a reactionary party took up arms to destroy the work of the revolution, Narvaez ranged himself on the side of the liberals. The invasion of Spain by a French army in 1823 forced him to retire from active life till the death of Ferdinand VII. in 1832. In 1834 he maintained a hot struggle against the Carlists of the Basque Provinces, and in 1836 completely routed the Carlist leader, Gomez, near Arcos. He now became immensely popular, and was regarded as the rival of Espartero. In 1838 he cleared the district of La Mancha of brigands, and was appointed in 1840 captain-general of Old Castile. He took part in the insurrection against Espartero that broke out at Seville in 1840, but, that having failed, he was compelled to flee to France, where he was shortly after joined by Queen Christina (see MARIA CHRISTINA), and commenced those plots against the government of Espartero which in 1843 effected its overthrow. In 1844 he was appointed president of council, and created Duke of Valencia. His ministry was thoroughly reactionary, but was overthrown in 1846. After a brief exile as special ambassador at the French court, he returned to power from 1847 to 1851, in 1856–1857, and again in 1864 and in 1866; and, despite the efforts of O'Donnell and Prim, he retained power till his death in Madrid, Spain, April 23, 1868.

Narwhal, Narwal, or **Narwhale,** a cetacean, called also the sea-unicorn; the *Monodon monoceros.* The name sea-unicorn is given because the male has a horn 6, 7, or even 10 feet long, one of the teeth in the upper jaw extraordinarily prolonged. It is the left tusk which makes the horn, the right being rarely developed. The tusk is spirally furrowed, and is of ivory, like the tusk of an elephant. When preserved in the cabinets of our forefathers, it was supposed to come from the mythic unicorn of antiquity (see UNICORN). The length of the narwhal varies from 15 to 20 or 22 feet, the head being one-fourth of the whole, and the horn one-half. It is in its element amid the snow and ice of the 80th parallel of N. latitude. It feeds on the mollusca, and yields an oil more valuable than that of the common whale.

Nasby, Petroleum V. See LOCKE, DAVID ROSS.

Naseby, a parish of Northamptonshire, England, 7 miles S. W. of Market-Harborough. Here, on June 14, 1645, 7,500 royalists under Charles I. and Prince Rupert were totally defeated by 14,000 parliamentarians under Fairfax and Cromwell, the king losing cannon, baggage, and 5,000 prisoners. An obelisk was erected in 1823 on the Naseby ridge (648 feet).

Nascimento, Francisco Manoel do (näs-chē-men'tō), pseudonym FILINTO ELYSIO, a Portuguese poet; born in Lisbon, Portugal, in 1734. He won a prominent place in his country's literature with a version of La Fontaine's fables, but it is to his "Odes" and other poems that he owes his greatest eminence. He died in 1819.

Nash, John, an English architect; born in London, England, in 1752, after the usual course of training for his profession he entered into some building speculations which enabled him to buy a small property in Carmarthen. Here in fresh speculations he lost much money; therefore, in 1792, he returned to London and architecture, in which he speedily rose to eminence. He claimed a great part of the credit of introducing the use of metal girders. A large part of his time was occupied in designing and constructing mansions for the nobility and gentry in England and Ireland, but he is chiefly celebrated in connection with the great street improvements in London, where he designed Regent street, the Haymarket theater, the terraces in Regent's Park, etc. He retired from his profession in 1834, and died May 13, 1835.

Nash, Richard, called BEAU NASH, an English leader of fashion; born in Swansea, Wales, Oct. 18, 1674. He was the son of an impoverished Welsh gentleman and was educated at Carmarthen and Oxford; held for some time a commission in the army, and next entered at the Middle Temple, but found greater attractions in the dissipations of society than the pursuits of law. He made a shifty living by gambling, but in 1704 he found his true function as master of ceremonies at Bath, where he conducted the public balls with a splendor and decency never before witnessed. In this way he came to acquire an imperial influence in the fashionable society of the place. In his old age Beau Nash sank into poverty, and often felt the want of that charity which he himself had never withheld. He died in Bath, England, Feb. 3, 1761, and received a public funeral.

Nash, Thomas, an English satirist and dramatist; born in Lowestoft, Suffolk, England, in 1567. He graduated at Cambridge in 1584, but was afterward expelled for satirizing the authorities. After spending several years on the Continent he returned to London in 1589, and took an active part in the Martin Marprelate controversy, writing several pamphlets on the prelatical side. In conjunction with Marlowe he wrote a drama, "Dido, Queen of Carthage," and in 1592 produced a comedy of his own, "Summer's Last Will and Testament," which was acted before Queen Elizabeth. He died in 1600 or 1601

Nash, William Hoyt, an American military officer; born in Gallipolis, O., June 22, 1834; was educated at Gallipolis Academy, and Marietta College; entered the army as a telegraph operator in 1861. A year later he was appointed captain in the commissary subsistence department, in which he was steadily promoted; being made commissary-general of subsistence, with rank of Brigadier-General, U. S. A., and retired in 1898. He died Dec. 2, 1902.

Nashua, a city and one of the county-seats of Hillsboro co., N. H.; on the Nashua river and on the Boston and Maine railroad; 35 miles S. of Concord. It contains a public library, a Protestant Home for Aged Women, several daily papers, electric lights, electric street railroads, waterworks, and National and savings banks. It has manufactories of edge tools, bobbins and shuttles, locks, cotton goods, furniture, carpets, glazed paper, etc., and an assessed property valuation of over $14,000,000. Pop. (1900) 23,392; (1910) 26,005.

Nashville, a city, port of delivery, and the capital of the State of Tennessee; on the Cumberland river, and on the Nashville, Chattanooga, and St. Louis, and the Louisville and Nashville railroads; 233 miles E. N. E. of Memphis. This city is regarded as the most important educational center in the South, and in population is the largest city in Tennessee. It is built on undulating grounds with the exception of Capitol Hill, which is very abrupt.

Business Interests.— Nashville occupies a foremost place among the manufacturing centers of the country. It is the fifth boot and shoe market in the United States, the largest candy and cracker manufacturing city in the South, and does an enormous wholesole dry goods, grocery, and drug business. It carries on an extensive trade in stoves and hollow-ware with the West and South, and its flouring mills have a daily capacity of more than 2,000 barrels. The iron interests of the South are largely controlled here, one company alone representing over $100,000,000 capital employed in making coke, iron and steel in Tennessee and Northern Alabama.

Public Interests.— The city has an area of 10 square miles; 181 miles of streets, of which 137 miles are paved; a system of waterworks that cost $2,000,000, with 77 miles of mains; and a sewer system 54 miles in extent. The streets are lighted

by electricity at a cost of $32,470 per annum. There is a public school enrollment of over 11,000, and annual expenditures for public education of over $170,000. The annual cost of maintaining the city government is nearly $1,000,000. Nashville is the seat of Vanderbilt University, Fisk University, the Roger Williams University (Bapt.), the Central Tennessee College (Meth.), Nashville College for Young Ladies, Boscohel College, Belmont College, the Saint Cecilia Academy, the Watkins Institute, and the Ward Seminary. Here are also a Custom House, costing nearly $1,000,000, the State Penitentiary, the State Institution for the Blind, and, about 6 miles distant, is the State Hospital for the Insane.

History.— Nashville was settled in 1780; received its city charter in 1806; was the capital of the State in 1812–1815 and in 1826–1843; and in the latter year was made the permanent State capital. It was occupied by Union troops in 1862, and was the scene of a noted battle in 1864. In 1897 the Tennessee Centennial Exposition was held near West End Park, and some of the handsome buildings were left standing. About 12 miles E. of Nashville is The Hermitage, the home of Andrew Jackson, the log cabin in which he was born stands in the grounds, and near by is his tomb. Pop. (1900) 80,865; (1910) 110,364.

Nashville, Battle of, a desperate battle fought near Nashville, Tenn., Dec. 15–16, 1864. In November of that year, Atlanta having been taken, the Confederate General Hood, invaded Tennessee. On Nov. 30, he advanced against Nashville, where he shut up a National force under General Thomas for two weeks. The latter then sallied out and in a terrible conflict of two days defeated the Confederates. The Union loss was 400 killed and 1,740 wounded; the total Confederate loss was estimated at 15,000.

Nashville, University of, a coeducational non-sectarian institution in Nashville, Tenn., founded in 1785; has grounds and buildings valued at over $300,000; productive funds, $100,000; volumes in the library, 26,000; scientific apparatus, etc., $20,000; average number of faculty, 70; average student attendance, 1,000; ordinary income, $75,000.

Nasik, a town of Bombay, British India, on the Godavari, 31 miles from its source, and 100 miles N. E. of Bombay. It ranks as one of the most sacred of Hindu places of pilgrimage, the banks and even the bed of the river being crowded with temples and shrines. Formerly it was a Mahratta capital; now it manufactures paper, cotton, and excellent brass and copper work. Pop. (1901) 21,490.

Nasmyth, Alexander, a Scotch landscape painter; born in Edinburgh, Scotland, Sept. 9, 1758. He went early to London, and studied under Allan Ramsay, painter to George III. He afterward proceeded to Rome, and on his return to Edinburgh he commenced portrait-painting, but soon abandoned it for landscape. His style is remarkable for its simplicity and beauty. He died in Edinburgh, April 10, 1840.

Nasmyth, James, a British engineer and astronomer; son of A. Nasmyth; born in Edinburgh, Scotland, Aug. 19, 1808. He was educated at the School of Arts, Edinburgh, and in engineering under Maudsley in London. He removed in 1834 to Manchester, England, where he became a successful machine constructor and inventor. The steam hammer, which has rendered possible the immense forgings now employed, was invented by him in 1839. The steam pile driver, and the safety foundry ladle, are among his other inventions. He also acquired fame as a practical astronomer. He died in London, England, May 7, 1890.

Nasmyth, Patrick, a British landscape painter; son of A. Nasmyth; born in Edinburgh, Scotland, Jan. 7, 1787. Owing to an injury to his right hand he learned to paint with his left. In London, where he became very popular as a painter of English landscape, he was designated the English Hobbema. He died in London, England, Aug. 17, 1831.

Naso. See OVID.

Nason, Elias, an American biographer; born in Wrentham, Mass., April 21, 1811. Among his works are: "Life of Governor Andrew" (1868); "Life of Charles Sumner" (1874); "Lives of Moody and Sankey" (1877); "Originality" (1882). He died in North Billerica, Mass., June 17, 1887.

Nason, Emma (Huntington), an American poet; born in Hallowell, Me., Aug. 6, 1845. She was a resident of Augusta, Me. Her works are "White Sails" (1888), and "The Tower, with Legends and Lyrics."

Nasr-ed-Deen, Shah of Persia; born April 24, 1831. He succeeded in 1848. In 1856 his occupation of Herat involved him in war with Great Britain. After that he was friendly, and made two journeys to Western Europe, in 1873 and 1889. In his reign telegraphic communication between Europe and India through Persia was secured. He was assassinated May 1, 1896.

Nassau (näs'sou), formerly a German duchy, now Weisbaden, a district of the Prussian province of HESSE-NASSAU (*q. v.*). The soil is fertile and produces some of the most esteemed Rhenish wines. The chief towns are WEISBADEN (*q. v.*), the capital of the district; Schwalbach, Schlangen-

bad, Fachingen, Selters, and Geilnau. The family of Nassau, the elder branch of which reigned till 1866, dates from the 10th century. The younger branch inherited in 1544 the principality of ORANGE (*q. v.*), and as the princes of Orange took an important place in European history (see HOLLAND). The reigning Duke of Nassau sided against Prussia in 1866, and his duchy was incorporated with Prussia (see PRUSSIA: GERMANY); and on the extinction of the male line of the Orange branch by the death of William III. of Holland, in 1890, the Duke of Nassau became Grand-Duke of Luxemburg.

Nassau, the capital of New Providence, and the center of the trade and seat of government of the BAHAMA ISLANDS (*q. v.*) and a bishop's see. Pop. about 12,000.

Nassau, Fort, an old fort on the Delaware river, near the site of the present city of Gloucester, N. J., memorable as the first settlement on the shores of the Delaware, and built by Capt. Jacobus May, in 1831.

Nast, Thomas, an American artist; born in Landau, Bavaria, Sept. 27, 1840; was educated in the public schools of the United States. He began early to draw and contributed illustrations to various papers, notably "Frank Leslie's Illustrated Newspaper" and "Harper's Weekly." He also illustrated a large number of books, and lectured throughout the country, introducing the system of drawing on a blackboard the various characters or subjects under consideration. He is best known for his political cartoons, which were of great influence, in the exposure of the "Tweed ring." Early in 1902 he was appointed United States consul at Guayaquil, where he died Dec. 7, following.

Nasturtium, the botanical name of the water cress; also the popular designation of the Indian cress (*Tropæolum majus*). The genus *Tropæolum* is the type of the small natural order *Tropæolaceæ*, and comprises some beautiful garden climbers, such as the widely cultivated canary creeper (*T. aduncum*), a native of Peru, and the more recently introduced *T. speciosum*, a native of Chile, which has established itself in many districts in the N. of Scotland and in Wales, and garlands the walls and roofs of cottages in summer and autumn with its festoons of vivid green leaves and brilliant crimson flowers. The Indian cress is also a native of Peru; the whole plant is characterized by a warm pungent taste and tonic stimulant, and antiscorbutic properties are ascribed to it. The flowers are employed as an ingredient in salads and for garnishing the same. The seeds when green are pickled in salt and vinegar and used as a substitute for capers. As an ornamental garden climber or creeper, the Indian cress has been long known and admired by cottagers and others.

Natal, a former British colony; since May 31, 1910, a province in the South African Union; bounded N. by Zululand, S. by Pondoland and East Griqualand, W. by Basutoland, the Orange River and Transvaal provinces, and E. by the Indian Ocean, with a sea-board of 376 miles; area, 36,434 square miles; pop. (1909) 1,206,386. The only spot where sheltered anchorage can be obtained is at Port Natal, a fine circular bay near the center of the coast (see DURBAN). The surface is finely diversified, rising by successive terraces from the shore toward the lofty mountains on its W. frontiers. The chief summits are Champagne Castle, 10,357 feet; Mont aux Sources, about 10,000 feet; and Giant's Castle, 9,657. The mineral productions are principally coal, ironstone, limestone, and marble; gold has also been found in various localities. The province is well watered, but none of its rivers are navigable. The most important rivers are the Tugela, Umvoti, Umgeni, Umkomanzi, and Umzimkulu. The climate on the whole is extremely salubrious. There are large forests on the W. and N. frontiers. The soil is generally rich and strong. On the higher forest and tableland cattle thrive well; and in the interior wheat, barley, oats, maize, beans, and vegetables of almost every description have been largely and successfully grown. In many parts the vine and fruit trees thrive well, and in the coast region generally cotton, tobacco, indigo, sugar-cane, and coffee grow well. In the less frequented parts of the interior elephants and lions are still occasionally seen; the leopard is not uncommon, and hyenas, tiger-cats, antelopes, jackals, ant-bears, and porcupines are numerous. The hippopotamus has still his haunts in several of the rivers, and there are numbers of small crocodiles. The birds comprise the vulture, several varieties of eagle, the secretary-bird, wild turkey, etc. Natal was discovered on Christmas day, 1497, by Vasco da Gama, a Portuguese, and named by him "Terra Natalis." The first settlers were the Dutch Boers, who left Cape Colony in 1836, and in 1839 removed to Port Natal and proclaimed themselves an independent republic. The establishment of a hostile settlement at the only port between Algoa and Delagoa Bays was incompatible with British interests, and in 1845 Natal, after a formidable resistance by the Boers, was proclaimed a British possession. In 1856 it was cut off from Cape Colony and made a separate colony. The province of Zululand was annexed to Natal, Dec. 30, 1897.

As a colony Natal had a governor appointed by the British crown, a Ministry of five members, a legislative council of 11

members, appointed for 10 years by the governor, with the advice of the ministry, and a legislative assembly of 39 members, elected for four years by voters having a property qualification of $250, or paying $50 rent per annum, or having an income of $480. Religion is well provided for by denominational bodies, but no state aid. There are 14 government primary schools, and a large number of other primary and secondary schools, for both European and native children, are aided and inspected by the government. There are still about 700,000 acres of crown lands unalienated. The chief products of the province are wool, cereals, coal (a rapidly growing industry), iron, and sugar. Over 400 miles of railway have been constructed. The capital is Pietermaritzburg; pop. 32,000. The revenue in 1897-1898 was $9,428,704; the debt, $38,491,884; the exports, $15,000,000; and the imports, $25,724,500. The native population of 800,000 Kaffirs has given the government a serious problem to deal with. Nearly 7 per cent. of the population consists of East Indians, who perform much of the labor. See SOUTH AFRICAN UNION.

Natatores, swimmers; an order of birds, founded by Illiger, corresponding to the *Palmipedes* of Cuvier. It contains four families: *Brevipennatæ, Longipennatæ, Totipalmatæ,* and *Lamellirostres.* The order is a natural one, and founded on characteristics all can appreciate. They are aquatic, with webbed feet, and the majority are fitted for swimming rather than for flight. In Huxley's classification, founded on anatomical distinctions, the natatores are distributed among the orders *Herodiones, Anseres, Steganopodes, Gaviæ, Pygopodes,* and *Impennes,* of the sub-class *Carinatæ.* They were first found in the Cretaceous series.

Natchez, a city and county-seat of Adams co., Miss.; on the Mississippi river, and the Yazoo and Mississippi, and the New Orleans and Northwestern railroads; 100 miles S. W. of Jackson. It is the shipping port for a large cotton region, exporting annually many thousands of bales. Here are a State Hospital, Stanton College, Fisk Library, Natchez Institute, a United States Marine Hospital, street railroads, electric lights, and several banks. The city has cotton mills, cotton-seed oil mills, cotton compress, artificial ice plant, saw and planing mills, etc., and an assessed property valuation of about $4,500,000. Natchez was settled by the French about 1713, and was a military and trade post till 1776. It then became a possession of Great Britain, and later passed into that of Spain. In 1798, under a treaty between Spain and the United States, it was ceded to the latter. It was made the State capital and remained so till 1815. During the Civil War it was taken by Admiral Farragut. The name, Natchez, is derived from a noted tribe of Indians. Pop. (1890) 10,101; (1900) 12,210; (1910) 11,791.

Natchez, a tribe of Indians, which owed its celebrity chiefly to Chateaubriand's "The Natchez." They resided in the W. part of Mississippi, near the banks of the Mississippi river. Irritated against the French, who in that region were incessantly encroaching on them, they rose, on Nov. 28, 1729, and murdered every Frenchman in the colony. On Jan. 28, 1730, they were attacked by the Choctaws under Le Sueur, and a few days after, Soubois, at the head of the French troops, completed the work of destruction. Part of the tribe escaped across the Mississippi river to the vicinity of Natchitoches, but their fortress could not long withstand the force sent against it. The chief and over 400 of the tribe were taken prisoners, and sold as slaves, while some were incorporated with the Chickasaws and Muskogees, and others fled further W., of whom nothing was afterward heard.

Nation, either a people inhabiting a certain extent of territory and united by common political institutions, such as the English nation; or an aggregation of persons of the same ethnological family and speaking the same or cognate language. In some foreign universities, as in those of Glasgow and Aberdeen, for instance, the students are divided into "nations" to distinguish those from different districts or countries. This custom originated in the University of Paris antecedent to the institution of faculties.

National Academy of Design. See ACADEMY OF DESIGN, NATIONAL.

National Air, an air or tune characteristic of or peculiar to a particular nation or people; specifically applied to an air or tune which is adopted as that to be played on state or public occasions; as, in the United States, "The Star Spangled Banner"; in France, the "Marseillaise," and in England, "God Save the King" (or Queen). Also called a national anthem.

National Assembly, the legislative assembly in France. When the nobility and clergy summoned with the Tiers Etat to the States-General declined to sit with the Commons, these assumed the name of the National Assembly, though the name Constituent Assembly is more frequently employed.

National Banks. See BANKS IN THE UNITED STATES.

National Capitol. See CAPITOL.

National Cemeteries, the name given to establishments, instituted by Act of Congress for the interment of United States

soldiers who have fallen in battle, and whose graves become, accordingly, a sacred National charge. These graves, 316,236 in number, are distributed in 72 special, or "National," cemeteries, and in 320 of the local cemeteries of the country. The names of 175,764 (more than one-half) of the dead have been preserved and attached to the graves. Of the rest it is only known that they died fighting in the Union armies; their graves marked with the sad inscription, "Unknown United States Soldier." Of the whole number, less than one-fifth now repose in their original graves; 257,520, or more than four-fifths, have been removed from the rude trenches of the battlefields, or from their roadside graves, to the orderly enclosures where the National flag floats over their long rows.

National Civic Federation, an American organization, founded in 1902; the outgrowth of a number of local bodies. It is entirely non-partisan in principle, considering such topics as imperialism, trusts, tariff, taxation, etc., with a view of obtaining the clearest understanding of them, and of enlightening the public. The primal purpose of the Federation is to encourage the study and discussion of all matters which deal with the welfare of the United States. It is controlled by an executive committee of 30 members and meets annually, or at such other times and in such localities as may be deemed advisable. Its membership consists of men from all parts of the country.

National Conservation Commission, a commission appointed by President Roosevelt, June 8, 1908, after a conference of State governors and others at the White House, to devise and apply means for conserving the natural resources of the United States. The commission was composed of fifty-seven members, organized into four committees—one each on Waters, Lands, Forests, and Minerals. Many States have appointed commissions to coöperate with the National Commission.

National Convention, in France, a legislative body constituted in the hall of the Tuileries, Sept. 17, and formally opened, Sept. 21, 1792, when M. Grégoire, at the head of the National Assembly, announced that that assembly had ceased its functions. It was then decreed, "That the citizens named by the French people to form the National Convention, being met to the number of 371, after having verified their powers, declare that the National Convention is constituted." This convention continued till a new constitution was organized, and the executive directory was installed at the Little Luxembourg, Nov. 1, 1795. The Chartists in England formed a National Convention in 1839.

National Debt. See DEBT, NATIONAL.

National Expansion, the acquisition of territory by a nation, whether by conquest, seizure, or purchase. Since the treaty of peace with Great Britain in 1783 the United States has expanded in area about fivefold. At the beginning of the 19th century it had hardly crossed the Alleghanies. Now it has in area territory as large as the whole republic E. of the Alleghanies was 100 years ago. By the annexation of the Hawaiian Islands in August, 1898, the United States acquired an additional area of 7,629 square miles; and by the peace protocol signed by representatives of Spain and the United States, Aug. 12, 1898, it was provided that Porto Rico and other Spanish islands in the West Indies and an island in the Ladrones should be ceded to the United States, and that the latter should "occupy and hold the city, harbor, and bay of Manila pending the conclusion of a treaty of peace, which shall determine the control, disposition, and government of the Philippines." By this treaty the Philippine Islands were ceded to the United States, the latter paying Spain $20,000,000. Subsequently the United States bought two other islands in the vicinity for $100,000. See UNITED STATES.

National Gallery, the principal depository of the pictures belonging to the British nation. The present building, which was intended to accommodate the Royal Academy and National Gallery, stands in Trafalgar Square, London, and was finished in 1838 at a cost of $500,000. The collection is most valuable to the student of art, and occupies more than 22 rooms. The various early and late Italian schools are extensively illustrated; there are good examples of the chief representatives of Italian art, as Raphael, Correggio, Paul Veronese. There are a few good examples of Murillo and Velasquez and the Spanish school; and the great Dutch and Flemish painters, Rembrandt, Rubens, Van Dyck, etc., are well represented. In the department of the "British and modern schools" the largest additions as yet made by private munificence are the gift of 157 pictures, made in 1847, and the bequest of Joseph M. W. Turner, R. A., in 1856, embracing 105 works in oil and an immense number in water colors and pencil by his own hand. The entire collection now consists of over 1,280 pictures. There are also national galleries of art in Edinburgh and Dublin; the great public collections of Paris, Berlin, Dresden, Munich, Florence, Rome, etc., are mentioned in the articles on those cities.

National Guard. See MILITIA, STATE.

Nationalists, the term applied to the Irish political party whose programme includes the more or less complete separation of Ireland from Great Britain.

National Parks and Reservations, certain public lands of the United States which have been reserved from settlement, and are retained and improved by the United States government as National parks. The principal reservations are as follows:

The Yellowstone National Park.— This is a tract of land near the head waters of the Yellowstone river, in the States of Montana and Wyoming. It is 62 miles in length from N. to S., 54 miles in width from E. to W., and contains about 3,348 square miles, or 2,142,720 acres; its area is greater than that of the States of Delaware and Rhode Island combined. The average altitude is about 8,000 feet.

Casa Grande Ruin.— The Casa Grande Ruin, located near Florence, in the Territory of Arizona, is one of the most noteworthy relics of a prehistoric age and people remaining within the limits of the United States. The land on which it is located is part of 480 acres reserved from settlement by executive order, dated June 22, 1892. It was discovered already in a ruinous condition by one Padre Kino in 1694, and since that time has been a subject of record by explorers and historians. This structure, like others erected by the most advanced among the native races in the Southwest, is of perishable material, being built of cajon — that is, a puddle clay, molded into walls dried in the sun.

Hot Springs Reservation.— The permanent reservation at Hot Springs consists of four mountain reservations — Hot Springs Mountain, North Mountain, Sugar Loaf Mountain, West Mountain — and Whittington Avenue Reserve, having an aggregate area of 911.63 acres.

The hot water issues from the base and side of the Hot Springs Mountain, and the actual quantity thereof is not known. That which is under control and being used to supply the bath houses amounts to about 507,000 gallons a day, and the amount collected and passed through the impounding reservoir about 350,000, making a total quantity of hot water under control of about 857,000 gallons a day.

Sequoia and General Grant Parks.— Sequoia Park is located in Tulare co., Cal. Its area is about 250 square miles. General Grant Park is situated in Mariposa co., Cal., and contains about four square miles. In these reservations are found the finest known specimens of the *Sequoia gigantea,* the famous "big trees" of California.

Yosemite National Park.— This park is situated in Tuolumne, Mariposa, and Mono cos., Cal., and covers an area of about 1,512 square miles, being 36 miles wide and about 42 miles long.

In addition to the above the government has reserved a number of localities because of their large public interest, such as the Chickamauga, Gettysburg, and San Juan (Cuba) battlefields.

National Portrait Gallery, founded in 1856, was established at South Kensington, in 1869, but removed on loan to the Bethnal Green Museum in 1885. In 1891, when the collection comprised nearly 900 portraits, a building for its special use was in progress at the rear of the National Gallery.

National Soldiers' Homes. See SOLDIERS' HOMES.

Native of Algiers, A. See MARKOE, PETER.

National University, known as the Carnegie Institute, an institution incorporated Jan. 4, 1902, in Washington, D. C., by John Hay, Secretary of State; Edwin D. White, Justice of the Supreme Court; D. C. Gilman, ex-president of Johns Hopkins University; Charles D. Walcott, superintendent of the Geological Survey; John S. Billings, ex-Surgeon-General of the Navy, and Carroll D. Wright, Commissioner of Labor. The aims of the university are: (1) To increase the efficiency of the universities and other institutions of learning throughout the country by utilizing and adding to their existing facilities, and by aiding teachers in the various institutions for experimental and other work in these institutions as far as may be advisable. (2) To discover the exceptional man in every department of study, whenever and wherever found, and enable him by financial aid to make the work for which he seems specially designed his life work. (3) To promote original research, paying great attention thereto, as being one of the chief purposes of this institution. (4) To increase the facilities for higher education. (5) To enable such students as may find Washington the best point for their special studies to avail themselves of such advantages as may be open to them in the museums, libraries, laboratories, observatory, meteorological, piscicultural, and forestry schools and kindred institutions of the several departments of the government. (6) To insure the prompt publication and distribution of the results of scientific investigation, a field considered to be highly important.

The board of trustees elected by the corporators of the institution was as follows: (Ex-officio) The President of the United States, the president of the United States Senate, the speaker of the House of Representatives, the secretary of the Smithsonian Institution, the president of the National Academy of Sciences, and Grover Cleveland, New Jersey; John S. Billings, New York; William N. Frew, Pennsylvania; Lyman J. Gage, Illinois; Daniel C.

Gilman, Maryland; John Hay, District of Columbia; Abram S. Hewitt, New Jersey; Henry L. Higginson, Massachusetts; Henry Hitchcock, Missouri; Charles L. Hutchinson, Illinois; William Lindsay, Kentucky; Seth Low, New York; Wayne MacVeagh, Pennsylvania; D. O. Mills, California; S. Weir Mitchell, Pennsylvania; W. W. Morrow, California; Elihu Root, New York; John C. Spooner, Wisconsin; Andrew D. White, New York; Edward D. White, Louisiana; Charles D. Walcott, District of Columbia; Carroll D. Wright, District of Columbia.

The establishment of the National University was made possible by the gift, for this purpose, of $10,000,000 by ANDREW CARNEGIE (*q. v.*) in December, 1901.

Nations, Law of. By national law, or the law of nations is to be understood that portion of public law which concerns the rights, duties, and obligations of nations. Nations are considered as moral persons, having duties to perform as well as rights to enforce, and are bound to the observance of the great principles of justice, which are applicable to the relations subsisting between each nation and its own subjects, and between each nation and every other nation. International law is divisible into two heads, the one which regulates the rights, intercourse, and obligations of nations, as such, with each other; the other, which regulates the rights and obligations more immediately belonging to their respective subjects. Thus the rights and duties of ambassadors belong to that head which respects the nation in its sovereign capacity; and the rights of the subjects of one nation to property situated within the territory of another nation, belong to the latter head. The former is frequently denominated the public law of nations, and the latter the private law of nations. The great foundation on which the law of nations rests is the law of nature, or that system of principles which is deduced by human reason from the nature of man, and his social obligations for the direction and government of human societies. The law of nations may be divided into two great classes of principles, namely, those which arise from natural or universal law, and those which are of mere positive institution. The former is denominated the universal law of nations; the latter the positive law of nations. And the latter is again divisible into the customary law or that which arises from the general usages and customs, and habits of intercourse, and the conventional law which arises from express compacts or treaties between nations, or in a particular State from the fundamental constitution of such State.

When any society of men, or body politic, is united for the purposes of government and for mutual protection, we are accustomed to call such society or body politic a State or nation. To every State or nation we ascribe the attributes of sovereignty, independence, and equality with every other. Every nation which governs itself, without dependence upon any foreign power, is deemed a sovereign State. Nations are deemed sovereign not so much because they possess the absolute right to exercise, in their actual organization, transcendent and despotic authority, but because whatever they do exercise is independent of and uncontrollable by any foreign nation. The sovereignty of many nations is in its actual organization limited by their own constitutions of government; but, in relation to all foreign States, the sovereignty is, nevertheless, complete and perfect. In respect to each other, then, nations possessed of sovereignty are deemed equals, and are entitled to the same general rights and privileges. Relative strength is of no consequence; it neither confers nor abstracts any sovereign power. In respect to its own internal concerns every nation possesses general and supreme authority. The authority of the nation over all its members is, by the very act of association, deemed in all that concerns the general welfare of the nation, complete and supreme. All the members are bound to obedience and allegiance; and in return the nation is bound to protect and preserve its members.

Every nation possesses a right to all territory within its own limits not belonging to private persons; and as all such territory is held for the national benefit, it may be alienated and disposed of according to the will of the nation. All property, however acquired by the nation, is subject to the like disposition. Thus all the national revenues arising from taxation or rents, or other income or resources, may be applied as the nation deems proper for its own welfare. But there are many things which a nation holds for the public use and benefit, in respect to which all the subjects possess, or may possess, a common right of enjoyment. Thus rivers, lakes, and arms of the sea within the limits of the territory of a nation are possessed and owned by the nation in virtue of its occupation of the adjacent country; and until alienated they are held for the common benefit of all the people, and may be used by all the people for the purpose of fishing and navigation. Of the like nature are roads and highways, and canals established and supported at the expense of the nation. All these territorial rights and possessions, however, are subject to the municipal regulations of every nation, according to its own choice and constitution of government.

The basis on which all the rights and duties of nations in their intercourse with each other rest, is that they are all moral

Nations

persons, and that each has a perfect equality, in sovereignty and social rights, with every other. They are treated as moral persons possessing a sense of right and wrong, and responsible for a just discharge of all the duties common to the human race. The other maxim to which we have alluded is the perfect equality of nations, whether great or small, maritime or inland, strong or weak. In this respect they are treated like individuals who, however differing in capacity and strength, are deemed entitled to equal rights and privileges in the general scale of the human race. The rights and duties of nations, in regard to each other, may be divided into two general heads—those which belong to a state of peace, and those which belong to a state of war.

We shall first treat of those which belong to a state of peace. (1) Every nation is bound to abstain from all interference with the domain of other nations. That domain extends to everything which a nation is in possession of by a just title, whether it be by purchase, or cession, or conquest, or by a title founded solely on a long possession. (2) Where two nations border on a river, or lake, or arm of the sea, it often becomes a matter of dispute how far the limits of each extend, and how far either may exercise exclusive jurisdiction over such places. No principles can be laid down which will embrace all cases of this sort. If a nation has long enjoyed the exclusive use of a river, lake, or arm of the sea, for navigation, fishing, etc., that is understood to strengthen its title of possession. If no priority of occupation is or can be established by either of two nations inhabiting the opposite banks of a river, each is considered as having an equal title; and in such a case the right of dominion of each will extend to the middle of the stream or the river (*usque ad filum aquæ*). Where a nation possesses the territory on both sides of a river, so far as such territory extends it is deemed to be the owner of the river itself; but other nations, owning in like manner above or below on the same river, may have a right of passage, or other servitude. In respect to the main sea the general doctrine is that all nations have equal and common rights on the high sea, and they are not bound to admit any superiority there. The sea which washes the coast of a nation to the extent of a marine league, or 3 miles, is now deemed to be a part of the territory of the nation, over which it may, for its own protection, exercise an exclusive jurisdiction. And, in respect to persons subjected to its laws, every nation now claims a right to exercise jurisdiction on the high seas, for the purpose of enforcing not only the law of nations but its own municipal regulations. (3) From the exclusive jurisdiction and sovereignty of a nation within its domain it follows that no other nation has a right to punish for crimes committed by its own subjects therein. No foreign nation has a right to pursue any criminal or fugitive from justice therein; but its claim, if any, is a mere right to demand him from the nation itself. (4) Every nation has a right to regulate its own intercourse and commerce with other nations, not denying them just rights, in such a manner as is most conducive to its own prosperity and interests. In respect to its conduct toward foreigners every nation is under a moral obligation to treat them with respect, kindness, and humanity during their sojourn within its territories. And if a nation allows foreigners to enter into its territory, it is bound to respect their rights so long as they conduct themselves peaceably; and if, in breach of good faith, it proceeds to punish them vindictively, when they have committed no offense, it is justly responsible for its conduct to the nation to which they belong. Foreigners, however, are bound to obey the laws of a country as long as they reside within it and under its protection. The property held by foreigners within a country, according to the laws, ought to be protected in the same manner as that of natives. It is a general rule among nations to regulate the descent, distribution, and alienation of real or immovable property exclusively by the laws of the country wherein it lies. As to personal or movable property, it is now a common custom to allow foreigners the liberty of disposing of it by will or otherwise according to the laws of their own country or of their own permanent domicile. (5) How far a nation is bound to concede to others the exercise of any right within its own territory has been a matter of much speculation among writers on the law of nations. To this there can be little more than a general reply, namely, that it is the duty of every nation to concede to the necessities of others whatever may not incommode itself, or affect its interests, or endanger its peace or prosperity. (6) The intercourse between nations can scarcely be beneficially carried on without the instrumentality of some public agents. They may have disputes to adjust, injuries to redress, rights to ascertain, mutual objects and interests to promote—all of which may require great deliberation and many conferences. Hence arises the right of every nation to send and to receive ambassadors and other public ministers. And this right of embassy has always been deemed peculiarly sacred. The law of ambassadors forms, therefore, a large head in the law of nations. As representatives of the nation itself ambassadors and other public ministers are exempted from all responsibility to the civil and criminal jurisdiction of the countries to which they are sent. Their persons are

held sacred and inviolable. Their property, and servants, and retinue enjoy a like privilege. These rights, and privileges, and immunities are not, however, to be considered as favors granted to the individual, but as a sovereign claim and public security insisted on by all nations, and refused by none. (7) It is through the medium of ambassadors and other public ministers that treaties, conventions, and other compacts between nations are usually negotiated, thus forming a positive code for the regulation of their mutual rights, duties, and interests. In the modern practice of nations such treatics and compacts are not generally deemed final and conclusive till they have been ratified by the respective governments to which the negotiators belong. When made such treaties possess the highest sanctity and obligatory force. Many rules have been laid down for the interpretation of treaties. But they all resolve themselves ultimately into one great maxim, which is that they are to be understood and construed according to their obvious meaning, and the intention of the contracting parties. (8) As to the modes of terminating disputes between nations: These are various — by compromise, by mediation, by arbitration, by conferences and congresses, by tacit acquiescences in the claims of the other side, and lastly, on a failure of all these, by an ultimate resort to arms. This resort may be by a limited or by an unlimited warfare — by a limited warfare, as by retaliation, by reprisals, or other modified redress; by an unlimited warfare, as in cases of general hostilities in a public war.

And this leads to the consideration of the rights and duties of nations in regard to each other which belong to a state of war. First, between the nations at war. The right of declaring war results from the right of a nation to preserve its own existence, its own liberties, and its own essential interests. In a state of nature men have a right to employ force in self-defense; and when they enter into society this right is transferred to the government, and is an incident to sovereignty. (1) What are just causes for entering into a war is a question which has been much discussed by publicists. In general it may be said that war ought not to be entered into except for very cogent reasons, as it necessarily involves much personal suffering and many private as well as public sacrifices. Defensive wars are necessarily justifiable from the fact that they involve the existence or safety of the nation and its interests. But offensive wars are of a very different character and can be justified only in cases of aggravated wrongs or vital injuries. (2) In respect to the mode of declaring war. It may be formal, as by a public declaration; or informal, as by actual hostilities. In modern times nations are accustomed generally to make a public declaration, and to justify themselves before the world by a manifesto of their reasons. (3) The effects of a declaration of war. The first effect is to put all the subjects of each of the nations in a state of hostility to each other. They are not at liberty to engage in trade or commerce, or contract with each other; and they retain the character of enemies in whatever country they may be found. In the next place, all the property belonging to each is deemed hostile. If it be personal property it may be captured as prize; if lands, it may be seized and confiscated at the pleasure of the sovereign; if it be merely in debts or stock it may, in the extreme exercise of the laws of war, be equally liable to confiscation. In general each nation restrains the right to make captures and to carry on hostilities to such persons as are in public employment, or to such as receive a public commission for this purpose. (4) But though the extreme rights of war are thus rigorous and oppressive there seems no reason to exclude, even between enemies, the common duties of humanity. As soon as the battle is over the conquerors are bound to treat the wounded with kindness and the prisoners with a decent humanity. And there are some things which seem positively prohibited from their cruelty and brutal barbarity; such are the violation of female captives, the torturing of prisoners, the poisoning of wells, the use of inhuman instruments of war. (5) In times of war there is occasionally an intercourse between the belligerents which should always be held sacred. Thus the granting of passports and ransom of prisoners and property; the interchange of prisoners by cartels; the temporary suspension of hostilities by truces; the passage of flags of truce; the engaging in treaties of capitulation, in cases of besieged armies or cities — all these are matters which are held in great reverence and demand the exercise of the utmost good faith. (6) In respect to captures made in war they generally inure to the benefit of the sovereign, unless he has made some other positive distribution of them. When any conquest of territory is made the inhabitants immediately pass under the dominion of the conqueror, and are subject to such laws as he chooses to impose upon them. In cases of reconquest the property, unless previously disposed of, returns to the original owner by the *jus postliminii*, in like manner as the restoration of a prisoner of war to his own country reinstates him in his prior rights. (7) There are also certain rights which war confers on the belligerents in respect to neutrals. Thus they have a right to blockade the ports or besiege the cities of their enemies, and to interdict all trade by neu-

trals with them. But the blockade must not be a mere "paper blockade"; no blockade is to be recognized unless "the besieging force can apply its power to every point in the blockaded State." They have a right also to insist that neutrals shall conduct themselves with good faith, and abstain from all interference in the contest by supplying their enemy with things contraband of war. And hence arises the incidental right of search of ships on the high seas for the detection of contraband goods. At the Congress of Paris, 1856, the ambassadors of Great Britain, France, Russia, Austria, Prussia, Turkey, and Sardinia agreed to a joint declaration by which several elements in the laws of war, as then understood, were modified. But the United States of America refused to accede to them, objecting especially to the article by which privateering was declared to be abolished.

The next question is the consideration of the rights and duties of neutrals. A neutral nation is bound to observe entire impartiality between the belligerents. It should do nothing, therefore, which favors one party at the expense of the other. Neutral nations are, strictly speaking, bound to compel their subjects to abstain from every interference in the war, as by carrying contraband goods, serving in the hostile army, furnishing supplies, etc. In practice, however, in cases of contraband goods, the belligerents content themselves with exercising the right of confiscation; and the neutral nation submits to this as a just and fit remedy, without any complaint. Subject to the exceptions above referred to, a neutral has a right to insist on carrying on its ordinary commerce with each of the belligerents, in the same manner as it had been accustomed to do in times of peace. Whether it may carry on a trade with either belligerent in war, which is interdicted in peace, is a point which has given rise to very sharp controversy in modern times, and especially between Great Britain and the United States, the former contending for the restriction to the accustomed trade, the latter insisting upon also carrying on the unaccustomed trade. Whether a neutral nation is bound to allow a passage to the troops of either belligerent through its own territory, is a point often discussed. Strictly speaking, neither party has a right to insist on such a passage; and if it is granted to either, and materially affects the fortune of the war, it is almost always construed as an act of hostility to the other party, and is resented accordingly. A neutral nation has also a right to insist that no hostilities shall be committed by the belligerents within its territorial limits. The property of an enemy, found on board a neutral ship on the high seas, is deemed good prize, and *e converso* the property of a neutral, found on board an enemy's ship, is deemed neutral. The reason for the difference is, that on land the neutral sovereign has exclusive jurisdiction within his own territory, over all persons and property within it. But all nations have a common jurisdiction on the high seas to enforce their rights, and the right of search carries with it an incidental jurisdiction over all enemy's property found therein, in the ships of a neutral. This right of search, however, is strictly confined to merchant ships and is never extended to ships of war belonging to the nation itself; for in such ships the national sovereignty is exclusive. In cases of civil war the rights and duties of neutrals are not essentially different. Every neutral is bound to abstain from all active interference in the contest, on one side or the other. If the contest gives rise to the establishment of independent governments formed out of the severance of the old empire, it is not deemed an act of hostility to recognize each as having a sovereign existence as a nation. But while the contest is dubious and the affair wears the appearance of a mere private rebellion, such a recognition would be deemed an active interference to promote the civil war and therefore would, or at least might, be resented as a departure from the neutral character. Hitherto we have dealt with the law of nations; but there is a division of international law, generally known as the "conflict of laws," which takes cognizance of the principles which should regulate the rights and obligations of private parties when these are affected by the separate internal codes of distinct nations. Mr. Justice Story, of the United States Supreme Court, in 1834 published his famous treatise on this subject, in which he methodized the results arrived at by foreign jurists. It treats of the "conflict of laws, foreign and domestic, in regard to contracts, rights, and remedies; and especially in regard to marriages, divorces, wills, successions, and judgments." The leading principle of international law in this department is that each nation should give effect to the laws of another country, unless these conflict with its own laws or the general principles of justice.

Natural Bridges, tunnels eaten through rocks by streams, etc. There are 10 of these natural curiosities, many of them of great beauty, in various parts of the United States; that of Virginia being the most celebrated. The arch of this one is 60 feet spring, depth 200 feet, crown 40 feet thick. In Walker Co., Ala., is a natural bridge in which the stone is so stratified as to resemble masonry. In Trinity Co., Cal., a small river runs for 3,000 feet through an arch of 80 feet span and 20 feet high. In Adams, Berkshire Co., Mass., the Hudson brook flows for 30 rods under an arch of white

marble. At the village of Natural Bridge, N. Y., Indian river flows through a series of arches.

Natural Gas, carburetted hydrogen, issuing from the earth in springs or wells. The fire damp of coal mines is practically the same gas, which was produced during the formation of the coal from vegetable matter and is set free by the miner's pick. Natural gas is generally found in connection with pools of petroleum. Though natural gas has long been known and is found in abundance at Baku, on the Caspian Sea, its practical development belongs to the industrial history of the United States. The great natural reservoirs of this fuel are located chiefly on the N. W. slope of the Appalachian Mountains and on the summit of the Cincinnati arch in Northwestern Ohio and Northern Indiana. These fields furnish 97 per cent. of the natural gas of the United States. The original pools have suffered great depletion by carelessness when the reservoirs were first tapped; but more careful handling of the supply has resulted in a great saving.

The first extensive use of this gas was at Fairview, Pa. In 1875 it was first applied to iron smelting; and in 1886 it was brought to Pittsburg, Pa., from a reservoir 19 miles distant and introduced as a substitute for all other kinds of fuel, for domestic and economical purposes. This city now consumes annually 50,000,000 cubic feet of natural gas.

The total number of gas wells in the United States at the close of 1900 was 10,506, a gain of 768 wells over the previous year. The total length of all natural gas mains of two inches and larger, reported in the United States at the close of 1900, was 21,048 miles.

The approximate value of natural gas produced in the United States during the calendar year 1908 was $54,640,374, from 21,375 wells scattered among 22 States. The chief producing States were: Pennsylvania, $19,104,944; West Virginia, $14,837,130; Ohio, $8,244,835; Kansas, $7,691,587; New York, $959,280; Oklahoma, $860,159; Illinois, $446,077; Kentucky, $424,271; California, $307,652; and Louisiana and Texas, $236,837.

Natural History, in the widest sense, and as used by the ancients, that branch of knowledge which included all natural science, and had the Cosmos for its subject. In more recent times its range was limited to zoölogy: now again, its bounds are extended, and it may be defined as the science which deals with the earth's crust and its productions. Thus it includes geology, mineralogy, palæobotany, and palæontology, treating respectively of the inorganic world and organic remains of past ages. To these succeed biology, or the science of life, in its widest science (see BIOLOGY). Popularly, natural history is synonymous with ZOOLOGY (*q. v.*), and some writers of authority use it in that sense.

Naturalism, in theology, the name given to all forms of belief or speculation which deny or ignore the doctrine of a personal God as the author and governor of the universe. It is opposed to THEISM (*q. v.*).

Naturalization, in law, the act of placing an alien in the position, or investing him with the rights and privileges of a natural-born subject. The naturalization laws of the United States are wholly the fabric of the Federal government, while the privileges attendant, so far as regards suffrage, etc., are left to the discretion and gift of the various State legislatures. For a foreigner to become a citizen of the United States it is necessary for him, first, to declare his *bona fide* intention to become a citizen, and the declaration must be made at least two years before "final papers" are taken out. It must be made before a United States Circuit or District Court, or (in a Territory) before the Supreme Court or a District Court, or (in a State) before a court having a common law jurisdiction and a clerk and seal. At the time of admission to citizenship, the applicant must have been, at least five years previously, a resident of the United States, and must produce evidence that he is a fit subject on whom to confer the rights of citizenship, and must, further, renounce allegiance to all foreign princes and governments — particularly to the one to which he was last subject. After admission he is, in all respects, a citizen of the United States and entitled, in every regard, to the same protection that the native-born citizen is. In the case of children of a foreigner, who, at the time of their father's naturalization, were not of legal age, the act of the father is considered as conferring citizenship on them, and further process is unnecessary. Any alien of 21 or over, of good moral character, who has served in the United States army, and resided in the country for one year previous to application, is entitled to full citizenship on production of evidence establishing these facts. Chinamen cannot be naturalized. The children of citizens of the United States if born abroad, are American citizens, and entitled to protection as such. On the naturalization of any foreigner, if he hold any title of aristocracy, such title must be renounced. In some of the States a foreigner who has declared his intention to become a citizen is permitted to vote, while in others none but full-fledged citizens are admitted to that privilege. For several years there has been an increasing sentiment in the United

States in favor of making the naturalization laws more severe, particularly with the view of excluding anarchists.

In biology, the introduction of plants through human agency into new lands or regions. They are of a diversified nature. In Dr. Asa Gray's "Manual of the United States," 260 naturalized plants are enumerated belonging to 162 genera. The sturdy plants of Europe introduced into New Zealand cause the native plants to die out, as the Maori vanishes before the colonizing European. H. M. KNOWLTON.

Natural Philosophy, a term still frequently employed to designate PHYSICS (*q. v.*), or the branch of physical science which has for its subject those properties and phenomena of bodies which are unaccompanied by any essential change in the bodies themselves.

Natural Science, Advancement in. A review of the results of investigations in the field of natural science during the 19th century presents a marvelous retrospect and shows the period to have been one of the great stepping stones in intellectual advancement of the world's history. It is true that the science of biology existed prior to 1800; Aristotle, Pliny, Linnæus, Belonius, Aldrovandus, Gesner, Fabius, Colonna, Imperato, Ray, Trembley, Donati, Lister, Rumphius, Palas, Fabricus, and many more were the early standard bearers of natural science; but it cannot be said that these men left the intellectual impression upon the 18th century that has been accomplished by the disciples of science who followed them in the period just closed. There is magic in the names that shine out in letters of fire in the 19th century. Lamarck, Cuvier, St. Hilaire, Agassiz and Darwin alone will render it immortal in the great cycles of the evolution of intelligence, and in their train are lesser lights contributing to the glories of discovery and original research whose names constitute the monuments along the pathway which has led to our present knowledge in the various fields of natural science.

At the beginning of the 19th century, or 100 years ago, science compared to that of today was extremely crude. The masses of the people were very ignorant, and the man of science was regarded as a curiosity outside of his particular circle. The works and theories and system of Linnæus prevailed, but the opening of the year 1800 saw new figures in the field. Lamarck was making himself famous in the department of invertebrates. Cuvier was delving into the vertebrates, and Latreille in other fields, and the most remarkable occurrences in the field of science at the beginning of the 19th century were due to the efforts of these men. In 1800 Latreille published his "Genera." In 1815 the splendid "History of Animals" was given to the world by Lamarck; and following, in 1817, came "Regne Animal," by Baron Cuvier — a vast work, which made the French savant at once famous, giving him a position which Agassiz later held in the world of science as one of the greatest investigators of modern times.

The appearance of Cuvier's works marks the beginning of the century as an important era in the advancement of science. They were "The Animal Kingdom" (1827); "Comparative Anatomy" (1815); "Fossils" (1812); and "Natural History of Fishes" (1828). One of the notable results of his work was to open up the study of comparative anatomy to the world and direct attention to its importance, a flood of new genera and species in all branches of animal life following to astonish the student and layman. Cuvier was most active in building up the Jardin des Plantes, aided by Napoleon, and France was a leader in science. The names of Quoy, Gaymard, Langsdoff, Savigny, Peron, and others became famous. To Cuvier is due the establishment of the principle of the correlation of organs, and he was the father of the science of palæontology.

The most remarkable event of the time was the first expression of the doctrine of evolution by Lamarck in 1802; and it can be safely said that no discovery in science ever equaled in popular interest the excitement which followed in the train of this remarkable disquisition. Lamarck announced the variation of species in plants and animals and their dependence upon environment. He separated the animal kingdom into the two great classes — vertebrates and invertebrates. The classes of infusorians and spiders are his suggestions. He discovered that the barnacles are crustaceans and not mollusks, and he was the first to suggest a phylogeny, or a genealogical tree for the animal kingdom.

In the first third of the century the science of embryology took definite form under the influence of Pander, Oken, Dollinger, Von Baer, and others. Notable discoveries in the nature of the animal cell were made by Schwann, the terms nucleus and nucleolus being applied by him. Von Baer now proved that all mammals developed from eggs. Coste, Valentin, and Jones discovered that these eggs were homologous to those of lower vertebrates, and in 1850 Remak made the remarkable discovery of the three germinal layers. The first part of the century was famous for the first of the great exploring expeditions for the study of marine zoölogy. From 1800 to 1823 France sent several ships; St. Vincent, Peron, Leseur, Vaillant, Quoy, and Gaymard being the naturalists. England sent Bennett, Owen, Darwin, and Huxley. Russia was not behind; nor Germany, and

the United States sent Dana, Couthuoy, Peale, Ringold, and Stimpson; and thus began the work which culminated in the magnificent expeditions of the "Challenger," the "Albatross," and others under Agassiz.

In the middle of the century Müller was a striking figure; a great anatomist, and under his teaching modern morphology was born. Now came an era of books on science, and the literature of modern and exact science under such masters as Owen, Huxley, Wagner, Gegenbaar, Müller, and others took permanent form.

The most notable event of this century of discovery was the discussion and theorizing regarding evolution. Lamarck, St. Hilaire and Goethe were early writers on the subject, but in 1859 appeared Darwin's "Origin of Species," which was a literary red flag, that aroused layman and scientist and brought on a remarkable war of discussion. It had been held by the people and Church that all life was created as it now appears, and briefly Darwin proved that all species are but the result of natural causes. It is a curious fact that Wallace simultaneously arrived at the same conclusion, and when Darwin was about to issue his book the former sent him a paper that embodied the same views, which the great master of scientific thought gave him full credit for. The new doctrine was expounded by Huxley, Spencer, Haeckel, Gray and others, while a modernized Lamarckian doctrine found supporters in Dall, Cope, Hyatt, Ryder, and Packard. The works of Darwin aroused the most remarkable opposition in the Church and the author became the butt of assaults of all kinds from press and pulpit, a war raging which has never been equaled; but today the theory that species are the outgrowth of natural causes holds among the great teachers and thinkers of the age.

In so limited a space as the present paper it is impossible to touch on all the great events which have marked the century. Perhaps the most important event in the United States was the arrival of Agassiz. He became the leader in scientific thought in the country, and inaugurated a system of investigation and study that entirely changed existing methods. He was one of the greatest of the world's teachers in zoölogy, and in morphology and embryology his work was epoch-making. It is impossible to mention all the distinguished modern representatives of these men, but Marsh, Baird, Coues, Cope, Leidy, Le Conte, Hall, Dana, Packard, Stimpson, Wyman, Brooks, Ryder, Hyatt, Verrill and many more will be recalled by the reader.

A remarkable feature of the advancement of science in the 19th century was the growth and development of museums and zoölogical stations all over the world. Space will only permit mention of those in the United States. The struggles of Agassiz to establish the Museum of Comparative Zoölogy at Cambridge are well known. It was his pride and joy, and today his herculean labors stand a monument to his tenacity of purpose; one of the greatest collections, so far as its scientific value is concerned, in the world. In 1847 the Smithsonian Institution was founded, and followed by the National Museum, the two now being under one roof at Washington, representing a colossal collection of material to aid in the dispersal of knowledge. In 1870 Prof. A. S Bickmore opened the American Museum of Natural History to the citizens of New York, and today this institution, with its treasures of science, ranks second to none in the world, and aided by its splendid system of public lectures, inaugurated by its founder, Professor Bickmore, it is one of the greatest aids to public education in the United States. Professor Bickmore's lectures reach, through the teachers of the public schools, an audience of millions, and the museum has a specially constructed lecture room for the purpose.

The establishment of schools of zoölogy was a feature of the advancement of science in the United States, the first one being at Penikese Island, where Agassiz drew about him all the bright lights in the firmament of science. Johns Hopkins University established another. Aquariums took shape in London, Berlin, and Naples, and today New York has a free aquarium where tens of thousands yearly observe the habits of the marine animals of this country.

The 19th century was a marvelous epoch. It saw innumerable discoveries in all fields, and doubtless will stand in all time as a period of maximum intellectual activity along the lines of exact science.

CHARLES F. HOLDER.

Natural Selection, the central idea of the Darwinian theory of evolution. It may be expounded in three propositions: (1) Living creatures are variable from generation to generation, for though like tends to beget like, there is often something novel in the expression of the inheritance. Many descriptions of specific characters are demonstrably only averages; they accurately fit the majority of individuals, but not all; around the compact center of closely similar forms there is a continually changing assemblage of outlying variants. The reasons for this variability are still obscure; the mingling of complex material which takes place in the fertilization of the egg cell by the sperm cell may account for some; the influence of changeful bodily nutrition, etc., on the germ cells before their liberation may account for others; and there are other possibilities. But as to the fact that variations are continually occurring there is no doubt. It is conven-

Natural Selection

ient to distinguish those bodily changes — technically called "modifications" — which are directly produced on the body by use and disuse and by surrounding influences, and which are not proved to be directly transmissible, from true "variations" which have their origin in the germinal material, and are certainly transmissible. These variations may be minute fluctuations on either side of a mean, a little more of one character and a little less of another; or they may be sudden steps of considerable magnitude; in other words, they may be continuous or discontinuous. They may visibly affect only one character at a time, or they may affect many parts of the organism at once, as if there were a general movement to a new position of organic equilibrium. A discontinuous variation affecting the organism as a whole, is often called a "mutation." To sum up, variability is a fact of life, the members of a family or species are not born alike; some have qualities which give them a relative advantage in life; others are relatively handicapped.

(2) Living creatures are involved in a manifold and intricate struggle for existence, varying greatly in its form and in its intensity, and due to a variety of causes. It is necessitated especially by two facts: first, that two parents usually produce many more than a pair of offspring, and that the population tends to outrun the means of subsistence; and, secondly, that organisms are at the best only relatively well adapted to the external conditions of their life, which moreover are variable. The "struggle" may be: (*a*) between organisms of the same kind, *e. g.*, locust against locust, and rat against rat; (*b*) between organisms entirely alien to one another, *e. g.*, between birds of prey and small mammals; and (*c*) between living creatures and the inanimate environment, *e. g.*, between birds and cold weather. The "struggle" may be for food or foothold, for mates or property, for self-preservation or for the welfare of the young. As Darwin said, though many seem to have forgotten the saying, the phrase "struggle for existence" is used in "a wide and metaphorical sense"; including much more than an internecine scramble around the platter which contains the necessaries of life; the phrase is applicable as regards relative length of life, vigor or constitution, success in having offspring, and so on. In many cases the struggle for existence might be more fairly described as an endeavor after well being.

(3) In this struggle for existence the relatively less fit organisms are weeded out or eliminated, and sometimes only a small proportion of those born survive to become adults or reproductive. But it must be clearly understood that elimination does not necessarily involve sudden death or no offspring; it may simply involve, in the first instance, a slightly shorter, less successful life, or a smaller, less vigorous family. Yet whether the eliminative process be gentle or severe, the result is the same — that the relatively more fit variants tend to survive. It is of course an error to suppose that this result — "The survival of the fittest" — necessarily means the survival of the best or highest according to any evolutionary standard; it only means fittest relatively to given conditions of survival, fittest in relation to particular circumstances of life. This being understood, the argument continues, that since many variations are demonstrably transmissible from generation to generation, and may, through the pairing of similar or suitables mates, or in other ways, gradually increase in amount, the eliminative or selective process works toward the establishment of new adaptations and new species.

The three steps in the argument are thus: (1) The occurrence of transmissible germinal variations is a fact of life; (2) the struggle for existence is a fact of life; and (3) the elimination of the relatively less fit is a fact of life. The result has been, and is, the rise and progress of new adaptations, new varieties, new species, new types. Given variability to produce the raw material of progress, given the relation of genetic continuity which we call heredity, given the eliminative processes of the struggle for existence, and evolution results. More technically, natural selection is a secondary or directive factor in the great historic process of change or becoming, which we call evolution. Whether the selection theory is "all-sufficient," as Weismann calls it, or "inadequate," as Herbert Spencer says, it remains for the great majority of naturalists a most useful formula, a fruitful working hypothesis, a unifying theory. Given a sufficiently abundant crop of variations, a persistent and discriminating struggle for existence, and a large draft on the bank of Time, what may the selective process not accomplish?

A formidable objection to the selection theory, first clearly stated by Prof. Fleeming Jenkin, is that variations of small amount and sparse occurrence would tend to be swamped out by intercrossing. In human or artificial selection, the breeder takes measures to prevent this by pairing similar or suitable forms, but what in nature corresponds to this action of the breeder? Various suggestions have been made in answer to this objection. Thus Weismann says: "The necessary variations from which transformations arise must in all cases be exhibited over and over again by many individuals," and in his ingenious theory of "Germinal Selection" he has suggested the internal mechanism by which this result may come about.

But the answer at present most relied on is that worked out by Romanes, Guliek, and others — the theory of isolation. The theory of isolation emphasizes the great variety of ways in which, in the ordinary course of nature, the range of intercrossing may be restricted, *e. g.*, by geographical barriers, by differences in habit, by psychical likes and dislikes, and by those remarkable reproductive variations which cause mutual sterility between two sections of a species living on a common area. According to Romanes, "without isolation, or the prevention of free intercrossing, organic evolution is in no case possible." But it must be confessed that at present the body of facts advanced in illustration of isolation and its effects is unsatisfactory.

An interesting corollary has been indicated by Prof. Cossar Ewart. Breeding within a narrow range often occurs in nature, being necessitated by geographical and other barriers. In artificial conditions this inbreeding often results in the development of what is called prepotency. This means that certain inbred forms have an unusual power of transmitting their peculiarities, even when mated with dissimilar forms. In other words, certain variations have a strong power of persistence. Therefore, wherever through inbreeding (which implies isolation) prepotency has developed, there is no difficulty in understanding how even a small idiosyncrasy may come to stay.

We have given a statement of the theory of natural selection very much as it might have been given in 1859, when Charles Darwin and Alfred Russel Wallace enriched biology by their independent exposition of the selection idea; but since then our knowledge of the nature and origin of variations has greatly increased, the analysis of the various modes of inheritance has become much more precise, the difficulty of proving any instance of the transmission of "an acquired character" or direct somatic modification is generally acknowledged, and we have recognized the value of a second directive factor in evolution, namely, isolation. It may be said that the theory of natural selection is now being subjected to more severe and more dispassionate criticism than it had to encounter in the early Darwinian days, when the validity of the general evolution idea was the central subject of discussion.

Thus there is a demand for some serious attempt to measure the intensity of the struggle for existence in typical cases, and for evidence that the absence of a particular variation in certain members of a stock does really determine their elimination. There are inquiries as to the relative frequency of discontinuous or transilient variations — where a new character or set of characters is reached with apparent suddenness, for if these are frequent they will lessen the claims which have to be made on the selective process; it is asked whether the task of elimination will not be further lessened if the crop of variations turns out to be more definite and less of the nature of random freaks than used to be supposed; information is wanted as to the degree in which the struggle is directly competitive, or merely between the living creature and its inanimate surroundings; especially it is desirable that statistics be forthcoming to show how far the elimination is discriminate, as when the breeder gets rid of the unsuitable members of his stock, and how far it is indiscriminate. In other words, evolutionists have awakened to the necessity of testing natural selection in relation to actual cases.

In conclusion, it should be noted that the "selection idea" must not be restricted to cases of "individual" or "personal" selection where there is struggle between individuals or between individuals and their environment. The idea has a much wider applicability. In human affairs we are aware of a struggle between institutions — superorganic selection occurs; in the life of individual men, animals, and plants around us, we see the typical struggle for existence (typical, because we can study it with most precision) — personal or individual selection occurs; Roux has made us familiar with the idea of a struggle of parts within the organism — intraorganismal or histonal selection occurs; there is an indubitable, indeed a visible, struggle between the germ cells as such, between young ova, between spermatozoa in their race to an ovum, between ova and spermatozoa, and between both sets of germ cells and their environment — gametal or germ cell selection occurs; and Weismann has gone a step further in his subtle hypothesis of germinal selection, which supposes a struggle between the determinants (organized rudiments of particular characters) within the germ cells. Thus the selection formula has a long gamut, and it is much to be desired that those who deny or doubt its efficacy would, as a courteous preliminary to criticism, make themselves acquainted with the length and breadth of the idea.

Natural Theology, as ordinarily understood, that branch of theology, or that system of theology, which derives nothing from revelation or revealed religion — that is, from the Bible — but is given us through the light of nature and reason alone. It treats of the nature, character, and attributes of God; the relation of God to the world and to man, and of man and the world to God; what may be believed regarding a future life, future rewards and punishments, etc. According to Professor Flint, "the relevant data of natural the-

ology are all the works of God in nature and providence, all the phenomena and laws of matter, mind, and history, and these can only be thoroughly ascertained by the special sciences. . . . The sciences which deal with nature, mind, and history hold the same position toward natural theology which the disciplines that treat of the composition, genuineness, authenticity, text, development, etc., of the Scriptures do toward Biblical theology." Questions of natural theology were discussed by various ancient philosophers, as Socrates, Plato, Aristotle, Cicero; but the first regular treatise on the subject seems to have been the "Theologia Naturalis" of Raymond de Sebonde, who died in 1432 in Toulouse. Among modern works on the subject are Paley's "Natural Theology," Butler's "Analogy," Chalmer's "Natural Theology," Tulloch's "Theism," McCosh's "Method of the Divine Government," etc.

Nature Printing, a process in which impressions which may be printed from are obtained from objects, such as leaves, fibers, lace, etc. In one method the object, such as a fern frond, is placed between a steel plate and one of heated lead and subjected to a strong pressure, forming an exact intaglio copy in the lead from which impressions are taken.

Nature Study, a feature of modern education to which much attention has been given of late years both in the United States and abroad. It introduces the child directly to nature without the medium of books, or at least making them merely supplemental. School gardens form prominent and valuable instrumentalities for the promotion of this department of school life and are becoming more common in the United States. They are numerous in France, Germany and some other countries.

Nature Worship, a generic term to denote a stage of religious thought in which the powers of nature are personified and worshiped. It found its highest and most beautiful expression in the mythology of ancient Greece. Classifying religions with regard to the estimation in which the Deity is held, Lubbock makes nature worship the second stage, atheism (the absence of definite ideas on the subject) being the first.

Naucratis, an ancient city of Egypt; in the Nile delta; near the modern village of Nebireh; 47 miles S. E. of Alexandria; existed in the 7th century B. C. It was the only city in Egypt at which the Greeks were allowed to trade; was celebrated for its artistic pottery; and was a center for the worship of Aphrodite. The site was discovered by Flinders Petrie in 1884, and excavated by him in that and the following year. His monograph "Naukratis" (1886) gives an account of the ruined temples and the many valuable archæological discoveries made on this site.

Naugatuck River, a river of Connecticut, rises in Litchfield county, runs S. through New Haven county, and enters the Housatonic river at Derby. It is nearly 65 miles long. The chief city on its bank is Waterbury.

Naukratis (na′-), an ancient Greek city in Egypt, which stood on a navigable canal in the W. part of the Delta near the Canopic branch of the Nile. It existed as early as the beginning of the 7th century, B. C., and had been a place of great splendor. Recent excavations on the site of the city have been productive of highly valuable results.

Naumachy, in Roman antiquities, a representation of a naval engagement, which took place most usually in theaters (called also naumachiæ) made for the purpose. These exhibitions were originally instituted for the purposes of naval discipline; but, in process of time, only malefactors or captives whose lives had been forfeited acted in them. They appear to have been conducted on a scale of such magnificence as almost to exceed belief. Within the places set apart for them whole fleets went through their evolutions. In the sea fight on the lake Fucinus, given by Claudius, there are said to have been no fewer than 19,000 combatants. Julius Cæsar appears to have first given a naumachia on an extensive scale; his example was followed by many of his successors on the imperial throne; and at last they were frequently exhibited at the expense of private individuals, as a means of increasing their popularity.

Naumburg (noum′bŏrg), a quaint old town of Prussian Saxony, on the Saale, 30 miles S. W. of Leipsic. Of its six churches, the triple-towered cathedral (1207–1242) is a noble Romanesque and Gothic structure. The manufactures include ivory carvings, combs, hosiery, wine, etc. The yearly "cherry feast" commemorates the raising of the siege of Naumburg by the Hussite leader Procopius in response to the supplication of the children (July 28, 1432); but recent historians cast doubt on the whole episode. The seat of a bishopric (1059–1564), Naumburg suffered much in the Thirty Years' War; in 1814 it came to Prussia. Pop. (1900) 23,192.

Nauplia, a small fortified town and seaport with an excellent roadstead in the Morea, Greece, at the N. extremity of the Gulf of Argos or Nauplia, 25 miles S. of Corinth. At an early period it was the port and arsenal of Argos. In the 13th century it was occupied by the Venetians (who called it Napoli di Romania), and it was taken by the Turks in 1540. From 1824 to

1835 it was the capital of Greece, and had a population of upward of 12,000; but on the removal of the court to Athens it fell into decay.

Nauplius, plural **Nauplii,** in zoölogy, a term applied by O. F. Müller to the unsegmented ovate larvæ of the lower Crustacea, with a median frontal eye, but without a bone carapace. The name is now employed to designate all the larval forms having this character.

Nauplius, in Greek mythology, the son of Neptune and father of Palamedes, said by the legends to have revenged the death of his son by deceiving the Greeks by false beacons, as they returned from Troy, and causing them to be wrecked.

Nausea, a sick feeling which may go on to vomiting, caused by the digestive system or the brain being in an abnormal state. In hysteria and pregnancy, irritation or tumors of the abdominal or the pelvic viscera may produce it, as may also the early stage of zymotic disease, or epilepsy, and diseases of the brain.

Nautch Girl, or **Nautchee,** a professional dancing and singing-girl in India. They are selected for their beauty, generally from the middle class of life, and when very young are placed under strict training in physical exercises and taught all the arts of their profession.

Nautilus, in ordinary language, a name popularly applied to two very different animals: the paper nautilus — the nautilus of poets, which belongs to the genus *Argonauta* (see ARGONAUT), and not to nautilus; and to the pearly nautilus (*N. pompilius*), for a long period the only known species. In zoölogy, the typical and only recent genus of the family *Nautilidæ*. The shell is involute, with an outer porcellanous and an inner nacreous layer. The soft structures of the animal were first described by Owen in 1832, and its anatomy is elaborately discussed by E. Ray Lankester in the "Encyclopædia Britannica" (ed. 9th, article "Mollusca"). Three species are known: *N. pompilius* (the pearly nautilus), *N. macromphilus*, and *N. umbilicatus*, all from the Indian and Pacific Oceans. The nautilus ranges in time from the Upper Silurian to the present day, with a maximum development in the Carboniferous period.

In hydraulic engineering, a form of diving-bell requiring no suspension. Water admitted through the cock into pipes flows into the exterior chambers, causing the apparatus to sink. The workmen enter through an aperture at the top, closed by an air-tight cover, and can in still water move the machine in any required direction by stepping on the ground and pushing. Air is condensed in a reservoir at the surface to a degree somewhat greater than the condensation due to the depth, and passes through a pipe into the chambers rendering the machine specifically lighter than water, and enabling it to lift stones or other objects below. A gauge indicates the amount of lifting power attained as the air is admitted, so that the supply may be cut off when the requisite power is reached.

Nautilus Propeller, a water-jet propeller on the reaction principle. Water is forced by a turbine driven from the engine, through two nozzles, one on each side of the vessel, and directed fore or aft. It has proved practicable, but wasteful.

Nauvoo, a village of Illinois, on the Mississippi river; 14 miles above Keokuk. It was built by the MORMONS (*q. v.*) in 1840, and in a few months contained a population of 15,000. Its principal feature was a great temple of white limestone (1841–1845); but it had also mills and factories, and the beginnings of a university, and was for a few years a prosperous and happy town. After the expulsion of the Mormons in 1846, the temple was half destroyed by fire in 1848, and further ruined by a tornado in 1850. The town was afterward bought and occupied for a while by a French Socialist community. The Nauvoo Legion was a Mormon military organization, embracing all the males between the ages of 16 and 50, founded here in 1840, and reorganized in Utah in 1857. In 1870, when it mustered for the last time, it numbered about 13,000 men.

Navajo (nav'a-hō) **Indians,** a half civilized tribe of the Athabascan group, inhabiting the N. part of Arizona and New Mexico, where they have a fine reservation. They have considerable native civilization, not a few of them engaging in agriculture, and in raising horses, sheep, and goats. They weave blankets, which are prized highly throughout the Southwest. They are a fine athletic race and excellent horsemen. While not an aggressive tribe, they have frequently been at war with the whites. They number about 11,850.

Naval Academy, United States, a technical educational institution, established in Annapolis, Md., by Act of Congress, in 1845, through the exertions of George Bancroft, then Secretary of the Navy. It was formally opened Oct. 10 of that year, with Commander Franklin Buchanan as superintendent. During the Civil War it was removed from Annapolis, Md., to Newport, R. I., but was returned to the former place in 1865. It is under the direct supervision of the Bureau of Navigation, Navy Department.

There are allowed at the academy one naval cadet for each member or delegate of

Naval Academy

the United States House of Representatives, one for the District of Columbia, and 10 at large. The appointment of cadets at large and for the District of Columbia is made by the President. The Secretary of the Navy, as soon after March 5 in each year as possible, must notify in writing each member and delegate of the House of Representatives of any vacancy that may exist in his district. The nomination of a candidate to fill the vacancy is made, on the recommendation of the member or delegate, by the secretary. Candidates must be actual residents of the districts from which they are nominated.

The course of naval cadets is six years, the last two of which are spent at sea. Candidates at the time of their examination for admission must be not under 15 nor over 20 years of age and physically sound, well formed, and of robust constitution. They enter the academy immediately after passing the prescribed examinations, and are required to sign articles binding themselves to serve in the United States navy eight years (including the time of probation at the Naval Academy), unless sooner discharged. The pay of a naval cadet is $500 a year, beginning at the date of admission. At the end of the third year the new first class is separated into two divisions, namely, the Line Division and the Engineer Division, the numbers of these divisions being proportioned to the vacancies that have occurred in the several corps during the preceding year. At the end of the six years' course appointments to fill vacancies in the line and in the Marine Corps are made from the Line Division, and to fill vacancies in the Engineer Corps from the Engineer Division. If, after making assignments as above, there should still be vacancies in one branch and surplus graduates in the other, the vacancies in the former may be filled by assignment to it of surplus graduates from the latter. At least 15 appointments from such graduates are made each year. Surplus graduates who do not receive appointments are given a certificate of graduation, an honorable discharge, and one year's sea pay.

Captain John M. Bowyer, U. S. N., was superintendent in 1911.

In 1895 was started the present plan which will give to the Naval Academy commodious and suitable buildings and to the United States a magnificent work of art, well worthy of a great nation. The new academy buildings are largely due to the efforts of two men — the superintendent at that time, Capt. Philip H. Cooper, now rear-admiral, and Col. R. M. Thompson, who graduated in 1868 and was in 1895 a member of the Board of Visitors. The board recommended the rebuilding of the Naval Academy and the energy of these two men pressed the scheme upon the government. The department was induced to order a board to consider and recommend a comprehensive plan for all the necessary buildings, and Colonel Thompson persuaded the New York architect, Ernest Flagg, to consult with the board and with Captain Cooper. A beautiful set of plans resulted, recommended by the board and approved by the department. But the Spanish War interfered and it was not till 1898 that an appropriation became available and the corner stone of the new armory was laid by Rear-Admiral F. V. McNair, who had succeeded Captain Cooper as superintendent.

The plan as viewed from the sea front shows the cadet quarters extending 729 feet, flanked on one side by the armory and on the other by the boat house. These buildings are at right angles to the direction of the cadet quarters, are 428 feet long and similar in appearance. They are connected by colonnades with the quarters. This gives from the sea a harmonious group of buildings extending in a N. E. and S. W. direction for 1,278 feet with the high roof of the main building of the cadet quarters as a center. Thirteen hundred feet in a N. W. direction, with the main line of buildings parallel to and facing the first group is the academic building with the chemistry and marine engineering buildings on either flank and with the high roof of the academic building in the center and balancing the group to the S. E. Between these two groups, facing the Severn river and forming the W. side of the rectangle, is the auditorium and chapel, with the superintendent's house and the administration building on either side. The fourth side of the rectangle is formed by the basin. From the steps of this basin and facing the auditorium is the best view. On either hand is a handsome group of buildings with the dome of the auditorium as the center. If the plans as designed by Mr. Flagg and approved by the Navy Department are carried out, the country will receive in return for its $8,000,000 not only commodious buildings well suited to the needs of the academy, but also a splendid architectural masterpiece well worthy of the country and so far unique that the entire group of buildings are the design of one master hand.

The buildings forming the Naval Academy have been of slow growth and at the same time the old buildings have been slowly decaying. Without the funds for a logical scheme they have been always behind the needs, and the process of decay has caught up with and passed that of construction till an entire reconstruction of all buildings became a necessity. Thanks to the energy and ability of those who pressed the necessities of the institution upon Congress and thanks to the Spanish War that made the navy popular with the people, the

rebuilding of the academy has begun on a plan commensurate with the dignity of the country, the necessities of the institution and the requirements of good architectural taste, a knowledge of and a desire for which was spread through the United States by the White City at Chicago.

The object of the Naval Academy is to train officers for the navy. In the four years' course the youth who enters fairly well equipped in the rudiments of mathematics and English studies must be fitted to take the place of an officer on a modern battleship, and more than this, he must be fitted to care for himself and the men under his charge. As a young graduate on a battleship, he will in almost any emergency be certain to have some older officer of experience to guide his energies in the right path. But it is possible that being assigned to some smaller ship an emergency may throw him upon his own resources, and the safety of the ship and crew may depend on his knowledge and courage. It is therefore necessary to have the naval cadet more thoroughly grounded in the theory and better acquainted with the practice of his profession than is usually required in an ordinary technical school, where the graduate can acquire his practice slowly and increase his grasp of the theory constantly under a guide till fitted to walk alone. The naval profession is one that requires constant practice and efficient and constant study to keep abreast of the times; and the graduate while lacking much that experience will teach him, must be fairly well fitted to walk alone, should that be required by an emergency.

The graduated cadet must be a seaman, an engineer, a true marine engineer, well acquainted with steam, electricity and ordnance, and a navigator and surveyor, and he must have a fair knowledge of his own language with some acquaintance with French and Spanish. To achieve this in four years he must be well grounded in the rudiments; he must have good health, and he must work hard. The course must be progressive and the instructors competent and in sufficient numbers to be able to instruct — not merely to examine and hear lessons. Even then the work of studying would be too hard for the average youth were it not for the fact that much of the practical work is good out-of-door exercise and the hard brain work is well balanced with plenty of physical exercise and healthy amusement. The instruction for the fourth class, that is for the first year, completes the study of algebra and geometry and includes trigonometry and descriptive geometry. In English it includes rhetoric and something of the art of writing English and Andrews' "Manual of the Constitution." French and Spanish and mechanical drawing are begun. It is a

Naval Academy

necessity for a naval officer to be able to read a drawing and to make a good working sketch. The naval architect, the marine engineer, and the ordnance engineer has each his special methods in drawing, with which the cadet must become familiar. Accordingly he starts drawing with the beginning of his course. All his professional work during this year is practical and is given him during the drill period. The academic year opens on Oct. 1 and closes about June 1; then comes the practice cruise, which is devoted almost entirely to practice professional work with some little study of the theory of professional subjects. The cruise ends about Sept. 1, when the cadets have a month's leave to visit their homes. Academic life begins again on Oct. 1. During the third-class year the cadets complete their studies in the mathematical department. They have trigonometry, descriptive geometry, conic sections, differential and integral calculus. In English they study naval history. They continue the study of French and Spanish, and mechanical drawing, and take up the study of elementary physics and chemistry. Their practical work is continued during the drill period and on the practice cruise at the end of the academic year.

After the month's leave they take up their life at the academy as second-class men, and now begin to take up the study of professional subjects. In the department of mechanics they study integral calculus, mechanics and hydro-mechanics. They continue the study of physics and chemistry and begin the study of electricity and magnetism. They continue mechanical drawing and lay the foundation for engineering in studying the principles of mechanism and mechanical processes, with marine engines and boilers. They study theoretical seamanship and the drill regulations for infantry and artillery. The practical work continues during the drill period and has advanced progressively so that the cadets are well prepared for the professional subjects of this and the following year. This is their last practice cruise, and by far the most important one, as they are now carefully instructed in their duties as officers. They are required to perform the work of officers at sea in handling the ship and managing the motive power, both steam and sail. They must work hard at practical navigation with instruments and charts. They visit the great shipyards of the country, listen to lectures and take notes, with the ships and engines under construction as object lessons.

In their last year as first-class men all their studies are professional. They have seamanship and naval tactics, ordnance and gunnery, navigation, compass deviations and surveying, boilers, engineering materials, designing and naval construction, and

Naval Fleet

electrical engineering. The practical work goes hand in hand with the theoretical during the drill period. The first class are the officers of the cadet battalion and under supervision perform much of the work of officers. At the end of their first-class year the cadets are graduated and are ordered to sea. Here they nominally continue their course for two years, being examined at the completion of that time and commissioned as ensigns. Actually their work as officers begins after leaving the academy, and under the present necessity for more officers they perform the duties of even higher grades than that of ensign. In fact they perform the duties of commissioned officers without the rank or pay or right to pension or retirement in case of injury or illness in line of duty.

At the close of the Civil War the study of steam was introduced, but unfortunately the advice of Isherwood was neglected and the students were separated, some remaining sailors with little training in engineering, while others became engineers with little training in executive duties. But the necessities of the service required the seamen to be trained in ordnance and electrical engineering with some knowledge of the steam engine, so that when the amalgamation came and the mistake made about 30 years ago was rectified, there was no great change in training necessary. The seaman was taught a little more engineering and the engineer a little more seamanship, and now true marine engineering includes steam, electricity, and ordnance.

To discuss the training of cadets at the Naval Academy without mentioning athletics would be to leave out a most important factor in their character training. Boating, football, baseball, fencing, track athletics, and gymnasium work are all encouraged. The various competitive games are a source of amusement to all and of healthy exercise to many. Courage and skill are gained and self denial must be practised by those who train for the various sports, and athletics furnishes one of the most important aids in training a youth to become an officer.

Much is required of the modern naval officer, and too much care cannot be taken with the training of the youth who may have to command a battleship or even a fleet of battleships. An American boy is well fitted to receive the necessary training and when he is sound in mind and body, and well grounded in the rudiments, the course at the Naval Academy places in his hands the means to become an ideal seaman and marine engineer, lacking only experience at sea to make him a thorough American naval officer.

Naval Fleet. The fleet of a navy when prepared for conducting active warfare comprises a great variety of types of ships; some especially constructed to fight, some improvised to assist in carrying on warlike operations, and some to accompany these to coal them, water them, keep them in repair, and attend the sick and wounded. There are ships to stand and fight, to run and fight, to scout, to patrol, to skirmish, to mount guard, and there are tugs, colliers, tankers, machine ships, and hospital ships. Among the many classes are:

Monitors.— The best type of modern harbor-defense vessel undoubtedly is the monitor. Its chief advantage lies in the fact that so little of the vessel is out of water, making armor protection possible and effective, with little weight, and enabling a heavy battery to be carried on a comparatively small displacement, which means small dimensions and light draught. The main battery, being carried very near the water-line, can, of course, be used only in practically smooth water. But this does not prevent the monitor being just what it was designed to be, an ideal harbor-defense vessel.

Cruisers.— The cruiser has a much wider sphere of action. It is designed to prey on the enemy's commerce and drive it from the sea, to ravage his coast at unprotected points, and to wage minor wars in distant waters. A cruiser must be able to perform the duties of a scout, of a patrol, of a lookout; she must be the eyes of a fleet; she must be the means of keeping squadrons in touch with one another, of ascertaining the movements of the enemy, of preventing surprises, of disseminating information, and of insuring the efficiency of a blockade. These multifarious duties can be efficiently performed by many kinds of cruising ships, since certain of them call for certain particular characteristics. The scout, for instance, needs to be a vessel of the highest order of sea-keeping qualities, to be able to scour the high seas far from land, far from a base and far from succor. Great size is a desideratum, great coal-carrying capacity a necessity, and highest speed indispensable. Even her armament must be subordinated to these, for her duty is primarily to ascertain where the enemy is, and having done so, to hasten at topmost speed to impart this information to the fighting fleet. Patrol cruisers must be well armed, and their crews alert and well drilled for they are expected to give battle to any intruder who might approach their beat. There are many points along a coast that a daring enemy might strike for singly or in couples, to make a sudden raid, throw a few shells into a town, cut out merchant shipping, or work mischief of some sort. These descents in force must be stopped by force; hence the need of establishing such a strong cordon along the coast at a distance of 100

Naval Fleet

miles or so off shore, that it cannot be broken through. The auxiliary cruiser, together with the navy cruiser, is expected to meet the requirements of the situation, though the former should have the assistance of the latter, because the auxiliary cruiser, having her boilers and machinery above the water-line, is more liable to damage from the enemy's fire. The auxiliary cruiser is the merchant steamer converted for the time into a man-of-war; she is given a good armament and some slight protection along her water-line in the wake of the boilers and machinery. Her value as a fighter depends very much on the skill of her commander and the lack of it in her opponent. It cannot be denied that the regularly designed cruiser is the best kind of ship to perform war duties, whether scouting, patrolling, skirmishing, or, with the fleet, fighting. Indeed for some of these services it would not be safe to employ an improvised ship, as, for instance, on the skirmish line or on the fighting line. The skirmisher belongs to the fleet; she is on guard ahead and on the flanks of it, in close touch with it, precisely as the skirmish line in an army belongs to the main body. She must be able to hold her own, firing, fighting, and eventually falling back on the heavy ships, where she must take her station and continue her aggressiveness. A cruiser, properly speaking, is an unarmored vessel, which from the nature of the duties assigned her, must be fast, must have a good coal supply, and must be well armed. Like all fighting vessels, she should be divided up into several water-tight compartments, have a double bottom, and be protected with a steel deck at the water-line, covering her vitals and magazines. Her main battery should be composed of guns of the rapid-fire type, so mounted that clear fire ahead and astern is secured. The smaller rapid-fire pieces should be numerous, to protect her against torpedo-boat attack, and also to enable her to operate against the personnel and exposed parts of a larger antagonist. The armament, however, must largely be determined by the displacement, and this, in turn, is dependent on the work demanded.

Protected and Armored Cruisers.— A protected cruiser is not an armored ship (this term signifying that a ship has vertical armor), but the protection of the cruiser is horizontal, in the form of a steel deck covering over the interior of the ship at her water-line, and curved down at the sides. It is often five or six inches thick on the crown. All recently constructed cruisers are protected. The unprotected cruiser is a cruiser without this steel deck, and the partially protected cruiser has the steel deck over only engines, boilers, and magazines. An armored cruiser, always so designated in contradistinction to a cruiser, is a type of ship midway between the cruiser and the battleship. Sometimes she inclines more to the one than to the other, or to state the same fact differently, often the cruiser, with turrets and armored gun positions, is virtually an armored cruiser, and frequently the battleship, with diminished armor and increased speed, is practically an armored cruiser. The title armored cruiser indicates quite well what is expected of this type of warship — to cruise and to fight. She must, therefore, have good speed, large coal capacity, moderately thick armor, and an excellent battery. In endeavoring to make an efficient warship for distant service, one that can move with great celerity and at the same time be possessed of admirable fighting qualities, some qualifications eminently suited to secure the one have to be sacrificed to secure measurably the other. Hence the high speed of the armored cruiser is not so high as that of the fastest cruisers, a certain portion of the weight of the machinery and boilers being given up to securing other desirable advantages. On the other hand, the armor and armament are not so powerful as on the battleship, the sacrifice here being made for the benefit of the coal capacity and speed. Yet when once on the ground the armored cruiser must fight, for that is her function. She must meet the enemy, fight him, and hold him in check, if she cannot beat him, till the battleships come.

Battleships.— The great fighting unit in a fleet is the battleship. She is designed to stand to her work, to give and take the hardest of blows, and to overcome any ship that may oppose her. Her armor is the most invulnerable, her guns are the heaviest, and the qualities of the cruiser and armored cruiser are more or less subordinated to secure this preponderance of protection and armament. The most noticeable thing in recent naval construction, however, is the narrowing of the difference between the battleship and the armored cruiser. The latter, in some cases, now equals the largest battleship in displacement, while the latest battleships have very nearly the speed of the fastest armored cruisers. The marked increase lately effected in the resistance of armor has enabled the battleship builder to decrease the thickness of armor, and spread it over a much larger area. Consequently, the battleship has increased in length and in fineness, and with these qualities speeds hitherto thought impossible are now obtained with certainty on the new ships of this class. The battleship is not unlike the monitor in essential characteristics, but it must be remembered that in the monitor both speed and coal capacity are of less consequence than in the battleship, for the monitor is to do her work near

a base and in comparatively smooth water, whereas the battleship can operate at some distance, and quite as effectively blow high or blow low. The latter is a sea-keeping vessel, the former is not; the one belongs to the off-shore line of defense, the other to the coast defense; the battleship is common to all navies the world over, the monitor is found only in the United States. A study of the development of battleships will show that the monitor is her prototype; though as the two appear today, the one high up above the water, bristling with guns, the other almost awash, with two conspicuous turrets, there is little to suggest how the one was evolved from the other.

Torpedo Craft and Sentries.— From battleship to torpedo boat is a long jump, the one being the most powerful, the other the weakest of warships; nevertheless, the torpedo boat was designed with the especial object of destroying the former. The torpedo boat is a good craft for coast-defense work, and in smooth water on a dark night she may shoot her bolt with effect, but she is of little use in heavy weather; and further, since the torpedo-boat destroyer — merely an immense torpedo boat — has been pitted against her, the sphere of usefulness of the boat has been much restricted. The destroyer can keep the sea, can go at high speed, and can work with the fleet. She is a most valuable adjunct to the fighting efficiency of a squadron. Torpedo craft make excellent pickets, especially when large ships wish to lie snugly at anchor.

Tugs.— So, too, for that matter do tugs, those improvised sentries which have lately been added in great numbers to the fleet of the United States. They steam about within 5 to 10 miles of a squadron, watching carefully for night attacks from torpedo boats and other night hawks, and, as they are well armed with small rapid-fire and automatic machine guns, can deliver a perfect rain of bullets that would quickly annihilate any swiftly dashing pigmy antagonist. These armed tugs are often called gunboats, but this is a misnomer.

Gunboats.— The regularly constructed gunboat is a larger craft, partaking of the nature of a cruiser. Indeed, the gunboat proper is but a small cruiser, in which speed and coal-carrying capacity are slighted in order to permit of the mounting of a strong battery. The duties of gunboats are quite like those of cruisers, though not so extensive, since their range of operations is necessarily restricted by their limited steaming radius. When fleets go to war they must be accompanied by many auxiliary vessels, non-combatants, but none the less indispensable to the welfare of the squadrons. For instance the boilers of modern men-of-war should be fed with fresh water. On the blockade and away from bases, cruising, this is not obtainable; the time and coal needed to condense water cannot be spared, hence—

Distilling Vessels.— These are a component part of a well equipped war fleet. Such auxiliaries mount but a couple of small guns to repel boat attacks.

Repair Ships.— A repair ship is another important adjunct. Such a ship is fitted up like a machine shop, carrying spare plates, tools and extra portions of machinery. She has forges, punching machines, etc., for repairing damages, and carries a crew composed to a large extent of machinists and iron shipwrights.

Hospital Ships.— With the fleet there is also a hospital ship, fitted with wards, operating rooms, modern appliances for surgical operations and for caring for the sick and carrying a large corps of trained nurses. In the United States navy this ship is painted white and flies the Red Cross flag, so that the foe may know her mission is sacred. She is absolutely unarmed.

Colliers.— Most important, however, of all these auxiliaries is the collier. Indeed, the limit of offensive sea operations is the limit of the coal. Stop the supply of coal and the fleet must give over fighting on the sea and return home. A collier carries nothing but coal, everything being sacrificed to make room for bunkers and the machinery to take in and eject coal most expeditiously.

Refrigerating Ships.— Still another adjunct is the refrigerating ship, with an ice manufactory on board and immense cold-storage rooms for carrying fresh food.

So it is seen that to move a great fleet of ships is an undertaking akin to moving an army, and requires elaborate preparations in order that the fighting element of it may be adequate to meet every emergency that can possibly arise.

Naval Militia. See MILITIA, NAVAL.

Naval Order of the United States, an organization composed of a General Commandery and commanderies in the States of Massachusetts, Pennsylvania, New York, and Illinois, and in the District of Columbia. The General Commandery meets triennially on Oct. 5, and the State Commanderies meet annually in the month of November. The Massachusetts Commandery is the parent commandery, and was organized at Boston on July 4, 1890. The General Commandery was established three years later, on June 19, 1893. The companions of the order are officers and the descendants of officers who served in the navy and marine corps in any war or in any battle in which the said naval forces of the United States have participated. The membership clause, as adopted

at the triennial congress held at Boston, Oct. 5, 1895, provides for two classes of members: First, veteran officers and their male descendants, and, second; enlisted men who have received the United States naval medal of honor for bravery in the face of the enemy.

Naval Veterans, National Association of, an organization founded by delegates from the various associations of naval veterans throughout the Union at a meeting held in the city of New York, in January, 1887. The object of the National Association, as declared by the constitution, is "to cherish the memory and associations of the war of the late rebellion, to perpetuate the glorious names and deeds of our navy, to strengthen the ties of fraternal fellowship and sympathy, to advance the best interests of this association, and to extend all possible relief to the widows and orphans of members; to foster the cultivation of naval science; to encourage the building of an efficient navy and national defenses; to enforce unqualified allegiance to the general government; to protect the rights and liberties of American citizenship, and to maintain national honor, dignity, union, and independence." Any officer, appointed or enlisted man who has served in the United States Navy, United States Marine Corps, or United States Revenue Marine Service during any portion of the time between April 12, 1861, and Aug. 25, 1865, who has not borne arms against the United States, or been convicted of any infamous crime, and who has been honorably discharged or resigned by an honorable acceptance of resignation, is eligible to membership in this association. There are 39 local associations under the national charter, a paid membership of over 7,500, and 3,000 contributing members.

Navarino (-rē'nō), or **Neocastro,** officially PYLOS, a small seaport on a bay on the S. W. coast of the Morea, Greece; it has the best harbor in Greece. The ancient Pylos, the city of Nestor, stood near. The Bay of Navarino was the scene of a great sea-fight between the Athenians under Cleon and the Spartans (425 B. C.), in which the latter were defeated; and on Oct. 20, 1827, it saw the annihilation of the Turkish and Egyptian navies by the combined British, French, and Russian fleets under Sir Edward Codrington.

Navarre, a province and ancient kingdom of Spain, bounded on the N. by France, on the E. by Aragon, on the S. by Old Castile, and on the W. by the Basque provinces; area 6,046 square miles; pop. 307,669. The surface is generally mountainous and bleak, but in the valleys and along the river banks the soil is very fertile. The principal rivers are, the Aragon, Zidacos, Arga, Ebro, and Bidassoa. Products, wheat, maize, barley, and oats. Minerals, iron, copper, and rock-salt. Principal towns, Pampeluna (capital), Tudela, Olite, and Estella. Navarre was inhabited at an early period by the Vascones, who were expelled by the Romans. It was seized by the Visigoths in 470, invaded by the Saracens early in the 8th century, and fell under the sway of Charlemagne in 778. It became an independent state in 855. In 1035 Navarre was divided into three kingdoms — Navarre, Aragon, and Castile. The first two became united in 1076, and again separated in 1134. In 1285, it became an apanage of France, but recovered its independence in 1328. Ferdinand conquered it in 1512. The estates of Navarre took the oath of allegiance to him in 1513, and it was incorporated with Castile in 1515. After this act of spoliation, there remained nothing of the ancient kingdom of Navarre beyond a small territory on the N. side of the Pyrenees, which was subsequently united to the crown of France by Henri IV. of Bourbon, King of Navarre, whose mother, Jeanne d'Albret, was granddaughter of Queen Catherine; and hence the history of Navarre ends with his accession to the French throne, in 1589.

Navarrete, Manuel Maria de (nä-värā'tā), a Mexican poet; born in Zamora, Mechoacan, June 18, 1768. His principal work is "Poem on the Divine Providence" (1808). Before his death he burned his manuscripts. The few which escaped destruction were published under the title of "Poetical Entertainments" (Mexico, 1823; Paris, 1825). He died in Tlalpujahua, July 17, 1809.

Navarrete, Martin Fernandez de, a Spanish historian; born in Abalos, Nov. 9, 1765. He paid particular attention to geographical science and to the historical side of discovery, his best work being "Collection of Voyages and Discoveries Made by the Spaniards since the End of the Fifteenth Century" (1825–1837). He died Oct. 8, 1844.

Navarro, Madame. See ANDERSON, MARY.

Navassa, an island in the Caribbean Sea, between San Domingo and Jamaica; length about 2 miles; width 1½ miles; altitude 300 feet. The shore line consists of perpendicular cliffs, and small shrubs constitute the chief vegetation. An act of Congress passed Aug. 18, 1856, provides that whenever any citizen of the United States shall discover a guano deposit on any island, rock, or key, not belonging to or occupied by any other government, and shall take peaceable possession of the same and occupy it, then and in that event such island, rock, or key may, at the discretion of the President, "be considered as appertaining

to the United States." On the island of Navassa a deposit of guano, estimated to amount to 1,000,000 tons, was discovered by one Peter Duncan, an American citizen, in 1857, and subsequent official action on the part of the State Department and the President was held by the Supreme Court to amount to a determination that the island should be considered "as appertaining to the United States." In Sept., 1889, a man named Henry Jones was working on the island in the employ of the Navassa Phosphate Company. A riot occurred, known as "the Navassa Riot," in the course of which this man killed Thomas N. Foster, a superintendent in the service of the same corporation. Jones was brought from Navassa to Baltimore, and was there indicted by the Federal grand jury for the crime of murder. He was tried in the Circuit Court of the United States and convicted, and after sentence of death a writ of error was sued out in his behalf to procure a view of the case in the Supreme Court at Washington. It was claimed that the United States had no jurisdiction, and this was the only point in the case, and as that was held by the Supreme Court to be untenable, the judgment of death against the prisoner, Jones, was unanimously affirmed. The sentence was commuted to imprisonment for life in 1891.

Nave, that part of an ecclesiastical edifice to the W. of the choir, and in which the congregation assemble; the part of a church between the aisles.

Navel, in anatomy, the cicatrix of the umbilicus which causes a narrow and deep impression on the surface of the abdomen; it marks where the fœtus was attached to the placenta by the umbilical cord. In ordnance, a perforated lug on the underside of a carronade which is engaged by a through bolt and thereby secured to the carriage.

Navesink, or Neversink, Highlands of, a low range of hills S. of Sandy Hook, near the mouth of the Navesink river. They extend N. W. and S. E. The highest point Mount Mitchell, is 282 feet above the level of the sea. These highlands form an important landmark to ships approaching New York and are eagerly looked for by crew and passengers. On the summit of an elevation of 195 feet there is a fine lighthouse with two towers 100 feet apart and 53 feet high, furnished with first-class fixed lights. The region of these Highlands is well known for its beauty.

Navew (French, *navette*), a garden vegetable much cultivated in France and other parts of the continent of Europe, though little used in Great Britain. It is by some botanists regarded as a cultivated variety of *Brassica napus,* or rape, while others refer it to *B. campestris,* sometimes called wild navew, the species which is also supposed to be the original of the Swedish turnip. The part used is the swollen root, which is rather like a carrot in shape. Its color is white. Its flavor is much stronger than that of the turnip. It succeeds best in a dry, light soil. The seed is sown in spring, and the plants thinned out to five inches apart. Wild navew is extensively cultivated in the N. of France and Holland for the sake of its seed, which yields colza oil.

Navicular Bone (from a word meaning boat-shaped), generally called in human anatomy the scaphoid; the first proximal bone of the carpus or wrist; it articulates with the radius. The name is also applied to the corresponding tarsal bone of the foot.

Navicular Disease, in the horse, an inflammation, often of a rheumatic character, of the small bone — the navicular — below which passes the strong flexor tendon of the foot. It is most common among the lighter sorts of horses, and especially where they have upright pasterns, out-turned toes, and early severe work on hard roads. It soon gives rise to a short tripping yet cautious gait, undue wear of the toe of the shoe, and projecting or "pointing" of the affected limb while standing. Even when early noticed and in horses with well-formed legs, it is incurable; and when of several weeks' standing it leads to so much inflammation and destruction of the tendon and adjoining parts that soundness and fitness for fast work again are impossible. In order to reduce the pain and inflammation, rest should at once be given, the shoe removed, the toe shortened, and the foot placed in a large, soft, hot poultice, changed every few hours. Laxative medicine and bran mashes should be ordered, and a soft bed made with old short litter. After a few days, and when the heat and tenderness abate, cold applications should supersede the hot; and after another week a blister may be applied round the coronet, and the animal placed for two months in a good yard or in a grass field, if the ground be soft and moist; or, if sufficiently strong, at slow farm work on soft land. Division of the nerve going to the foot removes sensation and consequently lameness, and hence is useful in relieving animals intended for slow work. The operation, however, is not to be recommended where fast work is required, for the animal, insensible to pain, uses the limb as if nothing were amiss, and the disease rapidly becomes worse. Navicular disease is very often due to hereditary taint; hence horses suffering from it should never be used for breeding purposes.

Navies and Navigation. The origin of the art of navigation is lost in antiquity, but we know that it was practised with

considerable skill by the ancient Egyptians and the Phœnicians, the latter of whom were distinguished as a great commercial and seafaring people long before the rise of Greece or Rome. Their most ancient city and seaport, Sidon, on the shore of the Mediterranean, is mentioned in Genesis, and in Josh. xi: 8 is referred to at the time of the Israelitish occupation of Canaan as Great Sidon. Tyre, which was a colony from Sidon, was a flourishing commercial city as early as 1200 B. C. From the beginning of the historic period Tyre was the chief city of the Phœnicians. The enterprise of the Phœnicians was, from their situation, specially directed to the sea, and they pushed their commerce on it with a spirit and daring which considering their opportunities has never been surpassed. They began by carrying on a mutual exchange of commodities between Egypt and Assyria. Their traffic included piracy and dealing in slaves. Their ships at length penetrated as far as the Arabian Sea and the Persian Gulf on one hand, and on the other to the N. and W. coasts of Africa, as far as Senegal, and visited the coasts of Italy, Spain, France, and Britain. They formed colonies and factories in the principal seats of their foreign trade, and their naval traffic set in motion extensive lines of inland commerce, conducted by the caravans and traders of numerous nations. They are the first who are known to have steered by the observation of the stars and who could thus venture out to sea. They ultimately adopted two distinct kinds of vessels: the trireme or ship of war, and the gaulos or merchant vessel, with a deep hold, adapted for stowage.

The history of navigation is closely associated with that of national armaments, and we have thus early the indication of a national navy. In the time of Solomon, and subsequently, the Kings of Israel and Judah made some attempts to emulate the Tyrians in opening up a foreign trade from their own ports and they even appear to have secured the friendly assistance of their neighbors in the effort, a remarkable departure from the usual spirit of mercantile jealousy; but the Jews never succeeded in developing a national mercantile commerce, nor are the causes of their failure difficult to conjecture. From a period earlier than authentic history, as indicated by the story of the Argonauts, the Greeks began to exhibit a spirit of naval enterprise, and as long as their independence remained the various States into which both the mainland and the islands of Greece, as well as their Asiatic colonies were divided, rivaled each other in planting colonies and pushing their commerce in all directions. These States had also their armaments, and fought fiercely with one another, as well as

Navies and Navigation

their foreign foes. The Athenians, Corinthians, Rhodians, even single cities like Chalcis and Megara, became renowned for their naval strength, and naval battles play a conspicuous part in the history of Greece.

Among the Pnœnician colonies arose one which in enterprise, ambition, and power eclipsed the parent State. Carthage, the rival of Rome, rose to her high rank among the nations of antiquity purely in virtue of her naval commerce. In her long struggle with Rome it was mainly the wealth acquired by commerce which enabled her to maintain the conflict. The Carthaginians also stimulated the Romans to enter upon naval enterprise. A Carthaginian vessel which had been cast on the coast of Italy furnished the model for their first fleet, which consisted of 100 quinqueremes and 20 triremes. This fleet is said to have been built in 60 days. Duilius, who commanded it, wisely distrusting the seamanship of his improvised sailors, contrived a means of approximating his first contest with the Carthaginians as nearly as possible to a land fight. By the use of grappling irons peculiarly contrived the Roman vessels were firmly attached to those of the enemy and a struggle ensued in which superior force and determination alone could influence the result. Thus the first great naval battle of Rome, fought off the Lipari Islands, 260 B. C. by the fleet of Duilius against a Carthaginian fleet of superior size under a leader named Hannibal, resulted in a complete victory which was celebrated by a triumph at Rome.

The galley, the war vessel of the ancients, was a narrow vessel about 100 feet in length. It was admirably fitted to move rapidly in smooth water and the numerous rowers gave great impetus to the attack of the beak which was its principal means of aggression. The bow curved inward, forming a circular beak which was faced with iron; or else it receded suddenly, having a single point like a plowshare projecting at the surface of the water and intended to open the side of an antagonist. Frequently the beak was formed to represent a lion, tiger, or other ravenous beast calculated to inspire terror. It was always surmounted by the national emblem; thus an owl stood on the prow of an Athenian galley; a cock on a Phœnician or Carthaginian, and the eagle on a Roman. Here or at the stern were also placed the ensigns and standards, and trumpeters standing beside them sounded their shrill blasts to inspire courage at the moment of onset. From the bow to the stern there extended a flooring or deck, which served as a battlefield for the mailed and heavy-armed soldiers. The stern was covered with a circular shed or pavilion, richly carved and decorated with streamers and trophies. Under this was placed the *tutela* representing some patron

Navies and Navigation

deity, to whom sacrifices and prayers were offered, and which was held so sacred as to furnish a sanctuary to whomsoever took refuge there. From this elevated station, too, the commander surveyed the fight and directed the efforts of his followers. There were two distinct classes of officers and men in each galley. The commander of the soldiers was supreme, and under him the pilot, who took his station abaft, at the side of the steersman, directing all necessary evolutions and maneuvers.

Javelins and arrows were discharged in showers from the deck, or from turrets at the bow and stern. As a protection from these a curtain of hides was used, from behind which the soldiers discharged their missiles in return and thrust with long spears used only at sea. In the center were engines from which rocks were projected of size sufficient to sink a ship; and masses of iron called dolphins were projected from the mast heads to break the bottom of the enemy's vessel. But the chief means of offense was the attack at the beak, and to make it with advantage it was generally desired to gain the wind. Combustibles were also cast from ship to ship, and peculiar devices due to the ingenuity of the particular commanders adopted on special occasions. The line of battle was usually triangular, the admiral's ship being at the angle in advance, and the line of storeships forming the base. Before encountering it was usual for the admiral to pass in a small boat throughout his fleet, haranguing his followers, and urging them to do their duty. Thus inspirited a shout of anticipated triumph would pass from ship to ship, and when the gilded shield was at length displayed as a signal for battle, the shrill trumpets sent forth their blasts, and the combatants rushed to the encounter, rending the air with shouts and war songs. The battle won, the victors returned to port, towing their prizes, their ships being decorated with fragments of the wrecks, themselves crowned with laurel, and singing pæans to Apollo.

On the fall of Tyre Alexandria, founded by Alexander the Great, revived the commerce of Egypt, and after Egypt fell under the Roman yoke it became the chief commercial city of the empire. It continued to flourish as a commercial place till it was taken by the Saracens about 640. Several of the Greek cities also continued to carry on a considerable naval traffic, and Antioch in Syria, through its port Seleucia, shared in the riches of the trade of the Mediterranean. The Gauls also began to develop a degree of maritime strength. The vessels of the ancients being of comparatively light draught were frequently grounded on arriving at port. Artificial harbors were, however, constructed with great labor. They were frequently constructed with semicircular piers with the ends overlapping to exclude the sea. At the entrance was placed a light tower called the Pharos, from the island at the mouth of the Nile, where the first was supposed to have been erected. In the inner port were docks for building and repairing vessels.

On the fall of the Roman empire naval enterprise declined, but only for a brief period. The honor of reviving it is disputed by the French and the Italians. To the latter chiefly belongs the honor of leading the way in the development of modern European commerce, but for the growth of naval armaments we must look also to the N. of Europe. Charlemagne had a considerable fleet both on the Mediterranean and the ocean; but already in his time, and even in that of his predecessors, the settled States of Europe had begun to become subject to the piratical excursions of Northmen and Danes, which were afterward directed so persistently against England, and continued for several centuries to disturb its government.

In the meantime the Italian republics of Venice and Genoa began to restore the commerce of the Mediterranean, and to open up communications with India by the Red Sea and the Persian Gulf. The Pisans and Florentines followed, and in the time of the Crusades the chief naval armaments of the Christians were supplied by the Italian cities. The successors of Charlemagne did not follow his example in maintaining a regular fleet, yet Saint Louis was able to transport his own army to Africa, and to defend his coast against the English, but Philip le Bel had recourse to the Genoese against the English. The great naval battles of these times were fought among the Italian republics, or by them against the Turks, with whom they alternately traded and made war.

After the epoch of the Crusades we have a period extending to the present time, which in one aspect of its development might be called the epoch of commerce and especially of mercantile navigation. The honor of leading the way in this new epoch belongs to the Portuguese. They were followed by the Spanish, the English, the Dutch, the French, and ultimately by all the other nations of Europe, according to their means and opportunities. A great development of European countries, a career of geographical discovery, which for the first time demonstrated the form, and made exactly known not only the principal features, but the more minute details, of configuration of the globe, and the inauguration, on a scale more extensive than any former epoch of history has exhibited, of a system of colonization by the more civilized nations, of the less peopled and less civilized regions of the world, were the main results of this movement. For the details

Navies and Navigation

of the first of these processes the reader must be referred to the histories of the various countries concerned. We shall here give a brief outline of the discoveries in the art of navigation which have resulted from the efforts of navigators to extend the boundaries of their excursions, and which have rendered these efforts so successful.

One of the earliest of these discoveries and the most important to the progress of navigation of them all, was that of the polarity of the magnet, which led to the construction of the mariner's compass, emancipating the sailor from the trammels to which he was subjected by the want of a constant and uniform guide in the direction of his course. The polarity of the magnet was not known to the ancients. Pliny, in his description of the properties of the magnet, makes no mention of it. It was, indeed, known from time immemorial to the Chinese, but like most of the discoveries of that extraordinary people, it remained buried among themselves, and for the purposes of civilization practically inoperative. The merit of discovering or introducing it in Europe has been attributed to Flavio Gioia, born about 1290, but it was probably known before his time. The skill, enterprise, and intrepidity that marked the Portuguese navigators, fostered by a line of enlightened kings, and especially by the personal predilections of Prince Henry, surnamed the Navigator (1394–1460), who surrounded himself with men of skill in the sciences relating to navigation, and gave a stimulus to its improvement extending far beyond his own day, led to an important series of improvements, which the emulation of other nations tended to perfect. The use of the astrolabe to discover the latitude from the elevation of the pole star originated with Henry or his assistants. He also caused charts to be made according to the knowledge of his day, which was of itself a step to the improvement of that knowledge. He also caused tables to be computed of the sun's declination. From this time the progress of navigation was rapid.

The variation of the compass was observed by Columbus and Cabot. The cause to which it is still generally assigned was explained by Martin Cortes in 1545. Pedro Nuñez in 1537 propounded the principle of great circle sailing, or that the shortest distance from place to place along the surface of the globe is to be found by following a great circle of the sphere, not by sailing on a parallel of latitude. The errors of the plain chart were exposed by Cortes, and a plan was first adopted by Gerard Mercator, but scientifically demonstrated and developed by Edward Wright, in which, by expanding the degrees of latitude in approaching the poles, the proportion between them and the degrees of longitude is maintained, and the rhumbs extended into straight lines. This is the principle on which the charts called Mercator's are now projected. The invention of logarithms by Napier of Merchiston (1550–1617), and of Gunter's scale (1624), put within reach of the mariner the means of making arithmetical calculations and working out his geometrical problems with a promptitude and accuracy hitherto unattainable. The circumference of the earth was ascertained on a method recommended by Wright, by measuring the distance between London and York, and taking the altitude of the sun at the summer solstice at both places. By this means the length of a degree of a great circle of the earth was ascertained. The log, an early contrivance for measuring the length of a vessel's course (mentioned in a treatise by William Bourne in 1577), was corrected accordingly. Hadley's quadrant, an instrument by which the altitude of heavenly bodies could be measured without disturbance from the motion of the vessel, and which led to the contrivance of the more perfect instrument, the sextant, was introduced about 1730. The successive improvements of the chronometer facilitated the taking of longitude by observing the difference of time at different places, the chronometer being set according to the time of the first meridian and the ship's time taken from observation of the sun. Tables of the moon's motions for ascertaining the longitude, invented by Meyer and perfected by Maskelyne, are now published periodically by the British government.

Simultaneously with the progress of the art of navigation the growth and development of national fleets, stimulated by the rivalry of the maritime nations, has made way. From the early days of colonization, when the ships of the rival powers used to fight with each other without a declaration of hostilities when the pursuit of a common object brought them together, to those of the well-ordered and disciplined fleets of modern times, there has been a continuous emulation among European powers for the sovereignty of the seas. The principal naval contests have taken place between Spain and England, England and Holland, and England and France. The Spanish navy reached its highest power in the time of Charles V. and Philip II. Francis I. attempted the revival of the French marine and it was vigorously undertaken by Richelieu. The administration of Colbert revived both the mercantile and national navy, and the latter attained its chief strength and highest glory in the reign of Louis XIV., when it opposed, and sometimes not unsuccessfully, the united navies of England and Holland. The navy of Holland became powerful almost from the time of the national independence, and

Navies and Navigation

contended with success alternately against the fleets of England and France. Some of the most hotly contested naval battles on record have been fought between the English and Dutch fleets. At a later period the United States developed a formidable naval power, but the priority still remained with England.

Cannon are said to have been first used in naval warfare by the Venetians against the Genoese in 1370, a considerable time after their invention. From this time till a comparatively recent period there was nothing to distinguish the development of naval armaments from the general progress of navigation.

The famous battle of Lepanto, which was fought between the Christian powers and the Turks on Oct. 7, 1571, may be considered as representative of the first stage of the transition from the earlier mode of warfare. The Christian fleet was collected in the port of Messina in September, 1571. It was contributed by the powers who had joined in the Holy League. The Spanish fleet consisted of 77 Spanish, 6 Maltese, and 3 Savoyard galleys under Don John of Austria, who commanded the joint fleet; there were 12 papal galleys, under Marc Antonio Colonna; and 108 Venetian galleys, and 6 galeazzi under Sebastian Veniero. The Turkish fleet, consisting of 300 vessels, under Capudan-pasha, Musinsade Ali lay in the Gulf of Lepanto. Though the Turks were more numerous the Christians were better armed and equipped. Their soldiers wore coats of mail and helmets, and were provided with firearms. The Turks defended themselves with leathern shields, and had bows and arrows in place of guns. The prows of the Christian galleys were less open and better defended than those of the Turks. The admirals, according to ancient custom, led the van. Both parties moved to the assault, but the wind changing at the moment favored the Christians. The admirals' galleys closed after a brief cannonade, and grappled each other. The Spaniards boarded three times, and were thrice driven back. A reinforcement of 200 men enabled them to return again to the assault with decisive effect, and an indiscriminate slaughter of the Turks took place. The head of Ali was exhibited on a pole to his followers. The battle after this only waxed fiercer, and the Turks fought with the courage of despair. So intense did the struggle become that the galley slaves in both fleets joined in the contest; but while the galley slaves of the Christians, who consisted of criminals, fought on their own side in hope of earning a pardon, those of the Turks, who were Christian slaves, rose against their masters. Fifteen thousand Christians are said to have been relieved from servitude by the victory. The Turks lost besides 224 ships and 30,000 men.

The improvements determined by the use of artillery were chiefly an increase in the size and offensive strength of the ships, and a relative diminution in the number of men. Oars were abandoned for sails. Battles were fought and ships maneuvered by the sailors, and the marines or organized body of soldiers became a mere auxilary force, available as sharpshooters and for land engagements. Two leading qualities now stood forth as the most important object to be attained in the construction and equipment of vessels for war — strength of offensive armament and speed and facility of maneuvering. These qualities did not now first acquire importance, but they gained in relative importance at the expense of a previously preponderating element of equipment, namely, the number of fighting men available for assault at close quarters. Two classes of vessels, according to the preponderance of one or other of these qualities, thus came to constitute the chief strength of modern fleets. The ship of the line, or first-class war vessel, carried the strength of offensive equipment to the utmost limit practicable without sacrificing sea-going qualities. The frigate, only excelled in strength by a line-of-battle ship, was built and rigged with every artistic appliance to secure speed. Even line-of-battle ships were sometimes made too heavy for effective service, and facility of movement could not be altogether neglected with impunity; but the great point in a first-class vessel was the weight of broadside, and a hundred or more guns on three decks were commonly carried. In a pitched battle it was the line-of-battle ships that bore the brunt of the fight and decided the day. The frigates scoured the seas on special missions, escaped from the enemy's line-of-battle ships by speed, destroyed his privateers, and protected the commerce of their own State. During all the great European wars these were the leading types of vessels employed. The tactics of naval warfare during this period, allowance being made for the different means of offense, did not differ materially from the ancient methods. To gain the wind of an adversary, to break his line and to engage him at close quarters with superior force, were still the main objects to be pursued. But a change took place when steam was introduced as a means of propulsion, and iron as a material for the construction of vessels. Vessels clad in iron armor now came to supersede the oak-built ship of the former epoch.

More recently improvements made in the size, range, and destructive power of projectiles have effected a new revolution, or succession of revolutions, in the science of naval armaments, and the broadside has given way to a small number of powerful

guns. The struggle between these new developments of offensive and defensive force still goes on. Iron clad and steel clad ships have superseded the wooden walls, but their own position has yet, perhaps, to be maintained against newer rivals. See NAVAL FLEET: *Navies of the World* under NAVY.

Navigation Laws. Very little change has been made in the navigation laws of the United States since their adoption in 1792–1793. The main features of these laws may be summed up as follows: No vessel, unless entirely built in this country and wholly owned and officered by Americans, is considered an American vessel having the right to be protected by the American flag. No foreign vessel is permitted to engage in the American coasting trade, the same extending from Atlantic to Pacific ports. American vessels are no longer considered as such if even a part-owner (with a few exceptions) resides abroad for a short time. Transfer of an American vessel to foreigners prohibits it from ever again sailing under the American flag. If an American vessel makes any repairs in a foreign port, duty must be paid on the value of all such repairs on her return to this country. The repairing of foreign vessels in our ports, with foreign materials, is placed under restriction. A tax of six cents per ton of their burden, called a tonnage tax, is imposed on all vessels (except fishing and pleasure vessels) engaged in trade to ports not in North or Central America and a few other specified places, the maximum aggregate tax in any one year not exceeding 30 cents. Foreign vessels pay the same tax, but if one of the officers of an American vessel is a foreigner, it is forced to pay an additional tax of 50 cents. Materials for the construction of vessels for foreign trade may be imported free of duty, but the duty must be paid if the vessel engages for more than two months a year in the coasting trade. American vessels may unload at any port of delivery in the customs district, but foreign vessels can only discharge their cargoes at a port of entry, which is a certain designated port in each customs district in the United States. Exceptions are made when they are laden with coal, salt, or similar merchandise in bulk.

Navigator Islands. See SAMOAN ISLANDS.

Navy, a fleet; the shipping of a country collectively; the war-ships belonging to a country collectively; the naval establishment of a country, including the ships, officers, men, armaments, stores, etc., intended for use in war.

Navies of the World.—The following shows the strength of the various navies of the world as reported in 1900:

Argentine Republic.—Coast defense armorclad, 4; armored cruisers, 5; 2d-class cruisers, 3; smaller cruisers and gunboats, 7; torpedo destroyers, 4; torpedo boats, 1st-class, 12; 2d-class, 10.

Austria-Hungary.—Battleships, 2d-class, 6, 3d-class, 2; port-defense ships, 7; cruisers (armored), 2, 2d-class, 3, 3d-class, 8; gunboats, etc., 12; torpedo boats, 1st-class, 32; 2d-class, 31, 3d-class, 8.

Brazil.—Battleships, 4; coast defense vessels, 6; cruisers, 2d-class, 3, 3d-class, 2; torpedo boats, 1st-class, 8, 3d-class, 6; smaller cruisers and gunboats, 12.

British Empire.—Battleships, 1st-class, 20, 2d-class, 24, 3d-class, 11; armored cruisers, 2d-rate, 9; protected cruisers, 1st-class, 21, 2d-class, 45, 3d-class, 34; torpedo gunboats, etc, 33; torpedo destroyers, 80; torpedo boats, 1st-class, 11, 2d-class, 71; torpedo ships, 2. Vessels of small fighting value: Battleships, 4th-class and coast defense, 21; obsolete cruisers, 4th-class, 28; miscellaneous vessels, 89; torpedo boats, 3d-class, 95. Under construction and projected (1902): Battleships, 16; armored cruisers, 1st-rate, 14; protected cruisers, 3d-class, 9; torpedo destroyers, 28; miscellaneous vessels, 6.

Chile.—Armorclad, 5; 2d-class cruisers, 2; 3d-class, 2; gun vessels and gunboats, 11; torpedo destroyers, 4; torpedo boats, 1st-class, 15, 2d-class, 4.

China.—Swift cruisers, 2; small cruisers, 3; torpedo destroyers, 3; torpedo gun vessel, 1; torpedo boat, 1; and several other vessels.

Colombia.—River gunboat, 1; other small vessels, 2.

Costa Rica.—Gunboat, 1; torpedo boat, 1.

Denmark.—Coast defense armorclads, 5; torpedo ship, 1; 3d-class cruisers and gun vessels, 6; gunboats, 7; torpedo boats, 1st-class, 14, 2d-class, 20.

Ecuador.—Torpedo launch, 1; transport, 1.

France.—Battleships, 6; armored cruisers, 5; torpedo destroyers, 28; torpedo boats, 112; submarine boats, 26. Under construction and projected (1902): Battle ships, 22; armored cruisers, 19; destroyers, 24; torpedo boats, 151; submarine boats, 12.

German Empire.—Battleships, 2d-class, 8, 3d-class, 8; coast defense ships, 19; cruisers, 2d-class, 8; 3d-class, 5; torpedo gunboats, 8; torpedo boats, 1st-class, 35, 2d and 3rd-class, 103. Under construction and projected (1902): Battleships, 46; coast defense ships, 8; cruisers, 2d-class, 22; 3d-class, 48; torpedo boats, 114.

Greece.—Armored vessels, 5; torpedo boats, 17; unprotected vessels: corvettes, 2; cruisers, 2; gunboats, 12; revenue vessels, 3; also a steel yacht, an iron transport, and miscellaneous craft.

Haiti.— Cruisers, 3d-class, 6; sloops, 2; and a gun vessel.

Italy.— Battleships, 2d-class, 5; large armored cruisers, 3; small armored cruisers, 3; battleships, 3d-class, 9; protected cruisers, 1st-class, 2; 2d-class, 5; 3d-class, 8; torpedo gunboats, 15; torpedo destroyer, 1; torpedo boats, 1st-class, 11, 2d-class, 100, 3d-class, 71; submarine torpedo boats, 1. Under construction (1902): Battleships, 1st-class, 3; small armored cruisers, 3; protected cruisers, 3d-class, 1; torpedo gunboats, 2; torpedo-destroyers, 4; torpedo boats, 2d-class, 1.

Japan.—Battleships, 1st-class, 3; armored coast defense vessels, 5; armored cruisers, 7; protected cruisers, 13; smaller cruisers, 5; gun vessels, 10; torpedo boats, 1st-class, 29, 2d-class, 24, 3d-class, 4; destroyers, 12. Under construction or projected (1902): Battleships, 1st-class, 3.

Mexico.—Dispatch vessels, 2; unarmored gun vessels, 2; and a steel training cruiser. Under construction and projected (1902): Gunboats, 4; torpedo boats, 1st-class, 5.

Morocco.—An iron screw ship and a smaller vessel.

Netherlands.— Old ironclad turret ships, 2; unprotected cruisers, 6; old flat-bottomed gunboats, 30; and a number of coast defense monitors. Under construction and projected (1902): Torpedo boats, 1st-class, 13, 2d-class, 15; 3d-class, 25; and 4 other 3d-class boats.

Norway.—Armorclad, 2; monitors, 4; unarmored gun vessels, 3; gunboats of various kinds, 28; torpedo boats, 27.

Paraguay.— One small ocean steamer, and 2 small river steamers.

Persia.— One screw steamship and one river steamer.

Peru.— One cruiser, a screw steamer, and 10 small vessels.

Portugal.—Protected cruisers, 5; cruisers, 3d-class, 6; old armored vessel, 1; torpedo boats, 1st-class, 15, smaller grade, 30; gunboats of various kinds, 26. Under construction (1902): Miscellaneous vessels, 8.

Rumania.—Protected cruisers, 1; gunboats, 7; coast guard vessels, 6; torpedo boats, 1st-class, 6; 2d-class, 2; training ship, 1; screw dispatch vessel, 1; projected (1902): Armored vessels, 2.

Russia.—Battleships, 1st-class, 3, 2d-class, 10, 3d-class, 1; coast defense vessels, 12; armored cruisers, 10, 2d-class, 3, 3d-class, 1; gunboats and miscellaneous, 30. Under construction and projected (1902): Battleships, 1st-class, 5; 2d-class, 9; coast defense vessels, 1; armored cruisers, 2, 2d-class, 3, 3d-class, 4; gunboats and miscellaneous vessels, 10.

Santo Domingo.—Small gunboats, 3.

Navy

Servia.—Steamer used in the military service, 1.

Siam.— Cruisers, 2; gunboats, 4; training ship, 1; torpedo store ship, 1; transports, 3; dispatch boats, 4; yachts, 5.

Spain.—Battleships, 1st-class, 1; coast defense ships, 2; armored cruisers, 1st-class, 3; protected cruisers, 1st-class, 1; cruisers, 2d-class, 5, 3d-class, 4; gunboats, etc., 60; torpedo boats, 1st-class, 20, 2d-class, 3; 3d-class, 4. Under construction (1902): Cruisers, 2d-class, 2, 3d-class, 1; gunboats, 1; torpedo boats, 4.

Sweden.—Armored coast defense turret ships, 1st-class, 10; 2d-class, 4; 3d-class, 9; steam corvettes, 3; torpedo cruisers, 5; gunboats and dispatch vessels, 13; torpedo boats, 26; miscellaneous, 13.

Turkey.— Coast defense ships, 12; cruisers, 2d-class, 2, 3d-class, 4; gunboats, etc., 6; torpedo boats, 1st-class, 19, 3d-class, 7.

United States.—Battleships, 1st-class, 9 2d-class, 1; coast defense ships, 19; armored ram, 1; armored cruisers, 2; protected cruisers, 15; unprotected cruisers, 3; dynamite vessel, 1; gunboats, 17; torpedo boats, 24. Under construction (1902): Battleships, 1st-class, 10; armored cruisers, 6; protected cruisers, 9; gunboat, 1; monitors, 4; torpedo-boat destroyers, 18; torpedo boats, 15; submarine torpedo boats, 7.

Venezuela.—Steamers, 3; sailing vessels, 2; and a number of small gunboats.

Navy, Department of the, an executive department of the United States government, created in 1798. The Secretary of the Navy, its head official, is a member of the Cabinet, appointed by the President and confirmed by the Senate. His salary is $8,000. To this department belongs the charge of the vessels, navy yards, guns, and whatever belongs to the navy. Under its supervision, also, is the hydropathic office, in which charts, sailing directions for the use of steamers and the "Nautical Almanac," are prepared. The Department consists of a number of Bureaus, the heads of which are chosen from active officers. They hold office four years and draw the sea-pay of their rank, not less than commodore. These assistants are the chiefs of: Bureau of Yards and Docks; Bureau of Navigation; Bureau of Ordnance; Bureau of Provisions and Clothing; Bureau of Medicine and Surgery; Bureau of Construction and Repair; Bureau of Equipment and Recruiting; Bureau of Steam Engineering; Judge-Advocate General; Commandant of the Marine Corps.

Navy, United States. The following is a list of the vessels in the United States navy on Jan. 1, 1902, with details of their construction and armament:

Name.	Class.	Keel Laid.	Displacement, Tons.	Speed, Knots.	Horsepower.	Cost.	Batteries. Main.	Batteries. Secondary.
ARMORED VESSELS. SEA-GOING B'LSHPS.								
Alabama	B S	1890	11,525	17	11,366	$2,650,000	4 13-in. B L R, 14 6-in. R F guns.	16 6-pdr. R F, 6 1-pdr. R F, 4 Colts, 2 3-in. R F field.
Georgia*	B S	1901	15,000	19	19,000	3,590,000	4 12-in. B L R, 8 8-in. B L R, 12 6-in. R F guns.	12 3-in. R F, 12 3-pdr. R F, 8 1-pdr. R F. 2 3-in. field, 2 machine, 6 automatic.
Illinois	B S	1897	11,525	17	10,000	2,595,000	4 13-in. B L R, 14 6-in. R F guns.	16 6-pdr. R F, 6 1-pdr. R F, 4 Colts, 2 3-in. R F field.
Indiana	B S	1891	10,288	16	9,738	3,063,000	4 13-in. B L R, 8 8-in. B L R, 4 6-in. R F guns.	20 6-pdr. R F, 7 1-pdr. R F, 2 3-in. R F field.
Iowa	B S	1893	11,340	17	12,105	3,010,000	4 12-in. B L R, 8 8-in. B L R, 6 4-in. R F guns.	20 6-pdr. R F, 4 1-pdr. R F, 4 Colts, 2 3-in. R F field.
Kearsarge	B S	1896	11,525	17	11,954	2,250,000	4 13-in. B L R, 4 8-in. B L R, 14 5-in. R F guns.	20 6-pdr. R F, 6 1-pdr. R F, 4 Colts, 2 3-in. R F field.
Kentucky	B S	1896	11,525	17	12,318	2,250,000	4 13-in. B L R, 4 8-in. B L R, 14 5-in. R F guns.	20 6-pdr. R F, 8 1-pdr. R F, 4 Colts, 2 3-in. R F field.
Maine*	B S	1899	12,500	18	16,000	2,885,000	4 12-in. B L R, 16 6-in. R F guns.	6 3-in. R F, 8 6-pdr. R F, 6 1-pdr. R F, 2 Colts, 2 3-in. R F field.
Massachusetts ...	B S	1891	10,288	16	10,403	3,063,000	4 13-in. B L R, 8 8-in. B L R, 4 6-in. R F guns.	20 6-pdr. R F, 8 1-pdr. R F, 2 Colts.
Missouri*	B S	1900	12,500	18	16,000	2,885,000	4 12-in. B L R, 16 6-in. R F guns.	6 3-in. R F, 8 6-pdr. R F, 6 1-pdr. R F, 2 Colts, 2 3-in. R F field.
Nebraska*	B S	....	15,000	19	18,000	3,733,600	4 12-in. B L R, 8 8-in. B L R, 12 6-in. R F guns.	12 3-in. R F, 12 3-pdr. R F, 8 1-pdr. R F, 2 3-in. R F field, 2 machine, 6 automatic.
New Jersey*	B S	....	15,000	19	18,000	3,405,000	4 12-in. B L R, 8 8-in. B L R, 12 6-in. R F guns.	12 3-in. R F, 12 3-pdr. R F, 8 1-pdr. R F, 2 3-in. field, 2 machine, 6 automatic.
Ohio*	B S	1899	12,500	18	16,000	2,899,000	4 12-in. B L R, 16 6-in. R F guns.	6 3-in. R F, 8 3-pdr. R F, 6 1-pdr. R F, 2 Colts, 2 3-in. R F field.
Oregon	B S	1891	10,288	17	11,111	3,222,810	4 13-in. B L R, 8 8-in. B L R, 4 6-in R F guns.	20 6-pdr. R F, 6 1-pdr. R F, 2 Colts, 2 3-in. R F field.
Rhode Island* ..	B S	....	14,600	19	18,000	3,405,000	4 12-in. B L R, 8 8-in. B L R, 12 6-in. R F guns.	12 3-in. R F, 12 3-pdr. R F, 8 1-pdr. R F, 2 3-in. R F field, 2 machine, 6 automatic.
Texas	B S	1889	6,315	18	8,610	2,500,000	2 12-in. B L R, 6 6-in. B L R.	12 6-pdr. R F, 6 1-pdr. R F, 4 37-mm. H R C, 2 Colts, 1 field.
Virginia*	B S	....	14,600	19	18,000	3,590,000	4 12-in. B L R, 8 8-in. B L R, 12 6-in. R F guns.	12 3-in. R F, 12 3-pdr. R F, 8 1-pdr. R F, 2 3-in. R F field, 2 machine, 6 automatic.
Wisconsin	B S	1897	11,525	17	10,000	2,674,950	4 13-in. B L R, 14 6-in. R F guns.	16 6-pdr. R F, 6 1-pdr. R F, 4 Colts, 2 3-in. R F field.
ARMORED CRUISERS.								
Brooklyn	A C	1893	9,215	22	18,769	2,986,000	8 8-in. B L R, 12 5-in. R F guns.	12 6-pdr. R F, 4 1-pdr. R F, 4 Colts, 2 3-in. R F field.
California*	A C	....	14,000	22	23,000	3,800,000	4 8-in. B L R, 14 6-in. R F guns.	18 3-in. R F, 12 3-pdr. R F, 8 1-pdr. R F, 2 3-in. R F field, 2 machine, 6 automatic.
Colorado*	A C	1901	13,600	22	23,000	3,780,000	4 8-in. B L R, 14 6-in. R F guns.	18 3-in. R F, 12 3-pdr. R F, 8 1-pdr. R F, 2 3-in. R F field, 2 machine, 6 automatic.
Maryland*	A C	....	13,600	22	23,000	3,775,000	4 8-in. B L R, 14 6-in. R F guns.	18 3-in. R F, 12 3-pdr. R F, 8 1-pdr. R F, 2 3-in. R F field, 2 machine, 6 automatic.
New York	A C	1890	8,200	21	17,401	2,985,000	6 8-in. B L R, 12 4-in. R F guns.	8 6-pdr. R F, 2 1-pdr. R F, 2 Colts.
Pennsylvania* ..	A C	1901	14,000	22	23,000	3,890,000	4 12-in. B L R, 8 8-in. B L R, 12 6-in. R F guns.	12 3-in. R F, 12 3-pdr. R F, 8 1-pdr. R F, 2 3-in. field, 2 machine, 6 automatic.
South Dakota* ..	A C	....	13,600	22	23,000	3,750,000	4 8-in. B L R, 14 6-in. R F guns.	18 3-in. R F, 12 3-pdr. R F, 8 1-pdr. R F, 2 3-in. R F field, 2 machine, 6 automatic.

NAVY

Name.	Class.	Keel Laid.	Displacement, Tons.	Speed, Knots.	Horsepower.	Cost.	Batteries. Main.	Batteries. Secondary.
West Virginia* .	A C	1891	14,000	23	23,000	3,885,000	4 8-in. B L R, 14 6-in. R F guns.	18 3-in. R F, 12 3-pdr. R F, 8 1-pdr. R F, 2 3-in. R F field, 2 machine, 6 automatic.
RAM.								
Katahdin	R	....	2,155	17	5,068	930,000	4 6-pdr. R F guns.	.....
DBL. TURRET MON.								
Amphitrite	C D	1891	3,990	10.5	1,600	‡	4 10-in. B L R, 2 4-in. R F guns.	2 6-pdr. R F, 2 3-pdr. R F, 2 37-mm. H R C, 7 1-pdr. R F, 1 Colt.
Miantonomoh ...	C D	1874	3,990	10.5	1,426	‡	4 10-in. B L R.	2 6-pdr. R F, 2 3-pdr. R F, 6 1-pdr. R F, 1 Colt.
Monadnock	C D	1874	3,990	12	3,000	‡	4 10-in. B L R, 2 4-in. R F guns.	2 6-pdr. R F, 2 3-pdr. R F, 2 37-mm. H R C, 2 1-pdr. R F.
Monterey	C D	1875	4,084	13.6	5,244	1,628,905	2 12-in. B L R, 2 10-in. B L R.	6 6-pdr. R F, 4 1-pdr. R F, 2 Gatlings, 1 field.
Puritan	C D	1889	6,060	12.4	3,700	‡	4 12-in. B L R, 6 4-in. R F guns.	6 6-pdr. R F, 2 37-mm. H R C, 2 1-pdr. R F.
Terror	C D	1875	3,990	10.5	1,600	‡	4 10-in. B L R.	2 6-pdr. R F, 2 3-pdr. R F, 2 37-mm. H R C, 2 1-pdr. R F.
SGL. TURRET MON.								
Canonicus	C D	1874	2,100	6	340	622,963	2 15-in. S B.	2 12-pdr. H.
Catskill	C D	1862	1,875	6	340	427,766	2 15-in. S B.	None.
Jason	C D	1862	1,875	5—6	340	422,766	2 15-in. S B.	2 12-pdr. H.
Lehigh	C D	1862	1,875	5—6	340	422,726	2 15-in. S B.	2 12-pdr. H.
Mahopac	C D	1862	2,100	6	340	635,374	2 15-in. S B.	2 12-pdr. H.
Manhattan	C D	1862	2,100	6	340	628,879	2 15-in. S B.	2 12-pdr. H.
Montauk	C D	1862	1,875	5—6	340	423,027	2 15-in. S B.	2 12-pdr. H.
Nahant	C D	1862	1,875	5—6	340	413,515	2 15-in. S B.	2 12-pdr. H.
Arkansas*	C D	1862	3,214	11½	3,235	960,000	2 12-in. B L R, 4 4-in. R F guns.	3 6-pdr. R F, 6 1-pdr. R F, 2 Colts.
Florida*	C D	1899	3,214	11½	3,235	925,000	2 12-in. B L R, 4 4-in. R F guns.	3 6-pdr. R F, 5 1-pdr. R F, 2 Colts.
Nevada*	C D	1899	3,214	11½	3,228	962,000	2 12-in. B L R, 4 4-in. R F guns.	3 6-in. S A, 4 1-pdr. automatic, 4 1-pdr. R F, 2 Colts.
Wyoming*	C D	1899	3,214	11½	3,218	975,000	2 12-in. B L R, 4 4-in. R F guns.	3 6-pdr. R F, 5 1-pdr. R F, 2 Colts.
UNARMORED STEEL VESSELS.		1899						
Albany	P C		3,437	20	7,500	.....	6 6-in. R F guns, 4 4.7-in. R F guns.	10 6-pdr. R F, 8 1-pdr. R F, 2 Colts.
Atlanta	P C	....	3,000	15.60	4,030	617,000	6 6-in. R F guns, 2 8-in. B L R.	2 6-pdr. R F, 4 1-pdr. R F, 2 Colts, 1 3-in. R F field.
Baltimore	P C	1883	4,413	20.096	10,064	1,325,000	12 6-in. R F, 6 14-pdr. R F.	6 3-pdr. R F, 4 1-pdr. R F, 4 automatic, 1 3-in. R F field.
Boston	P C	1887	3,000	15.60	4,300	619,000	6 6-in. B L R, 2 8-in. B L R.	6 6-pdr. R F, 4 1-pdr. R F, 2 Colts, 1 3-in. R F field.
Charleston*	P C	1883	9,600	22	21,000	2,740,000	14 6-in. R F.	18 3-in. R F, 12 3-pdr. S A, 4 1-pdr. automatic, 8 1-pdr. R F, 2 3-in. R F field, 2 .30 cal. machine, 8 .30 cal. automatic.
Chattanooga* ...	P C	....	3,100	16	4,700	1,039,000	10 5-in. R F guns.	8 6-pdr. R F, 2 1-pdr. R F, 4 Colt automatic.
Chicago	P C	1900	5,000	18	9,000	889,000	4 8-in. B L R, 14 5-in. R F guns.	7 6-pdr. R F, 2 1-pdr. R F, 2 Colts, 1 3-in. R F field.
Cincinnati	P C	1883	3,213	19	10,000	1,100,000	11 5-in. R F guns.	8 6-pdr. R F, 2 1-pdr. R F, 2 Colts, 1 3-in. R F field.
Cleveland*	P C	1890	3,100	16	4,700	1,041,000	10 5-in. R F guns.	8 6-pdr. R F, 2 1-pdr. R F, 4 Colt automatic.
Columbia	P C	1900	7,375	22.8	18,509	2,725,000	1 8-in. B L R, 2 6-in. B L R, 8 4-in. R F guns.	12 6-pdr. R F, 2 1-pdr. R F, 2 Colts, 1 3-in. R F field.
Denver*	P C	1890	3,100	16	4,700	1,080,000	10 5-in. R F guns.	8 6-pdr. R F, 2 1-pdr. R F, 4 Colt automatic.
Des Moines* ...	P C	1900	3,100	16	4,700	1,065,000	10 5-in. R F guns.	8 6-pdr. R F, 2 1-pdr. R F, 4 Colt automatic.
Detroit	C	1900	2,089	19	5,227	612,500	10 5-in. R F guns.	6 6-pdr. R F, 2 1-pdr. R F, 2 Colts, 1 3-in. R F field.
Galveston*	P C	1890	3,100	16	4,700	1,027,000	10 5-in. R F guns.	8 6-pdr. R F, 2 1-pdr. R F, 4 Colt automatic.
Marblehead	C	1901	2,089	18	5,451	674,000	10 5-in. R F guns, 1 3-in. field gun.	6 6-pdr. R F, 2 1-pdr. R F, 2 Colts.
Milwaukee*	P C	1890	9,600	22	21,000	2,825,000	14 6-in. R F guns.	18 3-in. R F, 12 3-pdr. S A, 4 1-pdr. automatic, 8 1-pdr. R F, 2 3-in. R F field, 2 .30 cal. machine, 8 .30 cal. automatic.

Name.	Class.	Keel Laid.	Displacement, Tons.	Speed, Knots.	Horsepower.	Cost.	Batteries. Main.	Batteries. Secondary.
Minneapolis	P C	1891	7,375	23.073	20,862	2,690,000	1 8-in. B L R, 2 6-in. B L R, 8 4-in. R F guns.	12 6-pdr. R F, 2 1-pdr. R F, 2 Colts, 1 3-in. R F field.
Montgomery	C	1890	2,089	19	5,580	612,500	10 5-in. R F guns.	6 6-pdr. R F, 2 1-pdr. R F, 2 Colts.
Newark	P C	1888	4,098	19	8,869	1,248,000	12 6-in. R F guns.	8 6-pdr. R F, 2 Colts, 4 1-pdr. R F.
New Orleans ...	P C	....	3,437	20	7,500	.....	6 6-in. R F guns, 4 4.7-in. R F guns.	10 6-pdr. R F, 8 1-pdr. R F, 2 Colts.
Olympia	P C	1891	5,870	21.686	17,313	1,796,000	10 5-in. R F guns, 4 8-in. B L R, mounted in barbette turrets, armor 3½ and 4½ in.	14 6-pdr. R F, 7 1-pdr. R F, 1 Gatling.
Philadelphia	P C	1888	4,324	19.678	8,815	1,350,000	12 6-in. R F guns.	4 6-pdr. R F, 4 3-pdr. R F, 2 1-pdr. R F, 2 Colts, 37-mm. R C, 1 3-in. R F field.
Raleigh	P C	1889	3,213	19	10,000	1,100,000	11 5-in. R F guns.	8 6-pdr. R F, 4 1-pdr. R F, 2 Colts.
Reina Mercedes°	C	....	3,090	17	3,700	.....	.....	.....
San Francisco ..	P C	1888	4,098	19.525	9,913	1,428,000	12 6-in. B L R.	12 6-pdr. R F, 2 1-pdr. R F, 2 Colts.
St. Louis*	P C	....	9,600	.....	21,000	2,740,000	14 6-in. R F guns.	18 3-in. R F, 12 3-pdr. S A, 4 1-pdr. automatic, 8 1-pdr. R F, 2 3-in. R F field, 2 .30 cal. machine, 8 .30 cal. automatic.
Tacoma*	P C	1900	3,100	16	4,700	1,041,000	10 5-in. R F guns.	8 6-pdr. R F, 2 1-pdr. R F, 4 Colt automatic
GUNBOATS.								
Bancroft	G B	1891	839	14	1,213	250,000	4 4-in. R F guns.	8 3-pdr. R F, 1 1-pdr. R F, 1 Colt.
Bennington	G B	1888	1,710	17	3,436	490,000	6 6-in. B L R.	2 6-pdr. R F, 2 3-pdr. R F, 2 37-mm. H R C, 2 Gatlings.
Castine	G B	1891	1,177	16	2,199	318,500	8 4-in. R F guns.	4 6-pdr. R F, 2 1-pdr. R F, 1 Colt.
Concord	G B	1888	1,710	16	3,405	490,000	6 6-in. B L R	2 6-pdr. R F, 2 3-pdr. R F, 2 37-mm. H R C, 2 Gatlings.
Don Juan de Austria°	G B	....	1,159	14	1,600	180,000	4 5-in. R F guns.	4 6-pdr. R F, 4 Colts.
General Alava° .	G B	....	1,390	10	770	.....	.....	2 42-mm. Nordenfelts, 4 11-mm. Nordenfelts.
Helena	G B	1894	1,392	15	1,988	280,000	8 4-in. R F guns.	4 6-pdr. R F, 4 1-pdr. R F, 2 Colts, 1 3-in. field.
Isla de Cuba°...	G B	....	1,030	14	1,000	215,000	4 4-in. R F guns.	4 6-pdr. R F, 4 Colts.
Isla de Luzon°...	G B	....	1,030	14	1,000	215,000	4 4-in. R F guns.	4 6-pdr. R F, 4 Colts.
Machias	G B	1891	1,177	15	2,046	318,500	8 4-in. R F guns.	4 6-pdr. R F, 2 1-pdr. R F, 1 Colt.
Nashville	G B	1894	1,371	16	2,536	280,000	8 4-in. R F guns.	4 6-pdr. R F, 2 1-pdr. R F, 2 Colts, 1 3-in. R F field.
Petrel	G B	1887	892	11	1,095	247,000	4 6-in. B L R guns.	2 3-pdr. R F, 1 1-pdr. R F, 2 37-mm. H R C, 2 Gatlings.
Topeka	G B	....	1,700	16	2,000	170,327	6 4-in. R F guns.	6 3-pdr. R F, 2 1-pdr. R F, 1 Colt.
Wilmington	G B	1894	1,392	15	1,894	280,000	8 4-in. R F guns.	4 6-pdr. R F, 4 1-pdr. R F, 4 Colts.
Yorktown	G B	1887	1,710	16	3,392	455,000	6 6-in. R F guns.	2 6-pdr. R F, 2 3-pdr. R F, 4 1-pdr. R F, 2 Colts.
Annapolis	C G B	1897	1,000	13	1,227	227,700	6 4-in. R F guns.	4 6-pdr. R F, 2 1-pdr. R F, 1 Colt.
Marietta	C G B	1897	1,000	13	1,054	223,000	6 4-in. R F guns.	4 6-pdr. R F, 2 1-pdr. R F, 1 Colt.
Newport	C G B	1897	1,000	12	1,008	229,400	6 4-in. R F guns.	4 6-pdr. R F, 2 1-pdr. R F, 1 Colt.
Princeton	C G B	1898	1,100	12	800	230,000	6 4-in. R F guns.	4 6-pdr. R F, 2 1-pdr. R F, 1 Colt.
Vicksburg	C G B	1897	1,000	13	1,118	229,400	6 4-in. R F guns.	4 6-pdr. R F, 2 1-pdr. R F, 1 Colt.
Wheeling	C G B	1897	1,000	12	1,018	219,000	6 4-in. R F guns.	4 6-pdr. R F, 2 1-pdr. R F, 1 Colt.
SPECIAL CLASS.								
Chesapeake	T S	1898	1,175	..	....	112,609	6 4-in. R F guns.	4 6-pdr. R F, 2 1-pdr. R F.
Dolphin	D B	1883	1,486	16	2,253	315,000	2 4-in. R F guns.	1 6-pdr. R F, 6 3-pdr. R F, 2 Colts.
Vesuvius	D G B	1887	929	21	3,795	350,000	3 15-in. dynamite guns.	3 3-pdr. R F, 2 Colts.

Navy

NAME.	Class.	Keel Laid.	Displacement, Tons.	Speed, Knots.	Horsepower.	Cost.	BATTERIES. Main.	BATTERIES. Secondary.
AUX. CRUISERS.								
Badger	S C	1892	4,784	16	3,200	367,000	6 5-in. R F guns.	6 3-pdrs.
Buffalo	S C	....	6,888	14.5	3,600	575,000	2 5-in. R F guns, 4 4-in. R F guns.	2 6-mm. Colts, 6 6-pdrs.
Dixie	S C	1893	6,145	16	3,800	575,000	8 5-in. R F guns.	4 6-pdrs., 4 1-pdr., 2 Colts, 1 3-in. field.
Panther	I C	1899	4,260	13	....	375,000	6 5-in. R F guns, 2 4-in. R F guns.	6 3-pdrs., 1 Colt, 1 3-in. field.
Prairie	I C	1890	6,872	14.5	3,800	575,000	8 6-in. R F guns.	6 6-pdr. R F, 2 Colts.
Yankee	I C	1892	6,888	12.5	3,800	575,000	.....	6 6-pdrs., 2 Colts.
TORPEDO BOATS.								
Bagley*	T B	1898	167	29	4,200	161,000	.....	3 3-pdr. R F, 3 18-in. W T.
Bailey*	T B	1897	235	30	5,600	210,000	.....	4 6-pdr. R F, 2 18-in. W T.
Barcelo°	T B	....	66	17	600	.....	.....	.....
Barney*	T B	1898	167	29	4,200	161,000	.....	3 3-pdr. R F, 3 18-in. W T.
Biddle*	T B	1898	167	28	4,200	161,000	.....	3 3-pdr. R F, 3 18-in. W T.
Blakeley*	T B	1898	165	26	3,000	159,000	.....	3 3-pdr. R F, 3 18-in. W T.
Cushing	T B	1898	105	22.5	1,720	82,750	.....	3 1-pdr. R F, 3 18-in. W T.
Dahlgren*	T B	1897	146	30	4,200	194,000	.....	4 1-pdr. R F, 2 18-in. W T.
Davis	T B	1897	154	23	1,750	81,546	.....	3 1-pdr. R F, 3 18-in. W T.
De Long*	T B	1898	165	26	3,000	159,400	.....	3 3-pdr. R F, 3 18-in. W T.
Du Pont	T B	1896	165	28	....	144,000	.....	4 1-pdr. R F, 3 18-in. W T.
Ericsson	T B	1892	120	24	1,800	117,500	.....	3 1-pdr. R F, 3 18-in. W T.
Farragut	T B	1897	279	30	5,600	227,500	.....	4 6-pdr. R F, 2 18-in. W T.
Foote	T B	1896	142	24	2,000	97,500	.....	3 1-pdr. R F, 3 18-in. W T.
Fox	T B	1897	154	23	1,750	85,000	.....	3 1-pdr. R F, 3 18-in. W T.
Goldsborough*	T B	1897	247	30	6,000	214,500	.....	4 6-pdr. R F, 2 18-in. W T.
Gwin	T B	1897	45	20	850	39,000	.....	1 1-pdr. R F, 2 18-in. W T.
MacKenzie	T B	1897	65	20	850	48,500	.....	1 1-pdr. R F, 2 18-in. W T.
Manly	T B	1897	....	..	....	24,250	.....	3 3-pdr. R F, 3 18-in. W T.
McKee	T B	1897	65	19	850	45,000	.....	2 1-pdr. R F, 2 18-in. W T.
Morris	T B	1898	104	24	1,750	89,000	.....	3 1-pdr. R F, 3 18-in. W T.
Nicholson*	T B	1899	174	26	....	165,000	.....	3 3-pdr. R F, 3 18-in. W T.
O'Brien*	T B	1896	165	26	....	165,000	.....	3 3-pdr. R F, 3 18-in. W T.
Porter	T B	1896	142	28	....	147,000	.....	4 1-pdr. R F, 3 18-in. W T.
Rodgers	T B	1896	182	24	2,000	97,500	.....	3 1-pdr. R F, 3 18-in. W T.
Rowan	T B	1899	165	27	3,200	160,000	.....	4 1-pdr. R F, 3 18-in. W T.
Shubrick*	T B	1897	145	26	3,000	129,750	.....	3 3-pdr. R F, 3 18-in. W T.
Somers	T B	1888	318	23	1,900	72,997	.....	3 3-pdr. R F, 3 18-in. W T.
Stiletto	T B	1898	165	18	359	25,000	.....	.....
Stockton*	T B	1897	340	26	3,000	129,750	.....	3 3-pdr. R F, 3 18-in. W T.
Stringham*	T B	1897	146	30	7,200	236,000	.....	7 6-pdr. R F, 2 18-in. W T.
T. A. M. Craven.	T B	1897	46	21	4,200	194,000	.....	4 1-pdr. R F, 2 18-in. W T.
Talbot	T B	1898	165	26	850	39,000	.....	1 1-pdr. R F, 2 18-in. W T.
Thornton*	T B		165	26	3,000	168,000	.....	3 3-pdr. R F, 3 18-in. W T.
Tingey*	T B	1898	165	26	3,000	146,000	.....	3 3-pdr. R F, 3 18-in. W T.
Wilkes*	T B	1898	142	24	2,000	129,750	.....	3 3-pdr. R F, 3 18-in. W T.
Winslow	T B	1896				97,500	.....	3 1-pdr. R F, 3 18-in. W T.

NAME.	Class.	Keel Laid.	Displacement, Tons.	Speed, Knots.	Horsepower.	Cost.	BATTERIES. Main.	BATTERIES. Secondary.
SUBMARINE.								
Adder*	S T B	1900	120	8	160	170,000	.....	1 torpedo tube, 5 W T.
Grampus*	S T B		74	8	45	150,000	.....	1 torpedo tube.
Holland	S T B		120	8	160	170,000	.....	1 torpedo tube, 5 W T.
Moccasin*	S T B		120	8	160	170,000	.....	1 torpedo tube, 5 W T.
Pike*	S T B		168	8	160	150,000	.....	2 W T.
Plunger*	S T B	1896	120	8	160	170,000	.....	1 torpedo tube, 5 W T.
Porpoise*	S T B		120	8	160	170,000	.....	1 torpedo tube, 5 W T.
Shark*	S T B							
TOR.-BOAT DEST.			420	28	8,000	283,000	.....	2 3-in. R F, 5 6-pdr. R F, 2 18-in. W T.
Bainbridge*	T D	1898	420	29	8,000	283,000	.....	2 3-in. R F, 5 6-pdr. R F, 2 18-in. W T.
Barry*	T D	1899	420	29	8,000	283,000	.....	2 3-in. R F, 5 6-pdr. R F, 2 18-in. W T.
Chauncey*	T D	1890	420	28	8,000	260,000	.....	2 3-in. R F, 5 6-pdr. R F, 2 18-in. W T.
Dale*	T D	1899	420	28	8,000	260,000	.....	2 3-in. R F, 5 6-pdr. R F, 2 18-in. W T.
Decatur*	T D	1899	408	29	7,200	291,000	.....	2 3-in. R F, 5 6-pdr. R F, 2 18-in. W T.
Hopkins*	T D	1899	408	29	7,200	291,000	.....	2 3-in. R F, 5 6-pdr. R F, 2 18-in. W T.
Hull*	T D	1899	402	30	8,400	281,000	.....	2 3-in. R F, 5 6-pdr. R F, 2 18-in. W T.
Lawrence	T D	1899	402	30	8,400	281,000	.....	2 3-in. R F, 5 6-pdr. R F, 2 18-in. W T.
Macdonough	T D	1899	420	29	7,000	285,000	.....	2 3-in. R F, 5 6-pdr. R F, 2 18-in. W T.
Paul Jones*	T D	1899	420	29	7,000	285,000	.....	2 3-in. R F, 5 6-pdr. R F, 2 18-in. W T.
Perry*	T D	1899	420	29	7,000	285,000	.....	2 3-in. R F, 5 6-pdr. R F, 2 18-in. W T.
Preble*	T D	....	420	29	8,000	282,000	.....	2 3-in. R F, 6 6-pdr. R F, 2 18-in. W T.
Stewart*	T D	1899	433	29	8,300	286,000	.....	2 3-in. R F, 6 6-pdr. R F, 2 18-in. W T.
Truxton*	T D	1899	433	30	8,300	286,000	.....	2 3-in. R F, 6 6-pdr. R F, 2 18-in. W T.
Whipple*	T D	1899	433	30	8,300	286,000	.....	2 3-in. R F, 6 6-pdr. R F, 2 18-in. W T.
Worden*	T D	1899					.....	2 3-in. R F, 6 6-pdr. R F, 2 18-in. W T.

Unarmored Gunboats.— Yankton, Scorpion, Vixen, Gloucester, Wasp, Frolic, Dorothea, El Cano°, Pinta, Stranger, Peoria, Hist, Eagle, Hornet, Quiros°, Villalobos°, Siren, Sylvia, Callao°, Pampanga°, Paragua°, Samar°, Arayat°, Aileen, Elfrida, Sylph, Calamianes°, Albay°, Leyte°, Panay°, Manileno°, Mariveles°, Mindoro°, Restless, Shearwater, Alvarado°, Sandoval°, Huntress, Basco°, Guardoqui°, and Urdaneta°. These vessels are built of steel and iron and carry a battery of from 2 to 10 guns, according to size. The largest vessel has a displacement of 975 tons and the smallest 42, with a speed of 8 to 19 knots.

*Building or building contracted for. ‡Appropriation to complete monitors, $3,178,046. °Captured from Spain. §Plans being prepared.

Old Naval Vessels.— Old Iron Vessels.— Alert, Monocacy, Michigan, and Ranger. These have a tonnage varying from 5 50 to 1,370; horsepower, 190 to 850, and speed, 8.5 to 11.2 knots.

Old Wooden Vessels.— Adams, Enterprise, Essex, Hartford (recently rebuilt), Lancaster, and Mohican. These have a tonnage varying from 900 to 3,250 horsepower, 220 to 2,000, and speed, 7.5 to 12 knots. They are now used for the training of apprentices and landsmen.

The above are steam vessels. In addition to the old navy vessels enumerated above, are the following sailing vessels: Training-ship Constellation, 3 guns, built 1854; Training-ship Monongahela, built 1862; School-ships St. Mary's and Saratoga, and Training-ship Alliance.

Tugs.— There are 39 tugs in the Naval Service, the largest of which, the Potomac, has a displacement of 677 tons, and the two smallest, the Chickasaw and Rapido, 100 tons. These vessels are distributed among the various naval stations in the United States and the Philippine Islands.

The following wooden vessels are unfit for further sea-service: Receiving-ships Franklin, Pensacola, Richmond, Vermont, Wabash, Independence, Nipsic, and Constitution.

The following vessels are being used by various State naval militia: Fern, Marion, Minnesota, Portsmouth, Yantic, Dale, New Hampshire, and St. Louis.

The Jamestown has been transferred to the Marine Hospital service.

The Michigan, an iron cruiser of 685 tons, is employed on special duty in the northwestern lakes.

Auxiliary Navy.— The auxiliary fleet of the navy consists of 15 cruisers, 16 colliers, 23 converted yachts, and 11 vessels of a special class.

The number of enlisted men in the United States Navy allowed by law prior to the war with Spain in 1898 was 12,500. On Aug. 15, when the enlisted force reached its maximum, there were 24,123 men in the service. This great increase was made necessary by the addition of 110 auxiliary ships to the navy. There were 856 appointments of officers for temporary service up to Sept. 24, 1898. The maximum fighting force of the navy in the war with Spain was as follows:

REGULAR.

Battleships, first class	4
Battleships, second class	1
Armored cruisers	2
Coast defense monitors	6
Armored ram	1
Protected cruisers	12
Unprotected cruisers	3
Gunboats	18
Dynamite cruiser	1
Torpedo boats	11
Vessels of the navy, including monitors	14

AUXILIARY.

Auxiliary cruisers	11
Converted yachts	28
Revenue cutters	15
Light-house tenders	4
Converted colliers	19
Miscellaneous	19
Converted tugs	27

Navy Yards. The principal navy yards of the United States government are as follows: New York (Brooklyn, N. Y.); Mare Island, Cal.; Norfolk (Portsmouth, Va.); Portsmouth, N. H. (Kittery, Me.); Boston (Charlestown, Mass.); League Island (Philadelphia); Washington, D. C.; and Puget Sound, Wash. There are also several naval stations, the important ones being at Boston, Mass.; Newport, R. I.; Indian Head, Md.; Norfolk, Va.; Premerton, Wash.; Port Royal, S. C.; Portsmouth, N. H.; Philadelphia, Pa.; Cavite, Philippines; San Juan, Porto Rico; Tutuila, Samoa; Guam, Ladrones; Guantanamo, Cuba; Honolulu, H. I.; Sitka, Alaska; Culebra, W. I.; North Chicago, Ill.; and Yokohama, Japan. In England the royal navy yards are at Chatham, Sheerness, Portsmouth, Devonport, and Pembroke, besides the Deptford and the Woolwich store yards. There are also royal dock yards at Houlbowline in Cork Harbor, at the Cape of Good Hope, Gibraltar, Malta, Halifax, Bermuda, Antiqua, Jamaica, Sierra Leone, Trincomalee, Singapore, Hong Kong, Esquimalt (Vancouver's Island), Fernando Po, Sidney, and Shanghai. The greatest naval centers of France are Cherbourg, Brest, Lorient, Rochefort, Toulon, and Bizerta in Tunis. Germany has three ports of war, Kiel, Danzig, and Wilhelmshafen. Trieste and Pola are the Austrian naval harbors. Russia has Cronstadt and Sebastopol at home, and Vladivostok in the Amur territory.

In the early history of the United States navy, nearly all the vessels were built and equipped at the navy yards. The six wooden frigates used in the Civil War were there constructed, but the modern steel warships have been built chiefly by contract, by private builders, so that the navy yards now are used mainly for repairs.

Naxos, or **Naxia,** an island of the Grecian Archipelago, the largest of the Cyclades; length 18 miles; breadth, 12 miles; area, 164 square miles; pop. about 15,000. It is hilly, but extremely productive. The chief products are fruits, wine, oil, cotton, silk, cheese, honey, and wax. Chief town is Naxia (or Naxos).

COIN OF NAXOS.

Nazareans, a Jewish sect mentioned by Epiphanius. They aimed at a patriarchal religion in place of a Mosaic Judaism, and rejected the history of Genesis and the Mosaic Law. They were found in Galaaditis, Basanitis, and other parts beyond Jordan.

Nazarenes, a name applied reproachfully to the early Christians by the Jews. (Acts xxiv: 5). Also a heretical sect from among the Judaizing Christians of Hebrew descent, so frequently in conflict with St. Paul, which arose about the end of the 1st century, contemporaneously with the Ebionites and at first holding similar tenets. Jerome says: "Desiring to be both Jews and Christians, they are neither the one nor the other." They made use of the Gospel to the Hebrews, observed the Mosaic ceremonial law, and to the last retained belief in the divinity of Christ, while the Ebionites ultimately rejected it. In ornithology, *Didus nazarenus* is a species of dodo, said to have existed in the island of Rodriguez, near Mauritius.

Nazareth, the home of Jesus, anciently in the district of Galilee, 21 miles S. E. of Acre, still a small but flourishing town of Palestine. It lies in a hilly tract of country, and is built partly on the sides of some rocky ridges. In the earliest ages of Christianity Nazareth (which is not mentioned in the Old Testament) was quite overlooked by the Church; the first Christian pilgrimage to it took place in the 6th century. The principal building is the Latin convent, on the supposed scene of the Annunciation; but the Greeks have also erected on another spot a church in commemoration. The traveler is also shown a Latin chapel, affirmed to be built over the "workshop of Joseph"; the chapel of "the Table of Christ," a vaulted chamber, containing the veritable table at which our Lord and His disciples ate; and the synagogue out of which He was thrust by His townsmen. The Virgin's Well is just outside the town. The women of the village have long been famous

for their beauty. There is here a Protestant mission and orphanage. Pop. about 7,500.

Nazarite, in the Jewish Church, a man or woman set apart by a vow for the service of God, either for a definite period or for life. The hair was allowed to grow, the fruit of the vine in any shape was forbidden, and no Nazarite might approach a corpse. The "law of the Nazarite" is given at length in Numbers (vi: 1–21. Samson (Judges xiii: 5), Samuel (I Sam. i:. 11), and John the Baptist (Luke i: 15) given at length in Nnmbers (vi: 1-21), it may be gathered that persons so dedicated to God had an organization like that of the prophets, and among the later Jews the vow was developed (I Mac. iii: 49; Acts xviii: 18, xxi: 23, 24). See RECHABITE.

Neagh (nā'ä*h*) **Lough,** the largest lake of the British Islands, in the province of Ulster, Ireland, surrounded by the counties of Armagh, Tyrone, Londonderry, Antrim, and Down; length 16 miles; average breadth, 10 miles; it contains 98,255 acres, is 102 feet in greatest depth, and is 48 feet above sea-level. It receives the waters of numerous streams, of which the principal are the Upper Bann, the Blackwater, and the Callan; and its surplus waters are carried off N. to the North Channel by the Lower Bann. Communication by means of canals subsists between the Lough and Belfast, Newry, and the Tyrone coalfield. The S. shores of the Lough are low and marshy and dreary in appearance. It is well stocked with fish — lake trout, char, and pullen.

Neal, Daniel, an English historian; born in London, England, Dec. 14, 1678. He was educated at Merchant Taylors' School, and at Utrecht and Leyden, and in 1706 became minister of an Independent congregation in London. His first work was a "History of New England" (1720), which met with a very favorable reception in the United States. But his reputation rests on his laborious and accurate "History of the Puritans" (4 vols. 1732–1738; new ed. 1793). He died in Bath, England, April 4, 1743.

Neal, John, an American poet and author; born in Falmouth, Mass., now Portland, Me., Aug. 25, 1793. He was a member of the Society of Friends, but left it at 25. Later in life he figured as editor, lecturer, lawyer, poet, novelist, and teacher of gymnastics. Among his numerous works are: "Keep Cool" (1817), a novel; "The Battle of Niagara" (1818), a poem; "Brother Jonathan" (1825); "Rachel Dyer" (1828), a novel; "Downeasters" (1833), a novel; "Wandering Recollections of a Somewhat Busy Life" (1870). He died in Falmouth, Mass., June 21, 1876.

Neale, John Mason, an English church historian and poet; born in London, England, Jan. 24, 1818. He was an extreme High Churchman; founded a sisterhood, was inhibited from church ministrations for 14 years, and once burned in effigy. His translations of Latin and Greek hymns are among the finest religious lyrics in the language the most famous are "Art Thou Weary" and "Jerusalem the Golden." His best-known books are: "History of the Holy Eastern Church"; and "History of the So-called Jansenist Church of Holland." He died in East Grinstead, England, Aug. 6, 1866.

Neal, Joseph Clay, an American journalist and humorist; born in Greenland, N. H., Feb. 3, 1807. He was editor of the "Pennsylvanian" 1831–1844, when he founded the "Saturday Gazette." His works are: "Charcoal Sketches" (1837); "Peter Ploddy and Other Oddities" (1844). He died in Philadelphia, Pa., July 18, 1847.

Neander, Johann August Wilhelm, a German historian; born in Göttingen, Jan. 16, 1789. His parents were Jews, but while pursuing his studies at the Johanneum College at Hamburg, he became a convert to the Christian faith, and assumed the name of Neander, signifying, in Greek, "a new man." He subsequently studied at the universities of Halle, Göttingen, and Heidelberg. His great attainments led to his being appointed Professor of Theology at the last named, and in 1812 he was chosen to fill the chair of theology at the University of Berlin, where he remained till his death. He published "The Emperor Julian and his Times" (1812); "Universal History of the Christian Religion and Church" (1825–1845). His greatest work: "Life of Jesus in its Historical Relations" (1835), a refutation of Strauss' "Life of Jesus." He died in Berlin, July 14, 1850.

Neanderthal (-täl), a wildly romantic valley between Düsseldorf and Elberfeld in Rhenish Prussia. In a limestone cave in this valley was found in 1857 the skeleton of a prehistoric man, and the peculiar formation of the skull induced several archæologists to regard it as typical of a separate race of ancient cave dwellers. Other authorities explain the abnormality as caused by disease during the lifetime of the individual.

Neap Tides, those tides which happen in the middle of the second and fourth quarters of the moon, taking place about four or five days before the new and full moons. They occur when the attractions of the sun and moon act on the waters of the ocean at right angles to each other.

Nearchus, an officer of Alexander the Great; a native of Crete, who settled in

Amphipolis during the reign of Philip, and became the companion and friend of the young Prince Alexander. In 330 he was governor of Lycia and other provinces in Asia Minor. In 329 B. C. he joined Alexander in Bactria with a body of Greek mercenaries, taking part in the Indian campaigns. Having built a fleet on the Hydaspes, Alexander gave Nearchus the command of it. He left the Indus toward the end of November, 325, and, skirting the coast all the way, arrived at Susa, in Persia, in February, 324. His own narrative of his voyage has been preserved in the "India" of Arrian.

Neath, a parliamentary and municipal borough and river-port of Glamorgan, South Wales, on a navigable river of the same name, 8 miles E. N. E. of Swansea. It is believed to stand on the site of the Roman station Nidum; and near it are the remains of an ancient castle, burned in 1231, and ruins of Neath Abbey. There are at Neath, which is one of the Swansea boroughs, extensive copper and tin-plate works and iron foundries, and chemicals are manufactured. Pop. about 12,000.

Neat's-foot Oil, an oil obtained from the feet of the common ox, either by splitting them up and boiling them over an open fire, or by treating them with superheated steam in a closed cylinder.

Nebel. See NABLUM.

Nebo, a mountain of Moab, whence Moses had a view of the Promised Land, and where he died. It is a summit of the range Abarium, "over against Jericho." Seetzen, Burckhardt, etc., identify it with Mount Attarus, about 10 miles N. of the Arnon. Travelers do not observe any very prominent summit in the range immediately opposite Jericho; but it has not yet been fully explored. In Babylonian mythology, an idol which probably represented the planet Mercury. It was also worshiped by the ancient Arabians. The extensive prevalence of this worship among the Chaldeans and Assyrians is evident from the many compound proper names occurring in the Scriptures of which this word forms a part; as, Nebuchadnezzar, Nebuzaradan, Nebushaszan; and also in the classics; as Naboned, Nabonassar, Nabopolassar, etc.

Nebraska, a State in the North Central Division of the North American Union; bounded by South Dakota, Iowa, Missouri, Kansas, Colorado, and Wyoming; admitted to the Union, March 1, 1867; capital, Lincoln; number of counties, 90; area, 76,840 square miles; pop. (1890) 1,058,910; (1900) 1,068,539; (1910) 1,192,214.

Topography.— The State is situated in the great central plain of North America, and has a flat or undulating surface, with a slight inclination S. E. On the N. W. is an extensive desolate tract of land known as the Mauvaises Terres or Bad Lands, rich in interesting fossil remains. Timber has been extensively planted here of late. The principal rivers are the Missouri, which forms the boundary on the E.; its great affluent, the Nebraska or Platte, which, formed by two main forks, from the Rocky Mountains, traverses the territory in an E. direction; and the Republican Fork of Kansas river, traversing the S. part of the State.

Geology.— The greater part of the State is occupied by Miocene Tertiary formations. A small portion of the N. W. is of Pliocene Tertiary deposit, the remainder of the State being divided among the Permian, Carboniferous, and Cretaceous. The Missouri and Platte river valleys exhibit signs of glacial action. The mineral deposits are not extensive. Coal occurs in places in layers ranging from 5 to 22 inches. Building stones are quarried in places, including a yellowish gray limestone, a magnesium limestone, capable of taking a high polish, and the blue Trenton limestone. Lignite, marble, lime, gypsum, rock salt, and peat are found in limited quantities all over the State. Considerable clay for brick and pottery is obtained in the central and W. parts of the State.

Soil.— The soil, excepting in the N. W. is a deep, rich loam underlaid by a porous clayey subsoil, and is admirably adapted to withstand drought. The climate is equable, and on the whole fine. The forest trees include elm, maple, black walnut, hickory, red cedar, linden, cottonwood, hackberry, pine, and spruce. Considerable attention is paid to forestry. The principal growth of timber, cottonwood, is found along the river banks.

Agriculture.— The even temperature, fertile soil, and extensive farm area, make Nebraska an important agricultural State. In 1900 the principal farm crops were corn, 210,430,064 bushels, valued at $65,233,320; wheat, 24,801,900 bushels, valued at $13,145,007; oats, 37,778,572 bushels, valued at $9,066,857; potatoes, 9,664,446 bushels, valued at $4,735,579; hay, 2,639,489 bushels, valued at $13,593,368; barley, 587,382 bushels, valued at $193,836; rye, 867,237 bushels, valued at $346,895; and buckwheat, 82,480 bushels, valued at $52,787.

Manufactures.— In 1900 there were reported 5,414 manufacturing establishments, employing $71,982,127 in capital and 24,461 persons; paying $11,749,706 for wages and $102,197,707 for materials; and having an annual output valued at $143,990,102. The chief manufactures included brick and tile, cars, dairy products, flour, liquors, lumber, harness, etc.

Banking.—On Oct. 31, 1901, there were 118 National banks in operation, having $10,082,500 in capital, $4,584,037 in outstanding circulation, and $4,312,620 in United States bonds. There were also 421 State banks with $7,080,596 in capital, and $1,168,771 in surplus; 6 private banks with $118,600 in capital, and $28,115 in surplus; and 2 loan and trust companies with $55,000 in capital and $41,180 in surplus. The exchanges at the United States clearing house at Omaha, for the year ending Sept. 30, 1901, aggregated $324,956,116, an increase over the preceding year of $8,892,343.

Education.—At the close of the school year 1899–1900 the children of school census age numbered 321,800; the enrollment in public schools, 288,227; and the average daily attendance, 181,874. There were 9,463 teachers, 6,733 buildings used for school purposes, and public school property valued at $9,591,135. The expenditures for the year amounted to $4,403,222, and the receipts, $3,984,640. For higher education there were 233 public high schools; 15 private secondary schools; the State Normal School of Nebraska, at Peru; Fremont Normal School, at Fremont; Lincoln Normal University, at Normal; the Santee Normal Training School, at the Santee Agency; and the Nebraska Normal College, at Wayne. There were 11 universities and colleges for men and for both sexes, including the University of Omaha, at Bellevue; State University of Nebraska, at Lincoln; Nebraska Wesleyan University, at University Place; Creighton University, at Omaha; York College, at York; and Union College at College View.

Churches.—The strongest denominations in the State are the Roman Catholic; Methodist Episcopal; Lutheran; Synodical Conference; Presbyterian, North; Regular Baptist, North; Congregational; Disciples of Christ; Lutheran, General Council; and United Brethren. In 1899 there were 2,522 Evangelical Sunday-schools, with 21,854 officers and teachers, and 148,355 scholars.

Postoffices and Periodicals.—In 1901 there were 1,086 postoffices of all grades, and 608 periodicals, of which 28 were daily, 1 tri-weekly 12 semi-weekly, 523 weekly, 2 semi-monthly, and 42 monthly.

Railroads.—On Jan. 1, 1901, the total length of railroads within the State was 5,701 miles, of which 193 miles were completed during the previous year.

Finances.—In 1901 the State had no bonded debt, the last payment of $35,000 having been made on June 3, 1900. On Dec. 1, 1900, the general fund warrants outstanding amounted to $1,727,509, and the cash in the treasury was $615,018. There is a permanent school fund of $4,365,544, and the State indebtedness is restricted by law to $100,000 to meet the casual deficits in revenue. The total assessed property valuation in 1900 was $117,747,592 and the tax rate, $7.25 per $1,000.

State Government.—The governor is elected for a term of two years and receives a salary of $2,500 per annum. Legislative sessions are held biennially in odd years, beginning on the first Tuesday in January and are limited to 60 days each. The Legislature has 33 members in the Senate and 100 in the House, each of whom receives $300 per annum, and mileage. There are 6 representatives in Congress. The State government in 1901 was Republican.

History.—Nebraska was originally a part of the Louisiana Purchase, and was for a long time part of the Northwest Territory. The overland emigration to California in 1849 brought about a general settlement of this region, and a Territory was organized in 1854 under the Kansas-Nebraska Bill. From the area of this Territory were taken part of Colorado, Montana, Wyoming, and the Dakotas. In 1867 the Union Pacific railroad was completed across Nebraska, the Territory was admitted to the Union as a State, and the capital was removed from Omaha to Lincoln. CHAS. H. DIETRICH.

Nebraska, University of, a coeducational non-sectarian institution in Lincoln, Neb.; opened in 1869; has grounds and buildings valued at over $1,260,000; aggregate endowment funds, $700,000; scientific apparatus, etc., $375,000; volumes in the library, 85,000; average number of faculty, 250; average student attendance, 3,600; ordinary income, $650,000.

Nebraska City, a city and county-seat of Otoe co., Neb.; on the Missouri river and on the Burlington Route and the Missouri Pacific railroads; 60 miles E. by S. of Lincoln. Here are the State Institution for the Blind, a United States government building, public library, a branch of St. Benedict's College, high school, waterworks, street railroad, electric lights, several daily and weekly newspapers, and a National bank. The city has extensive stock yards, lumber and planing mills, cereal and flour mills, starch factory, foundry, plow factories, a meat-packing plant, brickyards, distillery and breweries, and an assessed property valuation of nearly $1,000,000. Pop. (1900) 7,380; (1910) 5,488.

Nebraska Wesleyan University, a coeducational institution in University Place, Neb.; founded in 1887 under the auspices of the Methodist Episcopal Church; has grounds and buildings valued at over $450,000; productive funds, over $120,000; volumes in the library, about 8,000; ordinary annual income, $60,000; average number of faculty, 45; average student attendance, 900; graduates since opening, over 1,500.

NEBRASKA

SCALE OF MILES

10 5 0 10 20 30 40 50

Indian Reservation Boundaries

Military Reservation Boundaries

Forest Reserve Boundaries

State Capital ⊛ County Seats ⊙

Size of type indicates relative importance of places

Hammond's 8 x 11 Map of Nebraska
Copyright, 1909, by C.S. Hammond & Co., N.Y.

99°
F
98°
G
97°
H
96°
J
95°
K O T A
MINNESOTA
Chamberlain
Mitchell
Plankinton
Salem
Garretson
Luverne
Worthington
Sioux Falls
Manley
Hills
Lester
Rock Rapids
Sibley
Spirit Lake
Platte
Armour
Marion
Parker
Lennor
Canton
Doon
Sheldon
Hartley
Pringhar
Tripp
Scotland
James R.
Centerville
Wheeler
MILITARY RESERVE
Bonesteel
Jamieson
Ponca R.
Baker
Ft. Randall
Running Water
Tyndall
Napa
Yankton
Hawarden
Alton
Big Sioux R.
Akron
Maurice
Elkpoint
Vermillion
Le Mars
Merrill
Remsen
Marcus
Cherokee
Onawa Jc.
Kingsley
Moville
Correctionville
Sioux City
Dakota
Sergeant Bluff
Salix
Ida Grove
Mapleton
Whiting
Ute
Charter Oak
Denison
Missouri River
BOYD
Naper
Basin
Anoka
Gross
Butte
Spencer
Lynch
Verde
Bristow
Monowi
Watson
Grand Rapids
Brodie
Annear
Mariaville
Catalpa
Turner
Paddock
Scottville
Celia
Saratoga
Kirkwood
Dukeville
Knoxville
Verdigris
Inglis
Ray
Joy
Agee
Stuart
Atkinson
Slocum
Walnut
HOLT
Emmet
O'Neill
Middlebranch
Winnetoon
Mars
Venus
Page
Emporia
Plainview
Orchard
Greenvalley
Inman
Hammond
Inez
Stafford
Ewing
Savage
Brunswick
Amelia
Swan
Chambers
Little
Clearwater
Tonic
Deloit
Bliss
Neligh
ANTELOPE
Elkhorn
Niobrara
Sparta
Le Blanc
Santee
Crofton
Weigand
Aten
St. Helena
St. James
Constance
Fordyce
Hartington
Newcastle
Center
Bloomfield
KNOX
CEDAR
Bazile Mills
Creighton
Wausa
Andrew
Coleridge
Laurel
Belden
Randolph
McLean
Osmond
Concord
Sholes
Foster
Carroll
Wakefield
PIERCE
Pierce
Colbergen
Hadar
Melvin
Winside
Apex
Altona
Hoskins
WAYNE
Wayne
Ponca
DIXON
Waterbury
Dixon
Allen
Coburn
Hubbard
Jackson
DAKOTA
Nacora
Emerson
Homer
Winnebago Ind. Res.
Winnebago
Thurston
THURSTON
Pender
Omaha Ind. Res.
Onawa
Norfolk
Battlecreek
Hope
Norfolk Jc.
Pilger
Wisner
Stanton
STANTON
Beemer
Bancroft
CUMING
Westpoint
Monterey
Oleyen
Decatur
Lyons
BURT
Oakland
Craig
Tekamah
Argo
Blencoe
Mondamin
Logan
Modale
Woodbine
Arion
Manilla
Harlan
Missouri Valley
California
Neola
Avoca
Calhoun
Coffman
Minden
Ballagh
Erina
Blake
Francis
Newboro
Vim
Oakdale
Tilden
St. Clair
Meadowgrove
Elgin
Cumminsville
WHEELER
Bartlett
Petersburg
GARFIELD
Easton
Ericson
Pibel
Ono
Burwell
Beaver Cr.
Loretto
Akron
Cedar Cr.
Warnerville
Emerick
MADISON
Madison
Closter
Kalamazoo
Olnes
Newman Grove
Lindsey
Humphrey
Creston
Leigh
Albion
Bradish
Cornlea
Clarkson
Howell
Snyder
Scribner
Wells
Dodge
DODGE
Herman
Vacoma
Blair
WASHINGTON
Desoto
Ft. Calhoun
Alta
Elyria
Ord
Parnell
Sumter
Spalding
Primrose
Cedar Rapids
BOONE
Boone
Tarnov
Nebovile
Rosenburg
Geranium
VALLEY
GREELEY
Greeley
St. Edward
Woodville
PLATTE
Platte Centre
Monroe
Oconee
Schuyler
COLFAX
Northbend
Rogers
Fremont
Nickerson
Arlington
Coburg
Yale
Oleau
Miracreek
Arcadia
Horace
O'Conner
Brayton
Belgrade
Genoa
Kent
Scotia
N. Loup
Columbus
Richland
Linwood
Washington
Mercer
Briggs
Bennington
Irvington
OMAHA
SO. OMAHA
Funston
Cotesfield
Wolback
NANCE
Fullerton
Duncan
Octavia
Edholm
Prague
Cedarbluffs
Waterloo
Kingston
Alpine
Dannevirke
Cushing
Silvercreek
Rochon
Bellwood
David City
Abie
Bruno
SAUNDERS
DOUGLAS
Millard
Huxley
Loup City
Elba
Palmer
Sunrise
Havens
Clarks
POLK
Rising Cy.
Foley
Garrison
Weston
Wahoo
Papillion
Gretna
SARPY
Bellevue
Pacific Jc.
Glenwood
Malvern
Hastings
Divide
Ashton
Austin
Farwell
St. Paul
MERRICK
Archer
Osceola
Shelby
BUTLER
Brainard
Touhy
Swedeburg
Ithaca
Memphis
Litchfield
SHERMAN
Rockville
Hazard
HOWARD
Dannebrog
Dublin
Central Cy.
Stromsburg
Surprise
Dwight
Ulysses
Valparaiso
Ceresco
Ashland
Meadow
Louisville
Plattsmouth
Redoak
Sweetwater
Ravenna
Boelus
Cairo
Abbott
St. Libory
Chapman
Lockwood
Platte R.
Marquette
Polk
Thayer
Gresham
Staplehurst
Bee
Agnew
Davey
Greenwood
Southbend
Mynard
Pleasanton
St. Michael
HALL
Benedict
Seward
Raymond
Havelock
Murdock
Alvo
CASS
Murray
Nebawka
Tabor
Peake
BUFFALO
Grand Island
HAMILTON
Bradshaw
YORK
Tamora
Malcolm
LINCOLN
University Place
Weeping Water
Union
Shenandoah
Riverdale
Kearney
Wood River
Alda
Phillips
Aurora
Hampton
York
Waco
Utica
Ruby
SEWARD
Milford
Denton
Wyoming
Odessa
Shelton
Gibbon
Doniphan
Giltner
Henderson
Charleston
McCool
Beaver Crossing
Saltillo
Bennett
Palmyra
Nebraska City
Sidney
Buda
Prosser
Trumbull
Stockham
Lushton
Cordova
Dorchester
Roheby
Crete
LANCASTER
Syracuse
Paul
Hamburg
Newark
Lowell
Hansen
Hastings
Eldorado
Saronville
Big Blue
Exeter
Friend
Sprague
Panama
OTOE
Haydon
Kenesaw
Heartwell
Juniata
Inland
Harvard
Sutton
Fairmont
Sawyer
Burress
Shestak
Kramer
Hickman
Princeton
Firth
Douglas
Lorton
Burr
Talmage
Julian
Peru
Minden
ADAMS
CLAY
Geneva
SALINE
Ballau
Cortland
Sterling
Cook
Brock
Axtell
Norman
Glenville
Verona
Clay Centre
FILLMORE
Milligan
Wilber
Clatonia
Adams
Graf
NEMAHA
Brownville
Rockport
Funk
KEARNEY
Holstein
Roseland
Brickton
Alma Jc.
Fairfield
Tobias
Dewitt
Pickrell
JOHNSON
Vesta
Auburn
Langdon
Keene
Hildreth
Ayr
Pauline
Deweese
Edgar
Shickley
Ohiowa
Western
Swanton
Hoag
Crab Orchard
Tecumseh
Howe
Nemaha
Wilcox
Bladen
Lawrence
Davenport
Bruning
Daykin
Plymouth
Beatrice
Filley
Elkcreek
Shubert
Upland
Campbell
Bluehill
Anaus
Carleton
Helvey
Belvidere
Virginia
Lewiston
Stella
FRANKLIN
Otto
Rosemont
NUCKOLLS
THAYER
Oak
JEFFERSON
Jansen
Ellis
Rockford
Tate
Mayberry
Steinauer
Tablerock
RICHARDSON
Huntley
Macon
WEBSTER
Nelson
Ruskin
Gilead
Gladstone
Harbine
GAGE
Armour
Burchard
Pawnee City
Humboldt
Arago
Naponee
Bloomington
Franklin
Riverton
Red Cloud
Guiderock
Nora
Cadamas
Hebron
Fairbury
Endicott
Wymore
Odell
Liberty
PAWNEE
Salem
Straussville
Bigelow
Napier
Republican R.
Lester
Abal
Superior
Hardy
Stoddard
Reynolds
Thompson
Barnston
Dubois
Falls City
Rulo
Preston
40°
Chester
Hubbell
Lanham
Hanover
Belleville
Burr Oak
Axtell
Seneca
Sabetha
Hiawatha
Phillipsburg
Smith Centre
Mankato
Courtland
Scandia
Washington
Marysville
Lawrenceburg
Clyde
Gott
Holton
Republican
Yuma
Jamestown
Concordia
Clifton
Downs
Beloit
Osborne
N
S
A
S
Fork
South Fork
Solomon
Clay Centre
Miltonvale
Westmoreland
Valley Falls
Barnard
Minneapolis
Lincoln
Manhattan
Kansas River
Junction City
Topeka
39°
from 99° Greenwich F
98°
G
97°
H
96°
J
1
2
3
4
5
43°
42°
41°
M O.

Nebuchadnezzar, Nebuchadre z z a r, Nabuchodonosor, or **Nebucodonosor,** a king of Assyria, who lived in the 7th century B. C. The chief events of his reign were his defeat of the Medes under their king Arphaxed, and his sending a force of 120,000 foot and 12,000 horse, under Holofernes, against Israel. See JUDITH.

Nebuchadnezzar, or **Nabopolassar,** a king of Babylon, who reigned from 626 to 605 B. C. He united with Astyages in the conquest of Syria, and founded the second Syrio-Babylonian empire.

Nebuchadnezzar, or **Nebuchadrezzar,** surnamed THE GREAT, a king of Babylon, the son and successor of the preceding. He immediately entered on a war, by which he extended his empire over the greater part of Asia, and from the Caucasian Mountains in the N. to the Great Desert of Africa in the S. He defeated the Edomites and Ammonites, took Jerusalem, and led the inhabitants captive to Babylon. His vassal king of Judah, Jechonias, having revolted, he 13 years later deposed him, and put an end to the kingdom of Judah. He next turned his arms against Tyre, which after an obstinate resistance of more than 12 years, he finally took, and which, with Egypt and Persia, made his empire and power enormous. It was to this king that the Jewish captive Daniel interpreted the dream that so truly foreshadowed the fall and ruin of his empire. The celebrated hanging gardens of Babylon, one of the seven wonders of the world, were executed by this monarch, to please his beautiful wife, a Median princess. He died 562 B. C.

Nebula, plural **Nebulæ,** in astronomy, a slight cloudy patch of light, retaining its form unchanged except under keen and long-continued observation. More than 8,000 nebulæ, or star-clusters closely resembling them, have been found in both hemispheres, and in nearly every constellation. A few, as the great nebulæ of Orion, Argo Navis, and Andromeda, are visible on very clear nights to the naked eye; the rest are telescopic. When greatly magnified some are found to be composed of many thousand remote stars, others remain only as diffused masses of light. Sir William Herschel divided them into six classes:

(1) Clusters of stars, globular or irregular in form.
(2) Resolvable nebulæ, which look as if they might be resolved into stars under powerful telescopes.
(3) Nebulæ which look quite irresolvable.
(4) Planetary nebulæ, circular or slightly oval, like a planetary disk, and often colored.
(5) Stellar nebulæ, *i. e.*, those having in their middle a condensation of light.
(6) Nebulous stars.

The great nebula of Orion surrounds a multiple star, Theta Orionis, consisting of six, apparently revolving round their common center of gravity. It has been found to alter its form very slightly. The late Earl of Rosse and his assistant, Mr. Storey, detected in its densest part multitudes of minute stars, but the bluish light of parts of it has remained irresolvable, and Dr. Huggins has ascertained by means of spectrum analysis that this portion of it is a gaseous body, containing hydrogen, nitrogen, and an unidentified substance. The nebula in Andromeda has a bright ball in the center and is spindle-shaped. In pathology, the same as leucoma (*q. v.*). The name is also applied to a mist or cloud suspended in the urine.

Nebular Hypothesis, in astronomy, a hypothesis first suggested by Sir William Herschel, though the germs of it may be found in Kant's "General Natural History and Theory of the Heavens," printed in 1755. It was developed by La Place, with whose name it came to be associated. The hypothesis assumes that originally all suns were in a nebulous or ultra-gaseous state. The nebulous matter from which they were originally formed was at first scattered pretty uniformly through all space, but ultimately began to gravitate toward certain centers. The particles moving toward these centers not doing so with equal velocities or in the same direction, rotation would be established in the entire nebulous mass, and the spherical form produced. If, by radiation of heat, the condensed body still further contracted, its velocity would increase. If the centrifugal force overcame that of gravity, a ring would be thrown off, which would gradually become globular, in fact it would be a planet with an orbit almost or quite circular, moving in a plane nearly that of the central body's equator and revolving in its orbit in the same direction in which the central globe rotated. Further contraction producing increased velocity, ring after ring would be cast off, till the central body or sun generated a whole system of planets revolving around it. They, in turn, might in the same way produce satelites. La Place believed that the sun thus produced our earth and the other attendant planets. On this hypothesis the rings of Saturn were produced by Saturn himself, and have remained in the annular form instead of condensing into nearly spherical satellites. Many people supposed that the resolution of various nebulæe into stars (see NEBULA) was necessarily fatal to the nebular hypothesis, but the discovery that some are not only irresolvable, but can be actually proved by spectrum analysis to consist of glowing gas, has reestablished it on a firmer basis than ever, though the original theory may need revision in points of detail.

Necessitas, in Roman mythology, the goddess of necessity or destiny.

Necessitarian, one who holds any of the forms of the doctrine of necessity. Hobbes may be considered the founder of the English Necessitarians, and on the Continent it was developed by his contemporary Spinoza, and later by Leibnitz, who was opposed by Dr. Clarke, Dean of Salisbury, in his turn opposed by Anthony Collins, the author of a "Philosophical Inquiry into Human Liberty," which Dr. Clarke's "Boyle Lectures" (1720–1721) were designed to answer. Jonathan Edwards (1703–1758), president of Princeton College, toward the close of his life published "An Inquiry into the Freedom of the Will"; and Priestley (1733–1804) published his "Doctrine of Philosophical Necessity Illustrated" in 1777.

Necessity, a word used in philosophical and theological discussions with varying senses, but very commonly implying the operation of a blind fate or destiny, and absence of free will. See WILL.

Necessity, Fort, a defensive work near the site of the present borough of Union, in Fayette co., Pa.; built by Washington in 1754.

Necho (nē'kō), King of Egypt, called in Scripture Pharoah-Necho. He succeeded his father Psammetichus in 617 B. C. He planned a canal from the Nile to the Arabian Gulf, which undertaking he was forced to abandon, after losing a great number of men. The ships of Necho sailed from the Red Sea round the coast of Africa into the Mediterranean, and returned to Egypt, after a voyage of three years. This monarch invaded Assyria, and, on his march, was attacked by Josiah, King of Judah, who was slain the battle. Necho was in turn defeated by Nebuchadnezzar, and obliged to return to his own country, where he died in 601 B. C.

Neckar, one of the largest tributaries of the Rhine, and the principal river of Würtemberg, rising on the E. declivity of the Black Forest, near the village of Schwenningen. It has a winding course of 250 miles, and joins the Rhine at Mannheim — the other towns on its banks being Tübingen, Heilbronn, and Heidelberg. From Cannstadt, about midway in its course, the Neckar is navigable. Fair wines are grown on its banks.

Necker, Jacques, a French statesman; born in Geneva, Switzerland, Sept. 30, 1732. He went to Paris at an early age, obtained employment in a banking house, in which he rose to a partnership, and in 13 years, having made a number of successful speculations, retired from business with a large fortune. He commenced his political career by becoming a member of the council of Two Hundred at Geneva. He was afterward appointed minister of the republic of Geneva at Paris, where, by degrees, he rose to the highest employments. In 1765 he was appointed syndic of the French East India Company; in 1775, director of the royal treasury; and was twice director-general of the finances of France. But the Revolution, which all his efforts were unable to check, obliged him to retire to Switzerland. Necker wrote three volumes on the finances of France, a book on the influence of religious opinions, and other works. He married the daughter of a Protestant clergyman, by whom he had a daughter, Madame de Staël-Holstein, the wife of the Swedish ambassador. She afterward became celebrated by the name of Madame de Staël. He died in Coppet, Switzerland, April 9, 1804.

JACQUES NECKER.

Necromancer, The. See RAMIREZ, IGNACIO.

Necromancy, the divination of the future by questioning the dead. This superstition originated in the East, and is of the highest antiquity. Mention is made of necromancy in the Scriptures, where it is strongly condemned. In the "Odyssey" Homer has made Ulysses raise the shade of Tiresias from the infernal regions. In many parts of Greece there were oracles of the dead, the origin of which is lost in the obscurity of history. Though this practice has been condemned by the Christian Church from the very first, it has not yet entirely ceased. Modern spiritualism embodies all the elements of necromancy. The term is often extended so as to include the general art of magic.

Necropolis, a Greek term, meaning "the city of the dead," and applied to the cemeteries in the vicinity of ancient cities. It occurs in classical antiquity only as applied to a suburb of Alexandria, lying to the W. of

that city, where the corpses were received and embalmed. Here Cleopatra applied the asp to her breast.

Necrosis, a word used as synonymous with mortification or gangrene; but it is more commonly used in surgery to denote the death or mortification of a part or the whole of a bone. Necrosis differs from caries of a bone, inasmuch as in the latter case the vitality of the bone is only impaired, not destroyed, as in the former; in the same way as ulceration of the soft parts differs from gangrene. Necrosis is found in either sex, and at all periods of life, and may be occasioned either by external causes, as fractures, contusions, etc., or by internal or constitutional causes, as a debilitated or deranged habit of body. When a portion of a bone becomes dead, it is regarded as an extraneous substance.

Nectar, in Greek mythology, the supposed drink of the gods. It was believed that this nectar, which they never gave to mortals, contributed much toward their eternal existence. According to the fables of the classic poets, it was a most delicious liquor, with properties far exceeding anything that mortals could imagine, as it gave a beauty, bloom, and vigor to all who imbibed it. Combined with AMBROSIA (*q. v.*), it repaired all accidental injuries or decays which might assail them.

Nectarine, a fruit which differs from the peach only in having a smoother rind and firmer pulp, being indeed a mere variety of peach.

Nectary, or **Nectarium,** a term used by Linnæus, at first for any part of a flower which secreted nectar, *i. e.*, honey, but afterward extended by him to any accessory portion of the flower, even though it had no honey.

Nectocalyx, plural **Nectocalyces,** in zoölogy, the swimming-bell or disk of a Medusa, or jelly fish. The margin is produced inward to form a species of shelf running around the margin of the mouth of the bell; this distinguishes the nectocalyx from the somewhat similar umbrella of the *Lucernarida*.

Needell, Mrs. John Hodder (Mary Anna), an English novelist; born in London, England, in 1830. She wrote: "Ada Gresham" (1851); "Catherine Irving" (1853); "Julian Karslake's Secret" (1881); "Lucia, Hugh, and Another" (1884); "The Story of Philip Methuen" (1886); "Noel Chetwyn's Fall" (1888); "Stephen Ellicott's Daughter" (1891); "Unequally Yoked" (1891); "Passing the Love of Women" (1892); "The Vengeance of James Vansittart" (1895).

Needle, a small instrument of steel pointed at one end, and having an eye or hole in it through which is passed a thread, used for sewing. The early-made needles were all square-eyed. There are about 22 processes in the system by which needles are now made. The first is the cutting of the coils of wire into two-needle lengths by a guillotine shearing machine. The wire is of the best crucible steel, and requires to be very carefully gauged to size. After being cut, the lengths of wire are raised to a dull red heat and placed in loose bundles inside iron rings to be straightened by rolling each bundle backward and forward on a face plate with a slightly curved bar, through which the rings project. The wires are next pointed at both ends. An arrangement is used by which the wires are withdrawn — one closely following another — from a hopper by a pulley revolving at right angles to the grindstone, the wires being held to the face of the pulley by an india-rubber band. In their passage between the pulley and the grindstone the wires (double-needle blanks) revolve on their axis and become pointed at one end, and the process is repeated for the pointing at the other end. The fine steel dust formerly so injurious to the health of the hand-grinders, is now drawn away from the operative by the suction of a strong current of air. The stamping of these two-length blanks in the middle by the hand-worked stamping machine, so as to produce the flat of the eyes and the mark for the holes, as well as the punching of the holes by a screw press, can now be accomplished by more expeditious machines. By the newer method, the wire blanks are automatically fed into a quick-running belt-driven machine, in which a punch and dies form the prints or flats for the eyes. Then two oval holes are punched through the two prints of each blank by a vertical belt-driven punching-machine. After being eyed the still double blanks — they are now rather double needles joined at the heads by thin fins — are "spitted" through their eyes on two wires flatted at one end to retain them. The burr made by the punch and die (stamping) is now removed by filing the spitted needles on both sides, and after being broken in two between the heads, which are then also smoothed by filing, a row of single needles is left on each spit.

The needles now undergo a tempering process. They are first hardened by being laid on a plate and raised to a red heat in a furnace, after which they are dipped in cod oil, kept cool by running off a portion as it gets warm, and replacing it by an equal quantity of cold oil. The needles, now hard and easily broken, are made less brittle by placing them on a continuous band of wire gauze, which travels slowly over gas flames. They are now rolled one by one under the finger on a smooth stone, and thus

the bent ones are weeded out. In parcels of 50,000 they are next washed and scoured with soap to remove any of the oil used in tempering, which still adheres, and the eyes are afterward "blued" to soften them. In the case of needles of fine quality the eyes are gilt. By one method the eyes are polished by threading them loosely on wires carried by standards fixed to a tray or platform, which is moved rapidly with a reciprocating motion in a horizontal plane. In about one hour, with the assistance of a little fine emery and oil, the constant swinging of the needles on the wire smooths their eyes so as not to cut the thread. But the eyes of the best needles are hand-polished with fine emery on flax threads. The next step is to grind the heads and set the points by hand on a rapidly-revolving stone of fine texture. For the final polishing of the shanks, the needles are fed in a longitudinal direction, in rows one deep, between transverse leather-covered rollers, with holding rollers above them. Besides turning on their own axes, a lateral as well as a backward and forward motion is given to the rollers, which produces a high polish on the needles. The needles now require to be laid with their heads in one direction. A gun-metal disk revolving vertically takes up each needle by a groove in its periphery, and lets it fall on an inclined glass plate. Owing to the taper form of the pointed ends of the needles, they describe an arc in revolving so that those with the points in one direction roll to the right and the others fall round to the left. The finished needles, though intended to be of the same size, always differ to some extent in their lengths, so that those of exactly one size require to be separated from other lengths by the sorting process in which gauges are used. Lastly, the needles are papered either by being spitted on cloth pasted to paper, or by being made up into small packets, in which case the bits of paper are cut and folded in a machine like that used for envelope-making.

Special kinds of needles are required for sewing canvas, for upholstering, in surgical operations, etc. Knitting needles are slender straight rods with rounded ends, and are used in pairs or sets of four or five. They vary in length and are made of wood, bone, or ivory, but chiefly of steel. Crochet needles have a hook at one end. Some needles are used in machinery. They are made of steel and are used for hosiery and stockinet work. Sewing-machine needles have a hook, eye, or barb at the pointed end, and are used with a single thread in making a single loop stitch both with eye and with barb. The best known sewing-machine needle is the one with the eye at the pointed end, having a long groove on one side and a short groove on the opposite. The needle used on leather is the wax-thread needle, and includes many shapes. Instead of an eye these needles are formed with hooks by which the thread is pulled through a hole made by an awl. The welting needle is a section of a circle in shape, used for putting welts on boots and shoes.

Needle Gun, a firearm which is loaded at the breech with a cartridge carrying its own fulminate, and which is ignited by a needle or pin traversing the breech-block driven by a spiral spring, or struck by the hammer.

Needle Ore, acicular bismuth glance; native sulphide of bismuth, lead, and copper occurring imbedded in quartz in long, thin, steel-gray crystals, marked with vertical striæ, and apparently in four or six sided prisms. It consists of lead 35.8, copper 11, bismuth 36.7, and sulphur 16.5, and usually accompanies native gold.

Needles, The, a cluster of insulated chalk rocks in the English Channel, off the W. extremity of the Isle of Wight. They owe their name to their pyramidal and pointed shape. The Needles Lighthouse, on the most W. of the group, has an occulting light 80 feet above high-water, visible for 14 miles.

Neele, Henry, an English poet; born in London, England, in 1798. He was a lawyer, but devoted his leisure to literature, writing "Dramatic Scenes"; "Odes and Other Poems" (1817); and editing an edition of Shakespeare. He died in 1828.

Neenah, a city in Winnebago co., Wis., on the Fox river, and on the Wisconsin Central, and the Chicago, Milwaukee, and St. Paul railroads; 14 miles N. of Oshkosh. The river is navigable for steamboats to Fond du Lac. Here are National banks, a public library, electric lights, and daily and weekly newspapers. The city is widely known as an important lumber mart and as a popular summer resort. It has saw, lumber, and paper mills, and an assessed property valuation of 1,500,000. Pop. (1900) 5,954; (1910) 5,734.

Neer, Aart van der (nār), a Dutch landscape-painter; born in Amsterdam, about 1619. His chief subjects were canal scenes by moonlight, conflagrations at night, and winter landscapes. He died after 1692.

Neer, Eglon Hendrick van der, a Dutch painter; son of A. van der Neer; born in Amsterdam, in 1643. He painted chiefly genre subjects. He died in Düsseldorf, Prussia, May 3, 1703.

Neerwinden, a small village in the N. W. corner of the Belgian province of Liége; noted for the victory gained by the

French under Luxembourg over the English under William III. (July 29, 1693), and also for the defeat of the French under Dumouriez by the allies under the Prince of Coburg, March 18, 1793.

Ne exeat regno (Latin = let him not go out of the kingdom), in law a writ to restrain a person from leaving the country, originally applicable to purposes of state; now an ordinary process of courts of equity, resorted to for the purpose of obtaining bail or security to abide a decree.

Neff, Felix, a Swiss Protestant pastor; born in Geneva, Switzerland, Oct. 8, 1798. He was in his 26th year ordained, in England, to minister to the neglected inhabitants of the lofty Alpine valley in the E. of the department of Hautes Alpes. His parish was a most difficult one to minister to, owing to its mountainous nature and great extent (80 miles long), and the uncivilized character of the people. But with unwearied devotion and simple piety Neff labored among them like his chosen model, Oberlin, till his death, April 12, 1829.

Negapatam, a seaport of British India, on the Coromandel coast, 180 miles S. by W. of Madras city. Originally a Portuguese settlement, it was taken by the Dutch in 1660, and by the English in 1781. The port trades in cotton, live-stock, ghi (exported), and spices, piece goods, coal, gunny bags (imported), to the total annual value of $4,522,000, chiefly with Burma, the Straits Settlements, and Ceylon. Pop. (1901) 57,190.

Negaunee, a city in Marquette co., Mich.; on the Marquette and Ishpeming, the Chicago and Northwestern, and the Duluth, South Shore, and Atlantic railroads; 10 miles W. of Marquette. It is built on a ridge named Iron Mountain, at an elevation of about 1,000 above Lake Superior. It contains a high school, waterworks, a public library, electric lights, a National bank, and street railroads. It has a noted cluster of productive iron mines with an output of about 200,000 tons per year, and an assessed property valuation of $3,000,000. Pop. (1900) 6,935; (1910) 8,460.

Negley, James Scott, an American military officer; born in Liberty, Pa., Dec. 22, 1826; served as a private in the Mexican War; and when the Civil War broke out in 1861 raised a brigade in eight days, of which he was made Brigadier-General; was in the Army of the Ohio, and took part in the battles in Alabama and Tennessee; commanded the Union forces at the battle of Lavergne, Tenn., when the Confederates under Anderson and Forrest were defeated; was promoted Major-General of volunteers for gallant conduct at Stone river; resigned his command shortly after the battle of Chickamauga, and for many years lived in Plainfield, N. J., where he died, Aug. 8, 1901.

Negri, Ada (nā′grē) **(Mme. Garlanda),** an Italian poet; born in Lodi, Italy, Feb. 3, 1870. She wrote in mournful numbers of the sufferings of the poor, the best collection of her verse being in the volume "Fatality" (or "Fate": 1892); but excellent poems are contained in "Storms" (1895).

Negritos (ne-grē′tōz), the name given to certain Negro-like tribes inhabiting the interior of some of the Philippine Islands, and differing both in features and manners from the Malay inhabitants of the Eastern Archipelago. They seem to be more closely akin to the Andaman Islanders than to either Papuans or any other stock; and are also known as Aëtas or Itas (see PHILIPPINE ISLANDS). The name is also used in a wider sense for the Papuans and all the Melanesian peoples of POLYNESIA (*q. v.*).

Negro, the distinctively dark, as opposed to the fair, yellow, and brown varieties of mankind. Their original home was probably all Africa S. of the Sahara, India S. of the Indo-Gangetic plains, Malaysia and the greater part of Australasia. In early and middle Tertiary times this tract was probably broken up by the sea and the disappearance of the region named by Sclater Lemuria. Negroes fall naturally into two great divisions: (1) African Negroes, (2) Papuans or Melanesians. Prof. A. H. Keane makes four sub-divisions of African Negroes, according to locality: (1) West Sudan and Guinea; (2) Central Sudan and Chad Basin; (3) East Sudan and Upper Nile; (4) South Africa. He estimates their number at 130,000,000, with probably 20,000,000 full-blood or half-caste Negroes, either slaves or descendants of slaves, chiefly in tropical of sub-tropical America, and enumerates the following as the chief anatomical and physiological points in which the Negro differs most from his own congeners:

1. The abnormal length of the arm, sometimes reaching to the knee-pan.
2. Prognathism (Facial angle 70°, in Caucasian 82°).
3. Weight of brain, 35 ounces (in gorilla 20 ounces, average Caucasian (Europe or America) 45 ounces).
4. Full black eye, black iris, and yellowish sclerotic coat.
5. Short, flat, snub nose, broad at extremity, with dilated nostrils and concave ridge.
6. Thick, protruding lips, showing inner surface.
7. Very large zygomatic arches.
8. Exceedingly thick cranium, enabling him to use the head as a weapon of attack.
9. Weak lower limbs, terminating in a broad, flat foot, with low instep, projecting and somewhat prehensile great toe, and "lark heel."
10. Complexion deep brown, blackish, or even black, not due to any special pigment, but to the greater abundance of coloring matter in the Malpighian mucous membrane.
11. Short, black hair, distinctly woolly, not frizzly.

12. Thick epidermis, cool, soft, and velvety, mostly hairless, and emitting a peculiar odor described as hircine.

13. Frame of medium height, thrown somewhat out of the perpendicular by the shape of the pelvis, the spine, the backward projection of the head, and the whole anatomical structure.

14. The cranial sutures, which close much earlier in the Negro than in other races.

Negros, an island in the Philippine group, between Panay and Cebu; area, 4,854 square miles; pop. (1903) 509,766. In the S. W. is the mountain chain of Sojatas, and lying N. and N. E. of this are large plains cut by numerous rivers. The interior has not been explored. The island is divided into two provinces, Occidental and Oriental. The former is very fertile, and owing largely to the work of various European settlers, is in the front rank of all the provinces of the archipelago. The Eastern province, while not so fertile, produces large crops of sugar cane, hemp, rice, cocoa, and cotton. The forests of the island furnish an abundance of fine building woods, among them teak. On the sea shores are numbers of shell fish, tortoise shell, lagan, sea cucumbers, etc., while near the W. coast deposits of excellent coal have recently been discovered. Bacolod is the capital of Occidental Negros, and has a number of fine public and private buildings; pop. (1903) 11,960; capital of Oriental Negros, Dumaguete; pop. (1903) 14,894.

Negruzzi, Jakob (nā-gröts'ē), a Rumanian poet, son of K. Negruzzi; born in Jassy, Jan. 11, 1843. He was a member of the Rumanian Academy, and founder of the periodical "Convorbiri Literare." His volumes of "Poems," and "Copies from Nature," the latter made up of sketches and tales, have been widely read.

Negruzzi, Konstantin, a Rumanian poet and prose-writer; born in Jassy, in 1808. He wrote many verses and plays, the historical poem "Aprode Purice," and the historical sketch "Alexander Lepusneanu." His best verse is in the volume entitled "Youthful Sins." He died in Jassy, in 1868.

Negus (called after Col. Francis Negus, who lived in the time of Queen Anne, and is reported to have been the first to mingle the beverage now named after him), a beverage composed of wine, water, sugar, and spice.

Negus, the sovereign of Abyssinia.

Nehallenia, the Flemish deity who presides over commerce and navigation.

Nehemiah, three persons of this name are mentioned in Scripture: One who came with Zerubbabel from Babylon (Ezra ii: 2; Neh. vii: 7); another, the son of Azbuk (Neh. iii: 16); and lastly the celebrated Jewish leader, the son of Hachaliah (Neh. i: 1), and brother of Hanani (i: 2, vii: 2). In the 20th year of the reign of Artaxerxes Longimanus, King or Emperor of Persia (445 B. C.), he was cupbearer to the monarch. Questioned as to why he looked sad, he replied that his sorrow arose from the reflection that the city (Jerusalem), the place of his ancestors' sepulchers, lay waste, with its gates burnt (Neh. ii:3). He requested permission to rebuild the city, and was allowed temporary leave of absence to carry out the project. Carrying with him letters from the king designed to secure coöperation from various quarters, he proceeded to Jerusalem, obtained zealous assistance from his countrymen, and, notwithstanding Samaritan and other opposition, rebuilt the wall. An inscription in the earliest Hebrew, discovered in 1880 in the tunnel cut through the rocks which conducts the water of the Virgin's Spring, the Gihon of Scripture, into the modern pool of Siloam, has become the starting point for comprehending the topography of Jerusalem in the times of the kings and in that Nehemiah. Mount Zion is now fixed as the hill on the S. W. slope of which is the Pool of Siloam. The valley of the Tyropœon of the Græco-Roman age, was the Valley of Hinnom. The size of Jerusalem was only 50 acres, but it had crowded into it a population of 15,000 Jews and 5,000 slaves. In 433 B. C. Nehemiah returned to Persia, but that year or the next was a second time appointed governor of Judæa. The date of his death is unknown.

In modern Hebrew Bibles, as that of Van der Hooght, the Book of Nehemiah is distinct from that of Ezra, immediately following it as one of the Hagiographia. In the Jewish canon, however, the two were treated as a single work. Origen was the first to separate them, calling them the first and seconds books of Esdras. Jerome applied to the second the name of Nehemiah. The style of the two is so different that they must have had different authors. The latter work it naturally divided into four portions: ch. i:–vii., a continuous narrative written by Nehemiah; ch. viii.–x., apparently from another author; ch. xi:–xii: 26, from Nehemiah's pen, as was the fourth section, xii: 27 to the end of the book, excepting some verses of later date. Nehemiah's portions of the book were of date 433–432 B. C.; the later verses, which refer to Jaddua, high priest in the time of Alexander the Great and Darius Codomannus, 336–331 B. C., were penned later than this date (ch. xii: 11–22). The language used is Hebrew with some Aramæisms. Persian words also occur, some of which, however, are now found to have been originally Babylonian. No quotation from the book occurs in the New Testament. The Septuagint translation of the book is badly executed.

Neilgherry Hills, a mountainous district in the S. of India, rising abruptly from the plains to the height of 6,000 feet, though individual peaks shoot up to 8,760 feet. The mass is entirely isolated, with the exception that a precipitous granite ridge leaves its W. face and connects it with the Western Ghâts. The surface consists of grassy uplands with large groves of forest trees; but the lower slopes are heavily timbered. The Neilgherry Hills are inhabited by five distinct tribes, of whom the Todas are the most interesting. They speak a Dravidian dialect and practise polyandry; in 1881 there were only 675. The men are tall and athletic, with Roman noses, black bushy beards and eyebrows, but they are dirty in their habits. Their sole occupation is tending cattle. Owing to their great elevation, the Neilgherry Hills have a delightfully cool climate, and are much resorted to on this account by invalided Europeans, the principal station being Ootacamund.

Neilson, Adelaide, an English actress; born in Leeds, Yorkshire, England, March 3, 1848. Her real name was Elizabeth Ann Brown, though she was also sometimes called Lizzie Bland (Bland being the name of her step-father). She made her debut as Juliet when only 17 years old. She appeared as Amy Robsart in 1870, in London, with immense success, and by 1878 stood at the head of her profession. In 1872 she came to the United States, playing in Booth's theater, New York, and in Boston, where she was equally successful. She made four visits to the United States, her last one being in 1880. She died in Paris, France, Aug. 15, 1880.

Neisse (nīs'se), a town of Prussian Silesia, and an important fortress of the second rank; in a broad valley on the Neisse, an affluent of the Oder; 50 miles S. E. of Breslau. It manufactures arms, linen, and chemicals, and has great wool markets. Pop. 20,507. Neisse was formerly the chief town of a principality, and residence of a prince-bishop. Pop. (1900) 24,267.

Neith, in Egyptian mythology, a deity who was regarded as an incarnation of nature, and as the patroness of all the arts. Her most celebrated temple was at Sais, where stood the famous veiled image.

Nejd, or **Nejed** (Arabic, "elevated country"), a term sometimes used as an element in Arabic place-names, but used absolutely to signify the country in the interior of Arabia forming the Central Wahabi kingdom. A great part of its surface is sandy desert interspersed with fertile spots. The more elevated districts feed immense droves of camels and the best breeds of Arab horses. Chief town Riad, the Wahagi capital; pop. about 28,000.

Neken, the evil spirit of the North that plays his melancholy strains in Swedish waters.

Nekir. See MONKIR.

Nekrasov, Nikolai Alexievitch, a Russian lyrical poet; born in the province of Yaroslav, Russia, Nov. 22 (old style), 1821. He entered the army, but soon devoted himself to literature, editing a newspaper and a monthly magazine. Belonging to the realistic school, he gave powerful expression to the popular aspiration and social tendencies of his race in a series of poems that have been often reëdited. He died in St. Petersburg, Dec. 27 (old style), 1877.

Nélaton, Auguste (nā-lä-to*ng'*), a French surgeon; born in Paris, France, June 18, 1807. He studied there, and, after serving as surgeon in various hospitals and lecturing at the faculty of medicine, became in 1851 Professor of Clinical Surgery, and in 1866 surgeon to the emperor. He became a member of the Senate in 1868. Besides his great "Elements of Chirurgical Pathology" (5 vols. 1844–1860), he wrote on tumors of the breast, and the operation for cataract. He died in Paris, Sept. 21, 1873.

Nelus (nē'lūs), the son of Neptune and Tyro, who, it is said, became King of Pylos.

Nell. See GWYNN, ELEANOR.

Nelson, the capital of a provincial district in New Zealand, at the N. end of South Island, and the mouth of the Maitai, a small river at the head of Blind Bay. The situation is very beautiful, on a flat, hemmed in by ruggged hills and amidst almost tropical luxuriance. The harbor is sheltered, and there is regular steam communication with Sydney and Melbourne. The city was founded in 1841, is now lighted with gas, and the water supply is good. There is a cathedral, a literary institute, and museum, public hospital, and asylum. The manufactures of the town comprise cloth, leather, soap, and jam. Pop. (1901), town, 7,009; district, 37,915.

Nelson, Edward William, an American naturalist; born in Manchester, N. H., May 8, 1855; was graduated at the Cook County Normal School, Chicago, Ill., in 1875; spent four years (1877–1881) in scientific research in Alaska, and returned in time to join the Arctic expedition of the United States revenue steamer "Corwin." In 1890 he was a member of the Death Valley expedition, and from 1892 to 1901 most of his time was spent in scientific researches in Mexico. He is a member of various scientific societies, and author of "Report on Natural History Collection made in Alaska" (1887); "The Eskimo about Bering Straits"; etc.

Nelson, Henry Loomis, an American educator, born in New York city, Jan. 5, 1846; was graduated at Williams College in 1866; admitted to the bar in 1869; became editor of the Boston "Post" in 1885, and of "Harper's Weekly" in 1894; Professor of Political Science at Williams College in 1902. He died Feb. 29, 1908.

Nelson, Horatio, Viscount, an English naval officer; born in Burnham Thorpe, Norfolk, England, Sept. 29, 1758. At the age of 12 he entered the navy as a midshipman, and in 1773 accompanied Commodore Phipps in an expedition toward the North Pole. In 1777 he was made a lieutenant, and in 1779 raised to the rank of post-captain. He distinguished himself in an attack on Fort Juan, in the Gulf of Mexico, and on other occasions, and remained on the American station till the conclusion of peace. He afterward commanded the "Boreas" frigate, and was employed to

LORD NELSON.

protect the trade of the Leeward Islands. On the commencement of the war with the French Republic he was made commander of the "Agamemnon," of 64 guns (1793), with which he joined Lord Hood in the Mediterranean, and assisted at the siege of Bastia (May, 1794). At the siege of Calvi (July 10, 1794) he lost an eye. For his gallantry at the battle of Cape St. Vincent (Feb. 14, 1797) he was made rear-admiral of the blue, and appointed to the command of the inner squadron at the blockade of Cadiz. His next service was an attack on the town of Santa Cruz, in the Island of Teneriffe, in which he lost his right arm. In 1798 he joined Lord St. Vincent (Admiral Jervis), who sent him to the Mediterranean to watch the progress of the armament at Toulon. Notwithstanding his vigilance, the French fleet which conveyed Bonaparte to Egypt escaped. Thither Nelson followed, and after various disappointments he discovered the enemy's fleet moored in the Bay of Aboukir, where he obtained a most complete victory, all the French ships but two being taken or destroyed (Aug. 1, 1798). This achievement was rewarded with the title of Baron Nelson of the Nile and a pension of $10,000. His next service was the restoration of the King of Naples, which was accompanied with circumstances of revolting cruelty, generally attributed to the influence of Lady Hamilton, the wife of the English ambassador (see HAMILTON, LADY). In 1801 he was employed on the expedition to Copenhagen under Sir Hyde Parker, in which he effected the destruction of the Danish ships and batteries. On his return home he was created viscount. When hostilities recommenced after the Peace of Amiens, Lord Nelson was appointed to command the fleet in the Mediterranean, and for nearly two years he was engaged in the blockade of Toulon. In spite of his vigilance the French fleet got out of port (March 30, 1805), and being joined by a Spanish squadron from Cadiz, sailed to the West Indies. The British admiral hastily pursued them, and they returned to Europe and took shelter at Cadiz. On Oct. 19, the French, commanded by Villeneuve, and the Spaniards by Gravina, ventured again from Cadiz, and on Oct. 21 they came up with the British squadron off Cape Trafalgar. An engagement took place, in which the victory was obtained by the British, but their commander was wounded in the back by a musket ball, and shortly after expired. His remains were carried to England and interred in St. Paul's Cathedral.

Nelson, Samuel, an American jurist; born in Hebron, N. Y., Nov. 10, 1792; was graduated at Middlebury College in 1813; and in 1817 was admitted to the bar of Madison, N. Y. In 1820 he was presidential elector; and three years later was appointed circuit judge, which post he held till 1831, when he became an associate justice of the Supreme Court of New York. In 1837 he was raised to the chief justiceship. In 1845 President Tyler appointed him to succeed Judge Smith-Thompson as an associate justice of the United States Supreme Court. In the celebrated Dred Scott case he agreed with Chief Justice Taney, holding that if Congress had power to abolish slavery, it also had equal power to establish it. In 1871 President Grant appointed him a member of the "Alabama" arbitration commission. He died in Cooperstown, N. Y., Dec. 13, 1873.

Nelson, Thomas, an American statesman; born in Yorktown, Va., Dec. 26, 1738. He was the son of William Nelson, president of the colonial council. Elected a member of the House of Burgesses when

scarcely 21 years old, he was a member of the first convention which met in Williamsburg in August, 1774. He was a conspicuous member of the convention which met in Williamsburg, 1776, to frame a constitution for Virginia, was elected a delegate to the Continental Congress, and signed the Declaration of July 4, 1776. In 1777 he was appointed Commander-in-Chief of the forces of Virginia; and, in addition to his military duties, he was called, in June, 1781, to assume the functions of governor of the commonwealth. Being thus armed with executive and military power, he hastened with all the militia he could muster to oppose the enemy, who were ravaging the country, and did not hesitate to coöperate, as second in command, with the Continental troops under Lafayette. In November, 1781, the success of the American cause being then no more the object of a doubt, Nelson resigned his office, and passed the rest of his life in retirement. He died in Hanover co., Va., Jan. 4, 1789.

Nelson, Wolfred, a Canadian physician; born in Montreal, Canada, July 10, 1792; studied medicine and received his degree in 1811. In the War of 1812 he volunteered as an army surgeon. He was a leader in the rebellion of 1837, and presided over the gathering known as the "Four Counties," where armed resistance to British rule was determined on. The insurrection was unsuccessful, and Dr. Nelson was captured and sentenced to imprisonment for life in the Bermudas. Later the House of Lords declared his transportation illegal. He was liberated, and in 1838 settled in the United States. In 1842 he was permitted to return to Montreal, where he was twice elected mayor. For a number of years he was president of the Medical Board and College of Surgeons of Lower Canada. He died in Montreal, June 17, 1863.

Nelson Fort, a Revolutionary fort once defending Norfolk, Va., now the site of the United States Marine Hospital.

Nelson River, a stream issuing from the N. end of Lake Winnipeg in Canada, and, after a N. E. course of 400 miles through Keewatin, falling into Hudson Bay. It discharges an enormous quantity of water, and is navigable for 127 miles from its mouth, though only about 70 or 80 miles for large steamers.

Nelumbium, the typical and only genus of the order *Nelumbiaceæ*. The species are remarkable for the beauty of their flowers. *N. speciosum* has magnificent flowers, magenta or white. It is believed to be the Egyptian lotus and the Pythagorean Egyptian bean. It does not now grow in Egypt, but is found in India. The filaments are there deemed astringent and cooling; they are prescribed in burns, piles, and menorrhagia; the seeds are given to prevent vomiting, and to children as diuretics and refrigerants. The large leaves are made into bed sheets for fever patients; a sherbet made from the plant is given as a refrigerant in smallpox, etc. The rhizome, stalks,

NELUMBIUM LUTEUM.

and seeds are eaten by the Hindus. A fiber derived from the stalk is used as a wick for lamps in Hindu temples, the plant being considered sacred. The North American Indians eat the rhizomes of *N. luteum*.

Nemathelminthes, round and threadworms; a class of the type Vermes. Nearly all are parasitic. They have cylindrical unjointed bodies marked, with rings, or are filiform, narrowed at each end, with papillæ or stylets on the anterior extremity. The sexes are separate. The class is divided into two orders, *Acanthocephala* and *Nematoidea*.

Nematocyst, in physiology, a "thread-cell" of the Cœlenterata, that is, a cell or minute sac, in the interior of which is a long filament, often serrated or provided with spines, and capable of being swiftly protruded. It is to their nematocysts that the power of stinging possessed by many of the Cœlenterata is due.

Nemcová, Bozena (nyem'tsō-vä), a Czech poet; born (Pankl) in Vienna, Feb. 4, 1820. She studied the folk-lore of the Czechs, and embodied it in poetic narratives, notably "Little Grandmother,' and the "Little Mountain Village." She died in Prague, Jan. 21, 1862.

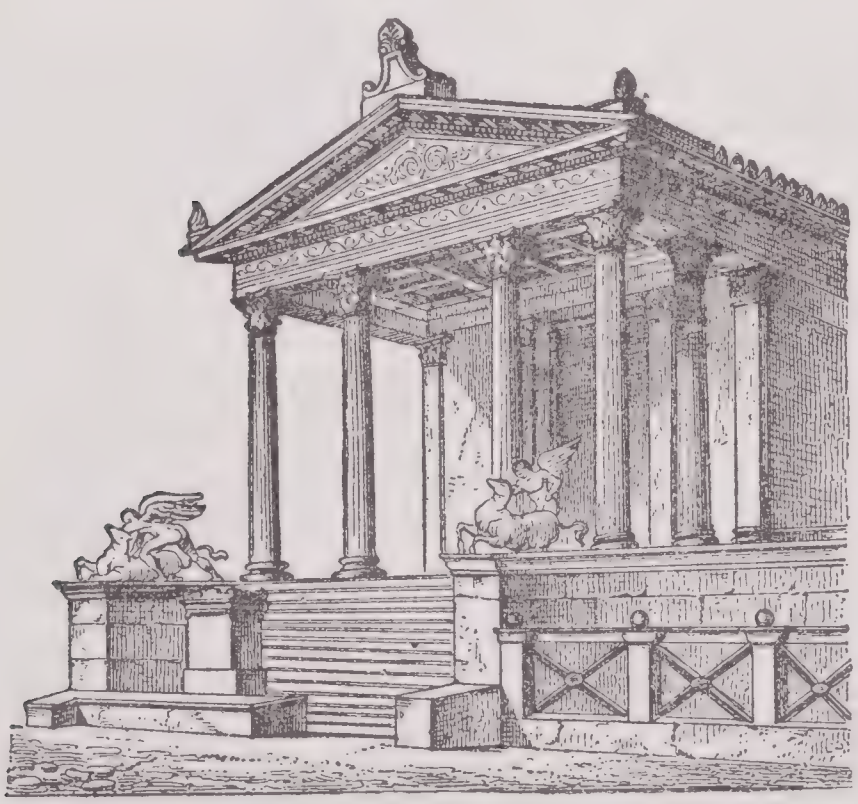
Nemea, in ancient geography, a deep and well-watered valley of Argolis, in the Peloponnesus, between Cleonæ and Phlius.

It lies N. and S., and is from 2 to 3 miles long and more than half a mile broad. It possessed a sacred grove, with a magnificent temple of Zeus, and was celebrated for the games called the Nemean Games, one of the great national festivals of the Greeks.

Nemean Games, in Greek antiquities, public games or festivals celebrated at Nemea, most probably triennially, in the Athenian month Boedromion (the modern August). The Argives were the judges at these games, which comprised boxing and athletic contests, as well as chariot-races; and the conquerors were crowned with olive.

Nemertea, a subdivision of worms, mostly marine, with ciliated skin, a retractile proboscis, and simple generative organs. They are ribbon-shaped animals, more or less cylindrical in section. There are no exterior appendages of any kind, and their colors are often bright and varied. Formerly arranged among Platelminthes, in the order *Turbellaria*, and made a sub-order *Nemertida*, *Nemertina*, or *Rhynchocœla*. They are now made a phylum of Platelminthes with three sub-orders: *Hoplo-Schizo*, and *Palæonemertea*.

Nemesis, in Greek mythology, one of the infernal deities, daughter of Nox. She was the goddess of vengeance, always prepared



TEMPLE OF NEMESIS.

to punish impiety, and at the same time, liberally to reward the good and virtuous. Her power not only existed in this life, but she was also employed after death to find out the most effectual and rigorous means of correction. Nemesis was particularly worshiped at Rhamnus, in Attica, where she had a celebrated statue, 10 cubits long, carved in Parian marble by Phidias. The Romans were also particularly attentive to her adoration. Her statue at Rome was in the Capitol. The Greeks celebrated a festival called Nemesia in memory of deceased persons, as the goddess Nemesis was supposed to defend the relics and the memory of the dead from all insult.

Nemi, Lake of, an extinct crater, 20 miles S. of Rome, accounted for its beauty the gem of the Alban Mountains. There was here a famous temple of Diana, portions of which have been recently excavated.

Nemophila, a genus of *Hydrophyllaceæ*, with pinnatifid leaves and conspicuous flowers. Several species are found in the United States, chiefly in California. The best known is *N. insignis*, which has brilliant blue flowers with a white center. It is prized in gardens as a border plant.

Nemours (nuh-mör'), an ancient town in the French department of Seine-et-Marne, 40 miles S. E. of Paris. It gave a ducal title to the second son of Louis Philippe.

Nemours, Louis Charles Philippe Raphael d'Orleans, Duc de, a French military officer; born in Paris, Oct. 25, 1814; educated at the College of Henri IV.; appointed colonel by Charles X. when only a child; elected King of the Belgians, 1831, but this offer of the National Congress was declined by his father on his behalf; was promoted lieutenant-general in 1837 for gallantry in Algeria; and on the death of his brother the Duc d'Orleans, his father, Louis Philippe, appointed him regent in case the throne devolved upon his infant nephew. In the revolution in February, 1848, the Duc de Nemours joined the exiled family at Claremont. He returned to Paris in 1870, and lived there in retirement till his death in Versailles, June 25, 1896.

Nen, an English river, rising in the N. W. of Northamptonshire, and falling into the Wash after a course of 70 miles.

Nennius, the reputed author of a "History of the Britons," evidently of Cymric origin. It gives the mythical account of the origin of the Britons, the Roman occupation, the settlement of the Saxons, and closes with the 12 victorious battles of King Arthur. The writer has preserved valuable fragments of earlier treatises which have been lost.

Neocomian, of or belonging to Neufchâtel. In geology, a European name for the Lower Greensand formation, the inferior part of the Cretaceous system. Lyell divides it into Upper, Middle, and Lower Neocomian; the Upper contains the Folkestone and Hythe beds of the S. E. of England with

the Kentish rag intercalated, the whole less than 300 feet thick. Beneath this is the Atherfield clay, gray in color, of great thickness at Atherfield, in the Isle of Wight. Part of the Speeton clay, several hundred feet thick, is also Neocomian. Under the Middle division are ranked the Weald clay, the Middle Speeton, the Tealby beds. Tealby is a village in Lincolnshire. The Lower Neocomian contains the Hastings sand, passing into Purbeck beds of the Jurassic series, and the lower Speeton clay, the latter 200 feet thick. Remains of Plesiosaurus and Teleosaurus have been found in the Upper Speeton clay and *Pecten cinctus*, various Ammonites, etc., in other beds. The lower Neocomian is homotaxic with the yellow sandstone of Neufchâtel.

Neogene, a term used by some continental geologists to denote the Pliocene and Miocene Tertiaries, in contradistinction to the older strata of the Eocene.

Neolithic, in archæology, a term applied to the more recent of the two periods into which the stone age has been subdivided, as opposed to palæolithic. During this period there is found no trace of the knowledge of any metal excepting gold, which it would seem had sometimes been used for ornaments. The neolithic stone implements are finely shaped and polished, and are found in connection with the remains of extinct animals.

Neon, a recently discovered primary element existing in air. It was discovered by Ramsay and Collie, of England, who, in July, 1898, separated it from argon while experimenting with liquid air. Neon is a gas having a density of 14.67, and like argon, it is characterized by inertness.

Neophron, a genus of birds of the vulture family, one species of which (*N. percnopterus*) inhabits Southern Europe, Egypt, and Asia. It is known as the Alpine or Egyptian vulture, Pharoah's chicken, etc.

Neophyte, a term applied in the primitive Church to the newly baptized. They wore white garments at their baptism, and for eight days after. The Council of Nice (325 A. D.), ordered that neophytes should not be admitted to holy orders till their constancy had been in some measure proved. The term is still used by Roman missionaries for their converts from the heathen. A special use of the word was to denote one who, not having passed through the inferior grades, was, in view of I Tim. iii: 6, considered canonically unfit to be consecrated bishop.

Neo-platonism, the name given to an important movement in the Alexandrian school. G. H. Lewes says that their originality consisted in having employed the Platonic Dialectics as a guide to Mysticism and Pantheism; in having connected the doctrine of the East with the dialectics of the Greeks; in having made Reason the justification of faith; and he concludes that "by their Dialectics they were Platonists; by their theory of the Trinity they were Mystics; by their principle of Emanation they were Pantheists." Neoplatonism passed through three periods: (1) That of Ammonius Saccas and Plotinus, in the 3d century; (2) that of Porphyry and Iamblichus, in the 4th century; and (3) that of Proclus (412–485). Under Justinian (483–565) the Alexandrian school became extinct.

Neoptolemus, or **Pyrrhus,** in Greek legend, the son of Achilles and Deidamia, who, at the taking of Troy, killed Priam and Polyxena, and had Andromache allotted to him. He was afterward King of Epirus, and married Hermonia, in consequence of which Orestes killed him.

Neo-Pythagoreanism, an Alexandrian development of Pythagoreanism under Oriental influences. It stood to Pythagoras somewhat as Neo-platonism did to Plato. It originated in the first half of the century before Christ, and was accordingly the predecessor of Neo-platonism. Neo-Pythagoreans may be divided into two groups, according as their aims were mainly practical — the purification and ennobling life by asceticism, including theurgy, or more modestly metaphysical — basing their views on the Pythagorean theory of numbers (see PYTHAGORAS). Of the former school APOLLONIUS (*q. v.*) of Tyana is the most conspicuous example; of the latter, Moderatus of Gades, Nicomachus of Gerasa (2d century A. D.), ARCHYTAS (*q. v.*), and Sextius.

Neotropical Region, Sclater's name for a zoölogical region, embracing South America, the Antilles, and tropical North America. It possesses more peculiar families of vertebrates and genera of birds than any other region. Neither Huxley's suggested alteration Austro-Columbia, nor Sclater's new term Dendrogæa, appears to be an improvement.

Neottia, in botany, bird's nest, a genus of orchids, family *Listeridæ*, reduced by Sir Joseph Hooker to a sub-genus of *Listera*. The species *L.* (*Neottia*) *nidusavis*, the bird's nest orchis; is a brown, leafless root parasite; the stem has sheathing scales, the raceme is laxflowered, the corolla grayish-brown, the lip concave at the base, the terminal lobes divaricate. Found in dark woods, especially of beech, in continental Europe and Western Siberia.

Neozoic, one of two divisions proposed by the late Prof. E. Forbes for past geological time and fossiliferous strata; it ranges from the commencement of the Trias up to the existing order of things, embracing the Mesozoic and Cainozoic epochs. He contended that, while there was a wide differ-

ence between Palæozoic and Mesozoic fossils, there was no essential difference between Mesozoic and Cainozoic fossils, and that it would be more philosophical to divide the whole lapse of geological time into two great epochs. See PALÆOZOIC.

Nepa, water-scorpion; the typical genus of the family *Nepidæ,* with one species, *N. cinerea,* the common water-scorpion, abundant in the fresh waters of Europe. It is about an inch long, elliptical, yellowish-gray, with red on the abdomen. It preys on aquatic insects, and its bite is painful to man.

Nepal (ne-pâl'), an independent kingdom of India, on the S. slope of the Himalayas; bounded on the N. by Tibet, on the S. and W. by Bengal, and on the E. by Sikkim; lon. 80° 6′—88° 14′ E.; length 500 miles; breadth about 150 miles; area about 54,000 square miles; pop. est. 2,000,000–5,000,000. The N. parts of the State embrace the main range of the HIMALAYAS (*q. v.*), with its offset spurs, on which stand the great peaks of Everest, Diwalagiri, etc. On the S. of the State lies the Terai. The intervening territory consists of mountain ridges, embracing several valleys drained by the Kurnali, Gandak, Kosi, and other rivers. The climate of course varies greatly according to the altitude; the principal valley has a climate like that of Southern Europe. The soil is very fertile, in some districts producing three crops in the year. The hillsides are terraced and the land is irrigated. Rice, opium, rape, linseed, tobacco, and various cereals and pulses are the more important products. Several minerals, as copper, iron, sulphur, and others exist, but are little worked. The forests contain valuable timber trees. Nepal has extensive trading relations with the provinces of British India, reaching the annual average value of $10,000,000, and with Tibet, the details of which are not known. The valleys are inhabited by numerous different hill tribes, partly aboriginal, partly of Mongolian or Chinese descent; but the dominant race are the GURKHAS (*q. v.*), whose ancestors came to the Himalayan slopes from Rajputana in the 12th century, though it was not till 1769 that they made themselves masters of Nepal. They rapidly subdued the hill valleys to E. and W. of them, and, after a war with China (1789–1792), on account of Tibet, in which the Gurkhas were worsted, and a period of great internal disorder, Nepal came into conflict with the Indian government. War followed; in 1815 Sir David Ochterlony defeated the Gurkha armies in the W., and peace was agreed to; but, the treaty not having been signed by the King of Nepal, a British force, 33,000 strong, advanced in the succeeding year to within three days' march of Katmandu, and compelled the Gurkhas to sign the treaty. Since that they have ceased their encroachments on British territory, and during the mutiny voluntarily sent to the assistance of the British a force which rendered useful service in the reduction of Oudh. The real ruler of the country is the prime minister; Sir Jang Bahadur held this office from 1846 to his death in 1877, and was succeeded by his son. But he was slain and supplanted by the head of a rival faction in 1885. Capital, Katmandu; pop. about 50,000.

Nepenthe, a magic potion, calculated to banish the remembrance of grief and enliven the spirits, and supposed to be opium. The first mention of it is in the "Odyssey" of Homer, who describes Helen as administering it to Telemachus, and states that she had learned the art of making it from Polydamna, wife of Thonis, King of Egypt. Of modern poets, Milton and Pope are the principal who have alluded to it. The word is now used figuratively to express any remedy which gives rest and consolation to an afflicted mind.

Nepeta, a genus of plants, order *Lamiaceæ.* The catnip, catmint, cat'sear, cat's-foot, or nep, *N. cataria,* is a common wayside weed, naturalized everywhere, and particularly attractive to cats. The gill-over-the-ground, or ground ivy, *N. glechoma,* is a creeping plant, leaves petiolate, opposite, roundish, hairy, and glaucous; flowers axillary; corolla bluish-purple, with a variegated throat. This plant is naturalized about hedges, walls, etc.; it is aromatic, and was formerly used in ale, and also in medicine.

Nepheline, or **Nephelite,** a mineral species included by Dana in his unisilicate sub-division of anhydrous silicates. Crystallization, hexagonal, usually occurring in six or twelve-sided prisms, with plane or modified summits. Principal cleavage, parallel to the planes of the hexagonal prism. Hardness, 5–6; sp. gr., 2.5–2.65; luster, vitreous to greasy; color, white to yellowish; when massive, frequently bluish-gray, dark-green, or brownish to brick-red; transparent to opaque. Composition: Silica, 44.52; alumina, 33.7; soda, 16.9; potash, 5.2 = 100 — formula, $2(3NaO,3KO)3SiO_2 + 3(2Al_2O_3,3SiO_2) + 3SiO_2$. Occurs in very fine crystals in cavities of the volcanic bombs in the agglomerates of Monte Somma, Vesuvius, and as a constituent of many dolerites, syenites, etc.

Nephrite, a mineral, an aluminous variety of amphibole among the bisilicates, of a leek-green color, massive, and in rolled pieces, remarkable for its hardness and tenacity. It was formerly worn as a remedy for diseases of the kidneys. A unisilicate, zoisite, is also spoken of as nephrite, as is jade. All three are capable of fine polish, and have been used since prehistoric

times for ornaments, weapon-handles, and even weapons.

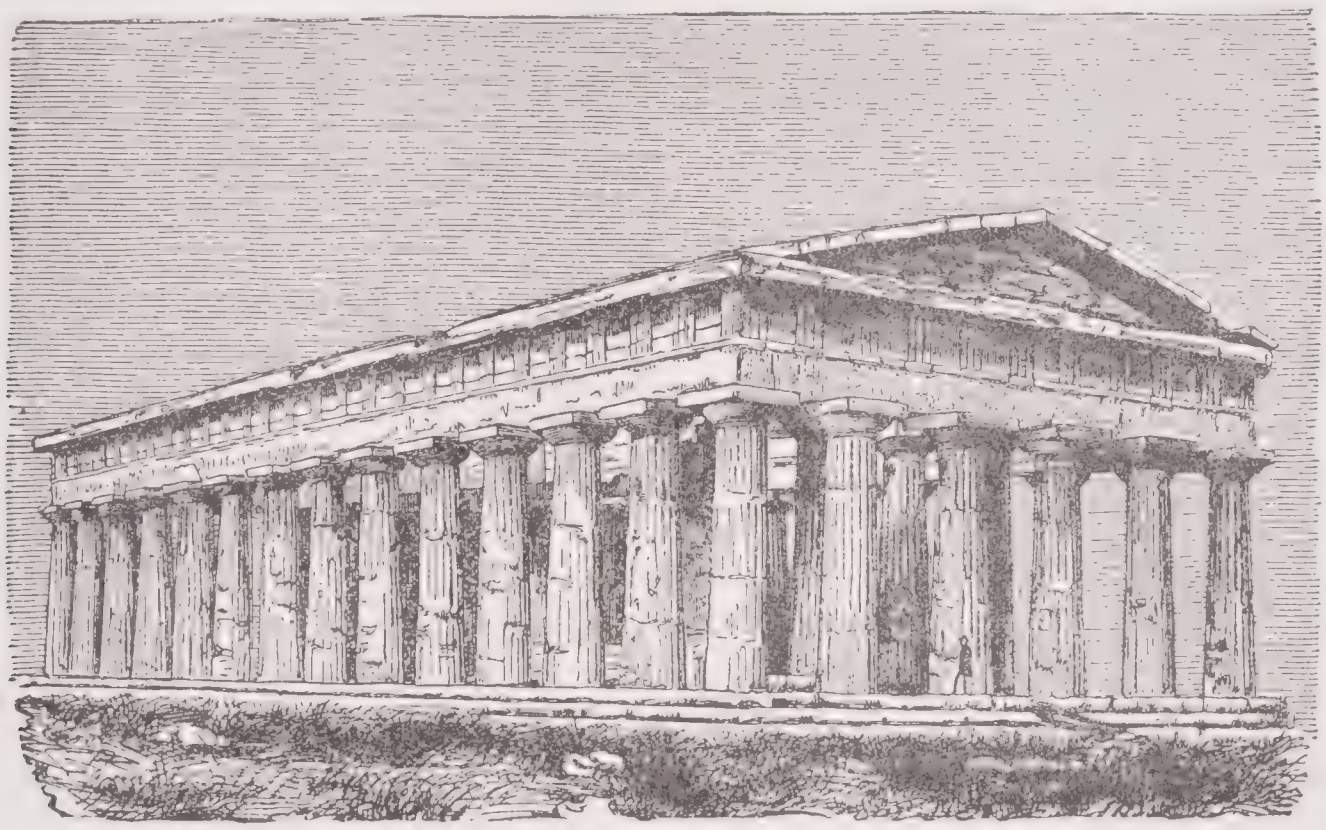
Nephthys, an Egyptian deity, the wife of Seth. Her proper sphere was the nether world, though she occurs in the upper world as the instructress of Horus. She is associated as one of a tetrad with Osiris, Isis, and Horus. She was called by the Greek writers Teleute (End), Aphrodite, and Nike (Victory).

Nepomuk, or **Pomuk, John of,** the patron saint of Bohemia, honored as a martyr of the seal of confession; born in Pomuk, a few miles S. E. of Pilsen, Bohemia, about 1330. Having studied at the University of Prague and taken holy orders, he held various ecclesiastical offices in Prague, and was appointed confessor to Sophia, wife of King Wencelaus IV. For refusing to betray to this monarch the confession of the queen John was put to the torture, then tied hand and foot, and flung into the Moldau, in March, 1383. His memory was cherished with peculiar affection by the Bohemian people, and in 1729 he was canonized by Pope Benedict XIII. His memory is celebrated May 16.

Nepos, Cornelius, a Roman historical writer; born probably in Verona, Italy; lived in the 1st century B. C. He was the contemporary and friend of Cicero, Atticus, and Catullus. The ancients ascribed to him the following works: "Chronology"; "Books of Examples"; "Lives of Cato and Cicero"; and "Illustrious Men." The last is supposed to have consisted of 16 books, but only 25 brief biographies of warriors and statesmen, mostly Greeks, have survived. These biographies are untrustworthy as history, but are written in a clear and elegant style, though affected archaisms and euphuistic mannerisms are not infrequent.

Nepotism (Italian *nepote*, "a nephew") a word used to signify the system or custom practised by several Popes subsequent to Innocent VIII. of granting high honors, dignities, offices, pensions, and the like to their family relations, generally their nephews, altogether irrespective of merit.

Neptune, in Roman mythology, the fabled god of the sea; the son of Saturn and Rhea, and the brother of Jupiter and Pluto. He is generally identified with the Greek Poseidon, and is variously represented; sometimes with a trident in his right hand, a dolphin in his left, and with one of his feet resting on part of a ship; at others in a chariot drawn by sea-horses, with a triton on each side. He was said to preside over horses and the manger.



TEMPLE OF NEPTUNE, NEAR PÆSTUM.

In astronomy, a planet, the most remote of any yet discovered. Irregularities having been remarked in the movements of the planet Uranus, not to be accounted for by the attraction of any known heavenly body, two astronomers, M. Leverrier in France, and Mr. Adams in England, correctly reasoning that the perturbations must proceed from a yet undiscovered planet, independently calculated the probable place in the sky which such a planet would occupy. On Sept. 20, 1846, Leverrier's calculations were communicated to Dr. Galle of Berlin, who promptly looked on the heavens, and the very same evening discovered the planet afterward named Neptune within a single degree of its calculated position. The diam-

eter of Neptune is nearly 35,000 miles. Its density is only a fifth that of the earth, its mean distance from the sun 2,792,000,000 miles, and its year 165 times as long as one of ours. Mr. Lassell discovered that it has one satellite.

Neptunian, one who holds the Neptunian theory.

Neptunian Theory, or **Hypothesis,** an hypothesis devised by Werner (1750–1817) to account for the aspect of geological strata. He assumed that the globe had at first been invested by a universal chaotic ocean, holding in solution the materials of all rocks. From these the crystalline rocks were first precipitated, somewhat clearing the waters, after which the so-called transition rocks went down next. The secondary rocks then followed. All igneous agency was ignored in this scheme. The Neptunian hypothesis has been long since disproved. See AQUEOUS ROCKS: GEOLOGY.

A NEREID.

Nerbudda, more correctly NARBADA, a river of India, rising on the Amarkantak plateau, 3,493 feet above sea-level, in lat. 22° 41′ N., lon. 81° 49′ E., and flowing W. through the Central Provinces, past Jabalpur 190 miles from its source, through the great depression between the Vindhya Mountains on the N. and the Satpura Mountains on the S., known as the Valley of the Nerbudda, and reaching the Gulf of Cambay half-way between Baroda and Surat; total length 800 miles; it drains 36,400 square miles. It is navigable as far as Broach, 30 miles from its mouth. The river ranks as a sacred stream in the eyes of the Hindus; some have held it likely to supersede the Ganges in sanctity. It is regarded as a meritorious act to walk from the sea to its source and back again alongside the river.

Nereids, in classical mythology, sea nymphs, daughters of Nereus and Doris, and constant attendants on Poseidon or Neptune. They are represented as riding on sea-horses, sometimes with the human form entire, and sometimes with the tail of a fish. They were distinguished on the one hand from the Naiads or the nymphs of fresh water, and on the other hand from the Oceanides or nymphs of the ocean.

Nereis, sea-centipede; the typical genus of the family *Nereidæ*. The species are numerous and widely distributed. Many of them are what Van Beneden calls "free messmates." *N. bilineata* and *N. succinea* inhabit the tubes of a species of Teredo, and *N. costæ* is found in the cavities of *Euspongia officinalis,* and was regarded by Peysonel as "the essential animal and sole fabricant of the sponge."

Nereocystis, a genus of *Fucaceæ,* family *Laminaridæ*. The stem, which is filiform, is many fathoms long. It is fixed below by root-like processes, while above it ends in a siphon about a fathom in length, full of fluid, with a bunch of leaf-like processes extending some feet from its center. It makes floating islands on the N. E. coast of America and the opposite shores of Asia, on which the sea-otter finds a home.

Nereus (nē′rūs), in classical mythology, an inferior divinity of the sea, the progenitor of the Nereids, a god subordinate to Poseidon (Neptune). In the ancient works of art, and also by the ancient poets, he is represented as an old man, with a wreath of sedge, sitting on the waves with a scepter in his hand.

Nergal, among the ancient Babylonians, the god of war.

Neri, St. Filippo de', an Italian clergyman; born in Florence, Italy, July 22, 1515. He early devoted himself to the study of theology and the canon law; established hospitals for the relief of pilgrims and the destitute sick, and founded the order of Priests of the Oratory, which was approved by Gregory XIII. in 1595. He died in Rome, Italy, May 25, 1595, and was canonized in 1622.

Nero, Lucius Domitius, called after his adoption CLAUDIUS DRUSUS, Roman emperor; born in Antium, Italy, Dec. 15, 37 A. D. He was the son of Cneius Domitius Ahenobarbus, and of Agrippina, daughter of Germanicus. He had the philosopher Seneca for his teacher; was adopted by Claudius, A. D. 50, and four years after succeeded him on the throne. At the commencement of his reign his conduct excited great hopes in the Romans; he appeared just, liberal, affable, and polished; but this was a mask which soon fell off. He caused his mother to be assassin-

EMPEROR NERO.

ated, and vindicated the unnatural act to the Senate on the ground that Agrippina had plotted against him. He divorced his wife, and led a most shameless and abandoned life. In 64, Rome was burnt, and popular suspicion pointed to Nero as the author of the conflagration. He charged the Christians with it, and commenced a dreadful persecution of them. His cruelties, extravagance, and debauchery at length aroused the public resentment. Piso formed a conspiracy against the tyrant, but it was discovered and defeated. That of Galba, however, proved more successful, and Nero being abandoned by his flatterers, put an end to his existence near Rome, June 9, 68 A. D.

Nero, Golden House of. See GOLDEN HOUSE OF NERO.

Neroli, an elegant perfume, extracted from the flowers of a peculiar orange, small in size, but very aromatic, a native of Italy. Neroli is an essential oil, obtained by distillation from the orange blossoms, and far superior to the pungent article known as the oil of orange peel (*oleum aurantii*), and too frequently substituted for this delicate perfume.

Nertchinsk, a town of Siberia, in the Trans-Baikal Territory, on the Nertcha, a tributary of the Shilka (a head-stream of the Amur), 875 miles E. of Irkutsk. The district of which it is the center yields silver, lead, zinc, tin, and gold; and the town is a trading center for Russians, Mongols, Turcomans, and Tunguses, exchanging tea, gunpowder, and furs. Another Nertchinsk, NERTCHINSKIY-ZAVOD, is 180 miles S. E., on a tributary of the Argun, and is also a great mining center. The silver mines and gold mines are largely worked by convict labor.

Nerthus, an ancient German goddess, regarded as representing the earth.

Néruda, Jan (nyer-ö′dä), a Czech poet; born in Prague, July 10, 1834. He was noted in periodical journalism; while as a poet he is distinguished for his "Book of Verse" (1867), "Cosmic Songs" (2d ed. 1878), and various plays, including "Francesca da Rimini." His "Humble Histories" (1878), a series of sketches of Czech life, attained great popularity. He died in Prague, Aug. 22, 1891.

Nerva, Marcus Cocceius, a Roman emperor; born in 32 A. D. He twice held the honor of consulship before his election to the dignity of emperor, and was elected by the Senate after the murder of Domitian, Sept. 18, A. D., 96. He displayed great wisdom and moderation, and rectified the administration of justice, and diminished the taxes; but finding himself, on account of his advanced age, not vigorous enough to repress the insolence of the Prætorian Guards, he adopted M. Ulpius Trajanus, then at the head of the army of Germany, who succeeded him on his death, Jan. 27, 98.

NERVA.

Nerval, Gérard de, adopted name of GÉRARD LABRUNIE, a French author; born in Paris, France, May 21, 1808. He was educated at the Lycée Charlemagne, and at 20 published a translation of "Faust" which pleased Goethe. He wrote: "Aurelia" (1855), an experience of his own madness; "The Enlightened, or the Precursors of Socialism" (1852); "Tales and Facetiousness" (1852); "Daughters of Passion" (1856); "Genteel Bohemia." Some of his most charming poems are graceful adaptations of French peasants' folk-songs, the beauty of which he had ears to hear. He committed suicide in Paris, Jan. 25, 1855.

Nerve, or Nervous System. A nerve is one of the fibers which proceed from the brain and spinal cord, or from the central ganglia of lower animals, and ramify through all parts of the body, and whose function is to convey impulses resulting in sensation, motion, secretion, etc. The aggregate of these nerves, and the centers from which they proceed, forms the nervous system, the medium through which every act or detail of animal life is inaugurated and directed. The essential idea of any nervous system involves the necessary presence, firstly, of a nerve center or centers, which generate the nervous force or impulse; secondly, of conducting fibers or cords, the nerves; and thirdly, of an organ, part, or structure to which the impulse or impression may be conveyed. The nerve-centers of man and vertebrates generally

Nerve

are disposed so as to form two chief sets, which are to be regarded as essentially distinct. The brain and spinal marrow together (see BRAIN) constitute the first of these centers, and are collectively included under the name cerebro-spinal system or axis. The second system is the sympathetic or ganglionic. From each of these systems nerve-cords are given off — the cerebral and spinal nerves from the former; and the so-called sympathetic fibers from the latter. The brain and spinal cord are contained within the continuous bony case and canal formed by the skull and spinal column; while the chief masses of the sympathetic system form an irregularly disposed chain, lying in front of the spine, and contained within the cavities of the thorax or chest and abdomen. The general functions of the cerebro-spinal system are those concerned with volition and muscular movements, with the control of the senses, and in higher forms with the operations of the mind. The nerves of the sympathetic system in chief are distributed to the viscera, such as the heart, stomach, intestines, blood-vessels, etc.; and the operation of this system is in greater part of involuntary kind, and without the influence or command of the will. The cranial or cerebral nerves pass from the brain through different openings in the skull, and are all in pairs, the first pair being the olfactory nerves or nerves of smell; the second, the optic nerves, or nerves of sight; while others have to do with hearing, taste, general sensibility, and muscular motion. The spinal nerves, after issuing from their openings in the vertebral column, split into two divisions, one of which proceeds to supply parts behind the spine, while the other passes toward the front. The first eight spinal nerves on each side are called cervical, the next 12 are dorsal, the next five lumbar, then five sacral, and one coccygeal.

All nervous structures consist of two elements, nerve-cells and nerve-fibers. The cells and fibers are combined and associated in various ways, and are imbedded in and supported by fine connective tissue so as to form a connected structure. The cells vary in size from $\frac{1}{5000}$ to $\frac{1}{400}$ of an inch, and consist of masses of protoplasm containing a nucleus and nucleolus. Processes or poles pass from the cell, branching outward. Nerve-fibers are of a glossy transparency and of a tubular form. They consist of a rod passing down the center, called the axis-cylinder, which is surrounded on all sides by a white substance, the whole being inclosed in a delicate sheath (*neurilemma*). The axis-cylinder is a continuation of the nerve-cell process, and acts in an analogous manner to an electric conductor. The nerve-fibers may exhibit a diameter so great as the $\frac{1}{1500}$ of an inch; but their average breadth may be stated to vary from $\frac{1}{2000}$ to the $\frac{1}{3000}$ of an inch. The largest fibers are those of the nerve-trunks themselves; and they diminish in size in the neighborhood of the nerve-centers — brain and spinal marrow — and as they approach to the periphery of the body or to their ultimate terminations. The nerve-fibers of the brain and spinal marrow do not exhibit a limiting membrane; and in the gray matter of the brain and cord the fibers are of exceedingly small size, not exceeding the $\frac{1}{10000}$ or $\frac{1}{14000}$ of an inch in diameter.

The general functions of nerve-fibers may be briefly considered under two aspects. The fibers may convey impressions from the brain or nerve-centers to their peripheral extremities, or to the parts to which they are distributed. Or secondly, they may transmit impressions from the periphery, or from the parts they supply, to their centers. A double series of nerve-fibers, each set subserving one or other of the preceding functions, exists in the cerebro-spinal as well as in the sympathetic nervous system. These series are therefore known as sensory, afferent, or centripetal nerves, when they transmit impressions from their peripheral extremities to the brain or centers; and as motor, efferent, or centrifugal nerves, when they carry impressions from the centers to their peripheral terminations. Stimuli of various kinds applied to the nerves arouse the so-called excitability of the fibers, and through this property nerves convey impressions thus made on them. Impressions have been calculated to pass along a nerve at the rate of about 200 feet per second. Nerve-fibers in any case — motor or sensory — can carry one kind of impulse only, corresponding to the kind of fiber. In certain nerves the impulses or impressions are of a limited or special kind, such as those by which sound, or odors, are produced. And such nerves, therefore, respond only to stimuli of a special kind. The various nerve-centers of the body which originate, or at any rate direct and dispose, the nerve-force, may be viewed as simply ganglia, or as collections of ganglia, or nervous masses. The brain itself falls under this latter division. The general functional relations existing between the nerve-centers and the nerves may be simply illustrated by the phenomena comprehended under the name of reflex-action. When a peripheral nerve-fiber is irritated a sensory or centripetal impression is conveyed toward the nerve-center. Arriving at the center the impression is converted into a motor or centrifugal one, and travels along the motor nerve-fibers, to excite, it may be, a muscle or other part to action. The general functional relation of the nervous system may be summarized by stating that its functions comprehend the reception and distribution of impressions; that these impressions originate either from influences acting on the

periphery, or from the nerve-centers, brain, or mind; these impressions respectively influence or stimulate the mind or nerve-centers, and the muscles or secreting structures; and lastly, that all nervous phenomena are exerted through, or accompanied by nervous action, and that this latter is, so far as physiology has yet been able to determine, of a uniform and similar kind. See also EYE: EAR: NOSE, etc.

The *Invertebrata* possess no such specialization of the nervous centers as is seen in vertebrates, in which the brain and spinal cord are inclosed within their bony case and canal, and thus shut off from the general cavity of the body. The great and distinctive feature between the nervous system of *Vertebrata* and that of the lower forms consists in the absence of a defined or chief nervous center, through which consciousness may intervene to render the being intelligent, and aware of the nature of the acts it performs.

Nervii, a powerful and warlike people of the ancient Gallia Belgica, whose territory stretched from the Sambre to the ocean, not subdued by Cæsar without an obstinate resistance.

Nervous Diseases, diseases due either to actual changes in the structure of nerve-fibers or nerve-centers, or to some irregularity of nerve function without actual structural change. Thus nervous diseases may be due to inflammation or degeneration of nerve substance; to the pressure on some part of the nervous system of tumors, effused blood, or other fluid; to the death of some part by the cutting off of its blood supply, etc.; or may be the result of lowered nervous action as a part of general bad health.

Nervures, in entomology, the corneous tubes which form prolongations of the tracheæ or air-vessels of insects, and which help to expand the wing and keep it tense. The term is applied in botany to the veins or nerves of a leaf.

Nesbit Moor, the name of a battle fought May 7, 1402, between the Scotch, under Sir P. Hepburn, of Hailes, and the English, under the Earls of Percy and March. The Scotch were defeated, their leader and most of his knights slain, and the rest taken prisoners.

Nesle (nāl), **Tour de,** the ancient castle of the noble family Nesle, formerly standing, with its gate and tower, at an angle of the city wall of Paris, on the S. bank of the Seine, where now stands the palace of the Institute. It came into the hands of the crown, was the scene of events recorded by Brantôme, and was bought by Cardinal Mazarin as the site for his college.

Nesr, an idol of the ancient Arabs; it was in the form of a vulture, and was worshiped by the tribe of Hemyer.

Ness, a cape or headland; in Great Britain a frequent element in the names of points of land projecting into the sea. It is of Norse origin.

Ness, Loch, a long, narrow lake of Inverness-shire, the second largest in Scotland, 6½ miles S. W. of Inverness; 50 feet above sea-level; length N. N. E. 22½ miles; average breadth 1 mile; area 19 square miles. It receives the Morriston, Oich, Foyers, and other streams, and sends off the river Ness to the Moray Firth. It lies in the valley of Glenmore, on the line of the CALEDONIAN CANAL (*q. v.*), and is enclosed by steep mountains — the highest, Mealfourvonie (2,284 feet). Owing to its great depth (in places 780 feet) it never freezes to any considerable extent.

Nesselrode, Carl Robert, Count von, a Russian statesman; born in Lisbon, Portugal, Dec. 14, 1780. He early entered the diplomatic service, in which his father was also engaged, and after various subordinate employments, was made councillor of the Russian embassy at Paris in 1807. He became a great favorite with Napoleon, succeeded in detaching Russia from the Austrian alliance, and was present at the important conferences between the emperors Napoleon and Alexander at Erfurt in 1808. He gained immense influence over Alexander's mind, was made chancellor of the empire, and dictated his foreign policy; followed him to France in 1814, and signed the Quadruple Alliance; took part in the Congress of Vienna, and in the dismemberment of Poland. At that Congress Nesselrode shared with Metternich and Talleyrand the chief direction of affairs. He was the chief contriver of the "Holy Alliance," which made Russia virtually supreme in Europe, and Nesselrode supreme in Russia. The count took a leading part at the congresses of Aix-la-Chapelle in 1818, and of Verona in 1822. Nesselrode's influence was considerably lessened under the Emperor Nicholas, and he long strove to avert the threatened war with the Western Powers, which broke out in 1853. After the accession of Alexander II., Count Nesselrode retired from his office of chancellor of the Russian empire, and died in St. Petersburg, Russia, March 23, 1862.

Nessus, in Greek legend, the Centaur whom Hercules ordered to carry his wife Dejanira across a river. The Centaur ill-treated the woman, and Hercules shot him with a poisoned arrow. Nessus, in revenge, gave Dejanira his tunic, saying to whomsoever she gave it would love her exclusively. Dejanira gave it to her husband, who was devoured by poison as soon as he put it on; but after

enduring agony, the hero threw himself on a funeral pile, and was consumed.

Nestor, in Greek legend, son of Neleus and Chloris. His father and 11 brothers were killed by Hercules; but the conqueror spared Nestor's life and placed him on the throne of Pylas. As king of Pylas and Messenia, he led his subjects to the Trojan war, where he distinguished himself among the rest of the Grecian chiefs by eloquence, wisdom, and justice. After the Trojan war he retired to Greece, where he enjoyed the peace and respect due to his old age and his surpassing prudence of mind. The ancients declare that he lived three generations of man.

Nestor, a Russian historian; born about 1056, was a monk at Kiev, and wrote a chronicle in his vernacular tongue, which has been the foundation of Slavonic history. He died after 1116.

Nestorianism, the doctrine taught by NESTORIUS (*q. v.*), that there were two persons as well as two natures in Jesus Christ, and that the Virgin Mary was in no sense Theotokos, or Mother of God, as she was the mother of the man Jesus and not of the Word. This doctrine was condemned by the Council of Ephesus, convened by Pope Celestine I., in A. D. 431. Nestorius was deposed, and the use of the Nicene Creed made obligatory. Nestorianism made rapid strides in the East, and Cardinal Newman says that in the 11th century "its numbers, with those of the Monophysites are said to have surpassed those of the Greek and Latin Churches together." Since 1553 a portion of the Nestorians have been in communion with Rome, and are known as Chaldeans. Blunt was of the opinion that Nestorius did not hold the doctrine of a dual nature, but that his chief offense in the eyes of the orthodox was opposition to the growing devotion to the Virgin Mary.

Nestorius, Bishop of Constantinople (428–431). He incurred the charge of heresy (see NESTORIANISM). Cyril of Alexandria, at the Council of Ephesus in 431, procured the condemnation of the doctrine taught by Nestorius and the deposition of the patriarch. He was banished to the deserts of Egypt, where he suffered much and died in 440. Numerous extracts from several of his works, entire epistles, and some sermons are extant. His followers, called Nestorians, were persecuted by several Greek emperors in succession.

Net, a term applied to that which remains of a weight, quantity, etc., after making certain deductions. Thus net weight is the weight of merchandise after allowance has been made for casks, bags, or any inclosing material.

Net, an open fabric made of thread, twine, or cord, woven into meshes of fixed dimensions, firmly knotted at the intersections. Nets are used for a great variety of purposes, as for protecting fruit trees, for collecting insects, for hammocks, screens, etc., but chiefly for hunting and fishing. The chief kind of nets used in fishing are the trawl, the drift, the seine, the kettle or weir, and the trammel or set nets. The trawl is a triangular bag with an arrangement for keeping its mouth open, drawn along the bottom of the water. The drift and seine nets are very long in proportion to their breadth, and differ from one another only in the manner in which they are employed. The seine has a line of corks along one of its long borders, and a line of leaden weights along the other; so that when thrown into the water it assumes a perpendicular position. It is used near the shore, being dragged to land with any fish it may inclose, by ropes fastened to the ends. The drift net is not loaded with lead, but floats in the water, and is used especially in herring fishing, the fishes as they drive against it becoming caught by the gills. Kettle and weir nets are structures fixed on stakes placed along the coast between high and low water. Trammel or set nets are also fixed between stays, but act like drift nets. Formerly all nets were made by hand, but hand-made nets have been superseded. Wire nets are used for garden purposes, for hen coops, etc.

Netherlands, The, or **Holland** (Dutch Nederland, or Koninkrijk der Nederlanden), a kingdom of Europe on the North Sea, N. of Belgium and W. of part of Northern Germany; area 12,648 square miles; pop. (1909) 5,825,198. The country is divided into 11 provinces: North Brabant, Gelderland, South Holland, North Holland, Zeeland, Utrecht, Friesland, Overijssel, Groningen, Drenthe, and Limburg. The king is also sovereign (grand-duke) of the grand-duchy of Luxemburg. In addition to her European territories Holland possesses extensive colonies and dependencies in the Asiatic archipelago and America; including Java, Sumatra, great part of Borneo, Celebes, part of New Guinea, Surinam or Dutch Guiana, the West Indian islands of Curaçao, Saba, St. Eustatius, etc.; estimated area, about 783,000 square miles; pop. approximately 35,000,000.

General Features.—The Netherlands (or Low Countries, as the name implies) form the most characteristic portion of the great plain of N. and W. Europe. It is the lowest part of this immense level, some portions of it being 16 to 20 feet below the surface of the sea, and nearly all parts too low for natural drainage. The coast line is very irregular, being marked by the great inlet of the Zuider Zee, as well as by various others, and fringed by numerous islands. In great part the coast is so low

Netherlands

that were it not for massive sea-dykes large areas would be inundated and lost to the inhabitants. In the interior also dykes are a common feature, being built to protect portions of land from the lakes or rivers, or to enable swampy pieces of land to be reclaimed by draining, the water being commonly pumped up by windmills. These inclosed lands are called "polders," and by the formation of the polders the available area of the country is being constantly increased, lakes and marshes being converted into fertile fields, and considerable areas being even rescued from the sea. One of these reclamations was the Lake of Haarlem, the drainage of which, yielding more than 40,000 acres of good land now inhabited by about 12,000 persons, begun in 1839, was finished in 1852. Almost the only heights are the sand hills, about 100 to 180 feet high, forming a broad sterile band along the coast of South and North Holland; and a chain of low hills, of similar origin perhaps, S. E. of the Zuider Zee. In the same line with the sand-hills, extending past the mouth of the Zuider Zee, runs a chain of islands, namely, Texel, Vlieland, Schelling, Ameland, etc., which seem to indicate the original line of the coast before the ocean broke in on the low lands. The coast of Friesland, opposite to these islands, depends for its security altogether on artificial embankments. The highest elevation, 656 feet, is in the extreme S. E. The general aspect of the country is flat, tame, and uninteresting, and about a fifth of the whole surface consists of marsh, sand, heath, or other unproductive land.

Rivers and Canals.—The chief rivers of the Netherlands are the Rhine, Maas (or Meuse), Scheldt, and Ijssel. The Rhine is above half a mile wide where it enters the Netherlands; it soon divides, the S. and principal arm taking the name of Waal and uniting with the Maas, while the N. arm, communicating with the Ijssel, takes the name of Leck; a branch from it named the Kromme (crooked) Rhine, winds by Utrecht to the Zuider Zee, while another very diminished stream called the Old Rhine flows from Utrecht by Leyden to the sea at Katwijk. The Maas, entering the Dutch Netherlands from Belgium, receives the Roer; of the Scheldt only the mouths, the E. and the W., or Old Scheldt, lie within the Dutch boundary. The Ijssel, flowing from Germany, enters the Zuider Zee. The navigable canals are collectively more important than the rivers, on which indeed they depend, but they are so numerous as to defy detailed description. The chief are the North Holland canal, between Amsterdam and the Helder, length 46 miles; and the more important ship canal, 15 miles long, 26 feet deep and 197 wide, from the North Sea to Amsterdam, and connected by locks with the Zuider Zee. Lakes are also very numerous.

Climate, Agriculture.—The climate of the Netherlands is humid, changeable, and disagreeable. The mean temperature is not lower than in like latitudes in the British Islands, and the quantity of rain (26 inches) is somewhat less; but the winter is much more severe. As regards rural industries gardening and agriculture have attained a high degree of perfection. Yet the latter holds a subordinate place in rural industry. Wheat, of excellent quality, is grown only in favored portions of the south provinces. Rye, oats, and buckwheat, with horse-beans, beet, madder, and chicory, are more common crops; and tobacco is cultivated in the provinces of Gelderland, South Holland, and Utrecht; flax in North Brabant, South and North Holland, Friesland, and Zeeland; and hemp, sugar-beet, oil-seeds, and hops in various parts of the kingdom. Culinary vegetables are cultivated on a large scale, not merely for the sake of supplying the internal demand, but also for the exportation of the seeds, which form an important article of Dutch commerce. But it is in stock (cattle, horses, sheep, swine, goats), and dairy produce in particular, that the rural industry of the Netherlands shows its strength.

Commerce, Manufactures, etc.—The commerce of the country was at one time the most important in the world, and is even yet of great importance and activity. The external commerce is chiefly carried on with Great Britain, Germany, Belgium, and the Dutch colonies in the East. The total imports in 1899 aggregated in value $1,003,083,300; exports, $650,500,000. The foreign trade centers chiefly in Amsterdam and Rotterdam. The industrial occupations are varied. Shipbuilding and subsidiary trades are among the chief. Of textile manufactures that of linen is the most important; but silks and velvets, as well as woolens and cottons, are produced in considerable quantity. Pigments, brandy, gin, paper, glass, earthenware, etc., are among the more important products. Large numbers of the sea-board population are employed in the deep-sea fisheries. Railways in 1898 had a length of 1,722 miles, and navigable water (canals excluded), about 3,000 miles. The chief money unit is the florin or guilder = about 40 cents. In 1899 the revenue was $60,332,000; expenditure, $63,596,650; debt, $476,389,790.

People, Institutions, etc.—The stock to which the people belong is the Teutonic, the great majority of the inhabitants being descendants of the old Batavians. They comprise over 70 per cent, of the population, and are chiefly settled in the provinces of North and South Holland, Zeeland, Utrecht, and Gelderland. The Flemings of North Brabant and Limburg, and the Frisians, in-

habiting Friesland, Groningen, Drenthe, and Overijssel, form the other groups. The majority of the people belong to the Dutch Reformed Church (a Presbyterian body); the remainder being Roman Catholics, Old Catholics, Jews, etc. All religious bodies are on a perfect equality. The government is a constitutional monarchy, the executive being vested in the king, and the legislative authority in the states-general, sitting in two chambers. The upper chamber, 50 in number, is elected by the provincial councils or assemblies of the 11 provinces; the lower chamber, 100 in number, is elected directly, the electors being all males of 25 years of age taxed at a certain figure. The members of the lower house are paid. Elementary schools are everywhere established, and are partly supported by the State, but education is not compulsory. Higher class schools are in all the chief towns; while there are State universities, namely, at Leyden, Utrecht, and Groningen, and the municipal university at Amsterdam. The commercial capital of the country is Amsterdam, but the seat of government and residence of the sovereign is The Hague.

History.—The S. portion of the Low Countries belonged at the beginning of the Christian era to Belgic Gaul (see GAUL). The N. portion, inhabited by the Batavians and Frisians (see those articles), formed part of Germany. The S. portion as far as the Rhine was held by Rome up to A. D. 400, after which it came under the rule of the Franks, as did also subsequently the rest of the country. In the 11th century the territory comprised in the present kingdoms of Belgium and the Netherlands formed a number of counties, marquisates, and duchies corresponding more or less with the modern provinces. By the latter part of the 15th century all these had been acquired by the Duke of Burgundy, and passed to the house of Hapsburg on the marriage of the daughter of Charles the Bold of Burgundy to the son of the Emperor Frederick III. On the abdication of Charles V. in 1556 they passed to his son Philip II. of Spain. In consequence of religious persecution in 1576 Holland and Zeeland openly rebelled, and in 1579 the five N. provinces — Holland, Zeeland, Utrecht, Guelders, and Friesland — concluded the celebrated Union of Utrecht by which they declared themselves independent of Spain. They were joined in 1580 by Overijssel, and in 1594 by Groningen. After the assassination of William of Orange, July 10, 1584, Maurice became stadtholder (governor). His victories at Nieuport and in Brabant, the bold and victorious exploits of the Dutch admirals against the navy of Philip II., the wars of France and England against Spain, and the apathy of Philip II., caused in 1609 the peace of Antwerp. But Holland had yet to go through the Thirty Years' War before its independence, now recognized by all the powers except Spain, was fully secured by the peace of Westphalia. In the middle of the 17th century the United Netherlands were the first commercial state and the first maritime power in the world, and for a long time maintained the dominion of the sea. The S. provinces alternated between the rule of Spain and Austria till 1797, when they came under the power of the French republic. In 1806 Louis Napoleon became king of Holland, but in 1810 it was incorporated with the French empire. In 1814 all the provinces both of Holland and Belgium were united by the treaty of Paris to form the kingdom of the Netherlands. This arrangement lasted till 1830, when the S. provinces broke away and formed the kingdom of Belgium. King Willem I. attempted to reduce the revolted provinces by force; but the great powers intervened, and finally matters were adjusted between the two countries in 1839. The king abdicated in 1840, and was succeeded by his son Willem II. (1840–1849), he being again succeeded by his son Willem III., who was succeeded in 1890 by his daughter Wilhelmina, Queen Emma reigning as queen-regent till the queen came of age, Aug. 31, 1898. Queen Wilhelmina was married to Duke Henry of Mecklenburg-Schwerin, Feb. 7, 1901.

Nethersole, Olga, an Anglo-American actress; born in Kensington, England, Jan. 18, 1870. She made her first professional appearance at the Theater Royal, Brighton, in "Harvest," in March, 1887. About a year later she appeared in London at the Royal Adelphi Theater, which was succeeded by an engagement at the Garrick. She subsequently went to Australia and returned to London at the head of her own company in "The Transgressor." She visited the United States four times, first in 1894, under the management of A. M. Palmer, appearing at Wallack's Theater in "Camille," and arousing great enthusiasm. In her subsequent visits she appeared in the rôles of Denise, Camille, Juliet, Carmen, etc.

Nethinim, an order of hereditary attendants on the Levites in the services of the second Temple. They were to do the more menial part of the work. It is supposed that the Gibeonites originally held a similar office (Josh. ix: 21–27.) At the return from Babylon, 392 accompanied Zerubbabel (Ezra ii: 58, Neh. vii: 60), and 220 came with Ezra (Ezra viii: 17,20); 612 in all.

Netley, a place on the E. side of Southampton Water, 3 miles S. E. of Southampton, England, with a ruined Cistercian abbey and the Royal Victoria Hospital. The latter is for the reception of invalids from the army on foreign service, and from

among the troops serving in the adjoining military districts. It nominally has accommodation for 878 patients, but for a few months during the trooping season room has usually to be found for over 1,000. The medical staff consists of a surgeon-general as principal medical officer, a registrar and secretary, and medical officers of various ranks. The invaliding depot attached consists of a colonel on the staff ranking as an assistant-adjutant-general, a paymaster, and a quartermaster. The total cost of the construction of this hospital, whose foundation-stone was laid by Queen Victoria May 19, 1856, was about $1,750,000. Attached is the medical school for candidates for the army medical staff. Netley is also the headquarters of the female nurses of the army. A direct line from Portsmouth, the port of disembarkation of invalids, has been opened, and they can now be brought to this hospital in 30 minutes.

Nettement, Alfred François (net-mo*ng'*), a French journalist; born in Paris, France, July 22, 1805. He acquired note with his "History of the Revolution of July, 1830" (1833), and "History of French Literature under the Reign of Louis Philippe." He died in Paris, Nov. 15, 1869.

Netting, a net of small ropes to be stretched along the upper part of a ship's quarter to contain hammocks. Netting also used to be extended along a ship's gunwale to prevent the enemy from boarding.

Nettle, a genus of plants (*Urtīca*) belonging to the natural order *Urticaceæ*, and consisting chiefly of neglected weeds, having opposite or alternate leaves, and inconspicuous flowers, which are disposed in axillary racemes. The species are mostly herbaceous, and are usually covered with extremely fine, sharp, tubular hairs, placed on minute vesicles filled with an acrid and caustic fluid, which by pressure is injected into the wounds caused by the sharp-pointed hairs. Hence arises the well-known stinging sensation when these plants are incautiously handled. Many species of nettle are known, of which three are found in Great Britain — the Roman nettle (*U. pilulifera*), the small nettle (*U. urens*), and the great nettle (*U. dioica*). Nettles yield a tough fiber which may be used as a substitute for hemp. Nettle-porridge and nettle-broth are dishes made from young and tender nettles cut in March or April. The nettle is common in the United States.

Nettlerash, or **Urticaria,** the term applied to a common form of eruption on the skin. The eruption consists of wheals, or little solid eminences of irregular outline, and either white or red, or most commonly both red and white, there being a white center with a red margin. The rash is accompanied with great heat, itching, and irritation, but is always aggravated by scratching; the appearance on the skin and the sensation being very much like the appearance and feeling produced by the stinging of nettles; and hence the origin of its names. The eruption is characterized by the extreme rapidity with which it appears and disappears; the whole duration of the attack may be a few hours or even less; but it is extremely apt to recur at regular or irregular intervals: it is very rare for the wheals to persist more than a day. The disease may be either acute or chronic. In the acute form feverishness may precede the rash by a few hours, or may be altogether absent. The disorder is often connected with some derangement of the digestive organs, and may be traced to the imperfect digestion of special articles of food, such as oatmeal, the kernels of fruit, strawberries cucumbers, mushrooms, and especially oysters, mussels, and crabs, which are eaten with perfect impunity by most persons. It may be brought on also by local causes of irritation, and frequently complicates other irritable diseases of the skin.

The chronic form is often very troublesome, and frequently comes on periodically in the evening. Cases are reported in which persons have been afflicted for 10 years continuously by this form of the disease. It is characterized by constant recurrence during periods, not by persistence of a single outbreak of the eruption. In the treatment of the acute form local causes of irritation must first be looked for and removed. Where it is brought on by some article of diet relief is often obtained by taking a teaspoonful of bicarbonate of soda (baking soda); but it may be necessary to administer emetics and purgatives, if vomiting and diarrhœa do not occur spontaneously. In the chronic form the patient should, in the first place, determine whether the rash is caused by any particular article of diet, and if this seems not to be the case an attempt must be made to improve the state of the digestive organs. A few grains of rhubarb taken daily, just before breakfast and before dinner, will sometimes effect a cure. Numerous other remedies have been recommended; perhaps the most generally useful is a draught containing a scruple each of the carbonates of magnesia and soda with five drops of tincture of nux vomica. Though external applications are usually of little avail, dusting the itching surface with flour sometimes affords temporary relief; and a still more useful application is a lotion composed of a drachm of the carbonate of ammonia, a drachm of the acetate of lead, half an ounce of laudanum, and eight ounces of rose-water.

Nettle Tree (*Celtis*), natural order *Urticaceæ*, a deciduous tree, with simple and generally serrated leaves, much resembling those of the common nettle, but not stinging. It has a sweet fleshy drupaceous

fruit. The common or European nettle tree (*C. australis*) grows to the height of 30 or 40 feet, and is frequently planted for ornament in the S. of France and N. of Italy. The wood is useful for various purposes. *C. occidentalis*, sometimes called the sugar-berry, is a much larger tree, often attaining a height of from 60 to 80 feet. It is a native of North America from Canada to Carolina. A variety, *C. crassifolia*, is often called hackberry.

Neuendorff, Adolph Heinrich Anton Magnus, an American musician; born in Hamburg, Germany, June 13, 1843, was educated in the public schools of New York city, and while attending school also studied music. When only 15 he appeared in public as a pianist, and a year later was engaged to lead a chorus, and also play in an orchestra. In 1864 he became musical director at the German Theater in Milwaukee, Wis. The following year he succeeded Carl Anshütz as conductor of German grand opera in New York; in 1872 founded the Germania Theater; and succeeded Theodore Thomas as leader of the New York Philharmonic Society in 1878. Afterward he conducted several orchestras, and produced some original operas, among them "The Rat Charmer of Hamelin" (1880); "Don Quixote" (1882); etc. He died in New York city, Dec. 4, 1897.

Neufchatel, or **Neuchatel** (nuh-chä-tel) (in German Neuenburg), a Swiss canton, bounded by France, Vaud, the Lake of Neufchâtel, and Bern, having an area of 312 square miles. Neufchâtel was an independent principality as early as 1034. After various vicissitudes it came into the hands of the King of Prussia, as heir of the house of Orange. In 1814 it was received into the Swiss Confederacy, and was the only canton with a monarchical government. This it preserved till 1848. After threatened war in May, 1857, the King of Prussia renounced all his rights in Neufchâtel. Several ridges of the Jura run through the country. The Lake of Neufchâtel, 24 miles long by 8 broad, communicates through the Aar with the Rhine. Grazing and dairy farming are extensively carried on in the canton; wine, fruits, hemp, and flax are produced. The chief manufactures are lace, cotton, watches and clocks (specially at Chaux de Fonds, Neuchâtel and Locle). The religion is Protestant. The language is French, but German is also spoken. Pop. (1908) 135,267. The capital, of the same name, is 24 miles W. of Bern, on a steep slope above the N. W. shore of Lake Neufchâtel. It has an old Gothic church of the 12th century; many charitable institutions; a gymnasium or college, containing a valuable natural history collection founded by Professor Agassiz, a native of the town, etc. It has various manufactures and an extensive trade. Pop. (1909) 23,400.

Neuilly (nuh-yē), or **Neuilly-sur-Seine,** a town of France; department of Seine; immediately N. of the Bois de Boulogne, and practically a suburb of Paris. Here, near the Seine, and in a large and beautiful park, formerly stood the Château de Neuilly, built by Louis XV., and the favorite residence of Louis Philippe, which was burned at the revolution in 1848. When Louis Philippe took refuge in England he assumed the title of Count de Neuilly. Pop. (1901) 36,437.

Neumann, John Nepomucene, a German-American Roman Catholic prelate; born in Prachatitz, Bohemia, March 28, 1811. In 1823 he entered the Budweis gymnasium, and in 1831, the theological seminary, where he took minor orders. In 1835 he came to the United States; was ordained priest in 1836; became a Redemptionist, and was made superior of that order in Pittsburg, Pa. In 1852 he became Bishop of Pennsylvania. In 1854 he visited Europe, where he received special marks of honor. He died in Philadelphia, Pa., June 5, 1860.

Neu-Mecklenburg. See New Ireland.

Neuralgia, severe pain produced by irritation of a nerve, or by sympathetic action with inflammation of surrounding parts; a disease chiefly of debility, overwork, and general depression. When it occurs in the head it is called tic-doloreux, in the breast *angina pectoris*, and in the chest-wall, intercostal neuralgia. Bromide of potassium, strychnine, arsenic, quinine, and tonic treatment generally are indicated in this disease.

Neurapophyses (nū-ra-pof-i-sēs), or **Neural Arches,** the name applied to the upper or superior arches which spring from the body of the typical vertebra, or segment of the vertebrate spine, and which by their union form a canal — the "neurol canal" — inclosing the spinal marrow.

Neurin, or **Neurine,** the nitrogenized substance of nerve fiber and cells, consisting chiefly of albumen and a peculiar fatty matter, associated with phosphorus.

Neuritis, a term applied to inflammation of the nerves. The disease is not very common, and not very well defined. The symptoms are those of neuralgia, with impairment of sensation, or localized paralysis, according as sensory or motor nerves are affected.

Neuroptera, in entomology, an order of the class Insecta, in which the older entomologists included all insects possessing four membranous wings, more or less elaborately veined, but without the peculiar arrangement of cells which occurs in the Hymenoptera. This arrangement included

insects with a complete and others with an incomplete metamorphosis. The latter are now more generally called *Pseudoneuroptera*, and made a sub-order of *Orthoptera*. The order *Neuroptera* of modern authors includes insects with a perfect metamorphosis, a mandibulate mouth, a free prothorax, and four more or less veined membranous wings.

Neuropurpuric Fever, a malignant epidemic fever attended with lesions of the brain and spinal cord, usually with purpuric or other eruptions; mortality from 25 to 80 per cent. of those attacked. Tanner prefers to call it cerebro-spinal fever, and gives as synonyms malignant purpuric fever, malignant purple fever, epidemic cerebro-spinal meningitis, cerebro-spinal typhus, and spotted fever. See MENINGITIS.

Neurosis, a name common to diseases of the nervous system unaccompanied by any discoverable alteration in structure, that is to say functional diseases of the nervous system. Hysteria, for example, is a neurosis; catalepsy, some forms of mental disease, such as melancholia, various forms of neuralgia and spasm, are called neuroses.

Neurotic, a term introduced into medicine to indicate some relationship to the nervous system. Thus a neurotic disease is a nervous disease. Medicines that affect the nervous system, as opium, strychnine, etc., are called neurotics.

Neuss (nois), an ancient manufacturing town of Germany, near the left bank of the Rhine, 4 miles W. of Düsseldorf. Its church of St. Quirinus, a notable specimen of the transition from the Round to the Pointed style, was founded in 1209. Neuss has flourishing ironworks, foundries, flour and iron mills, and manufactures of cottons, woolens, leather, paper, chicory, etc. Pop. (1900) 28,472.

Neustadt, or **Wiener-Neustadt,** a town of Lower Austria; 32 miles S. of Vienna. It is overlooked by the large old castle of the Dukes of Babenberg, now a military academy. The castle contains a fine Gothic chapel (1460), rich in painted windows; and is the burial-place of the Emperor Maximilian I. Locomotives and machinery, wire, bells, pottery, starch, leather, and ribbons are among the manufactures. The city, called "the Ever-faithful," was founded in 1192, and was rebuilt after a great fire in 1834. Pop. (1900) 28,700.

Neustria (noies'-), or **West France,** the name given in the times of the Merovingians and Carlovingians to the W. portion of the Frank empire, after the quadruple division of it which took place in 511. Neustria contained three of these divisions. It extended originally from the mouth of the Scheldt to the Loire, and was bounded by Aquitania on the S., and by Burgundy and Austrasia on the E. The principal cities were Soissons, Paris, Orleans, and Tours. Bretagne was always loosely attached to Neustria, of which the strength lay in the duchy of France. After the cession of the territory afterward called Normandy to the Normans in 912, the name Neustria soon fell into disuse.

Neuter, in botany, a flower having neither stamens nor pistils; as in those occupying the outermost flowers of the head of *Centaurea cyanus*, the margin of the cymes in garden plants of Viburnum, Hydrangea, or in the whole cyme of *Viburnum opulus*. In grammar, a noun of neuter gender. In entomology, a sterile female, a worker. Neuters are found in social insect communities, such as those of bees and ants. They have no sex, and, consequently, no reproductive power. According to Huber and Latreille the non-development of sexual organs is due to the kind of nourishment to which such insects have been limited in the larval state. Darwin considers the different castes of neuters to have arisen from natural selection among males and fertile females, and considers that the existence of these sterile forms furnishes an argument against Lamarck's doctrine of inherited habit.

Neutral Ground, the name given to a space between the Spanish lines and the fort of Gibraltar.

Neutrality, in chemistry, possessing the neutral condition.

In international law, that condition or attitude of a country or state in which it does not take part, directly or indirectly, in a war between other countries. A neutral state is allowed to supply to either of the belligerents any supplies or stores which are not contraband of war. It may also enter into treaties or engagements with either side, provided such treaties or engagements are unconnected with the subject of the war. Armed neutrality, the state of a country or nation which holds itself armed in readiness to resist any aggression of either of the belligerents between whom it is neutral.

Neutralization, a chemical term indicating the process by which an acid and an alkali are so combined as to disguise each other's properties or render them inert, as may be done with sulphuric acid and soda.

Neutral Tint, a dull grayish hue, having the character of none of the brilliant colors, such as red, yellow, blue, etc.

Neuville (nuh-vēl'), **Alphonse Marie de,** a French painter of battle-scenes; born in St. Omer, France, May 31, 1836. After studying under Delacroix he painted a series of pictures illustrative of French exploits in the Crimean War, Italy, and Mexico. During the Franco-Prussian War Neuville fought in the ranks and afterward painted a series of works, depicting incl-

dents of that conflict. The attack at Rorke's Drift and that at Tel-el-Kebir in the Anglo-Egyptian campaign of 1882, were also chosen by him as subjects for pictures. His masterpiece is "The Attack by Fire on a Barricaded House at Pillersexel." Neuville excelled as an illustrator of books, his best work in this line being the designs for Guizot's "History of France." He died in Paris, May 20, 1885.

Neuville, Jean Guillaume, Baron Hyde de, a French statesman; born in the castle of Neuville, near Charité-sur-Loire, France, Jan. 24, 1776. He was educated at the College Cardinal Lemoine in Paris; affiliated with the exiled Bourbon princes; and became one of their most trusted agents. In 1799, under the name of Paul Xavier, he had an interview with Bonaparte with a view to the restoration of Louis XVIII. Later his estates were confiscated, but in 1806 Napoleon agreed to refund them if he would live in the United States. He settled near New Brunswick, N. J., where his house was open to all French exiles. In 1814 he returned to France, and was received with favor by Louis XVIII.; in 1815 he was elected to the Chamber of Deputies, and in 1816 was appointed minister and consul general to the United States. Louis made him a baron and gave him the grand cross of the Legion of Honor. In 1823 as minister to Portugal he rescued the old King John VI., who had been imprisoned by his son. He was made Count of Pembosta; was secretary of the navy; and again elected to the Chamber of Deputies. He published "An Historical Eulogy of General Moreau" (New York, 1814), and, "Notes on the Commerce of France with the United States." He died in Paris, France, May 28, 1847.

Neuwied (noi-wīd), a town of Germany, on the right bank of the Rhine, 8 miles below Coblenz; formerly capital of the principality of Wied. The castle of the princes has a beautiful garden, in which are many Roman antiquities unearthed in the vicinity. The town contains an important institute of the Moravian Brethren, and there are some minor manufactures.

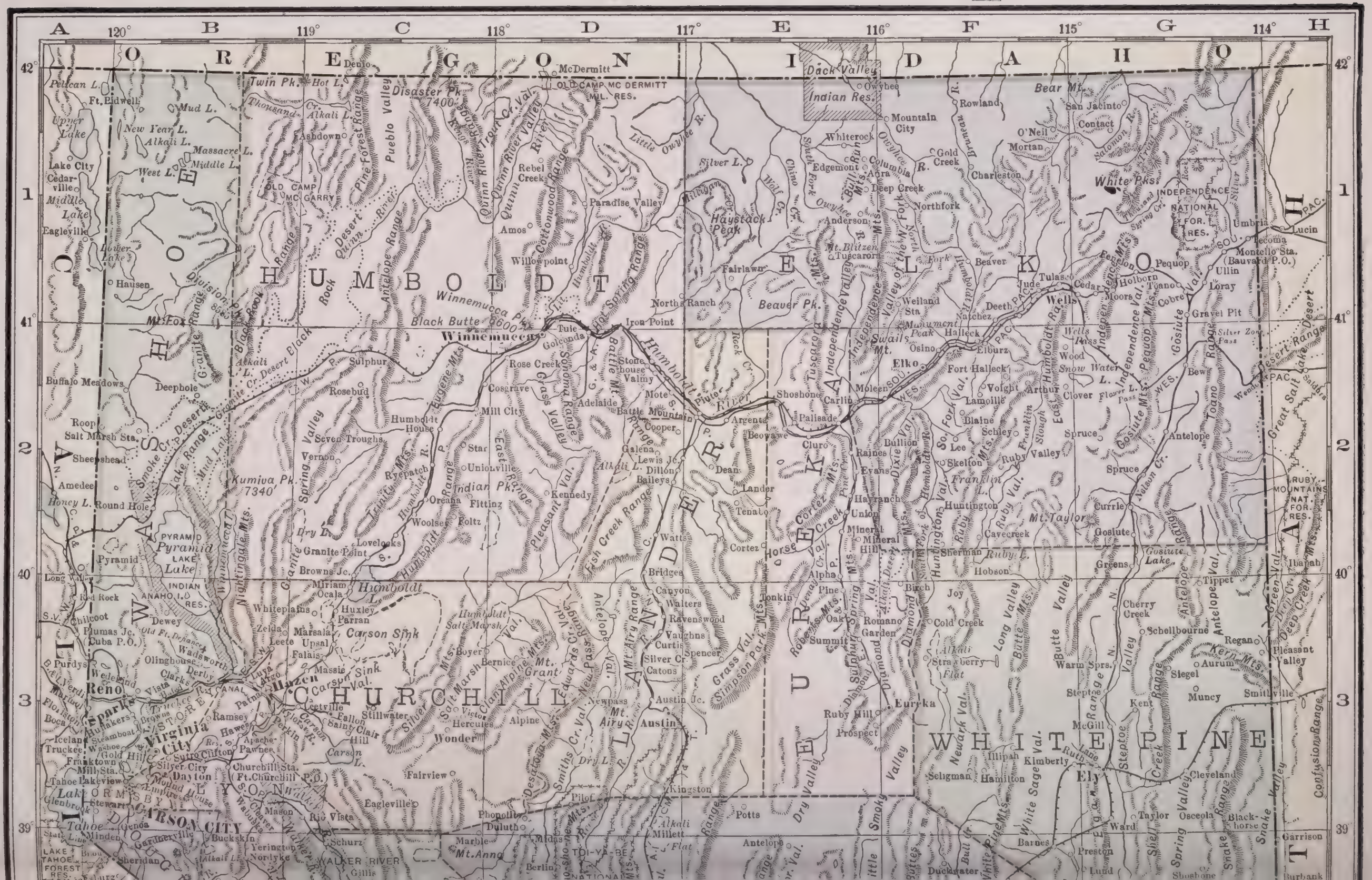
Neva, a river of Russia, flowing W. from Lake Ladoga to the Bay of Cronstadt, in the Gulf of Finland. It passes through St. Petersburg, and carries to the sea an enormous volume of water (greater than that of the Rhine) from the lakes Ladoga, Onega, Ilmen, and others. Its total length, with windings, is about 40 miles; in places it is over 4,000 feet wide, elsewhere the channel is narrowed to 180 feet; and in one or two places the navigation is embarrassed by reefs and rapids. It is frozen on an average from Nov. 25 to April 21. By the Ladoga canal the Neva communicates with the vast water system of the Volga, and thus it may be said to join the Baltic with the Caspian Sea.

Nevada, a State in the Western Division of the North American Union; bounded by Oregon, Idaho, Utah, Arizona, and California; admitted to the Union, Oct. 31, 1864; number of counties, 14; capital, Carson City; area, 109,740 square miles; pop. (1900) 42,335; (1910) 81,875.

Topography.—The State is situated in the Great American Basin, having for its boundaries the Sierra Nevada Mountains on the W., the Wahsatch Mountains on the E., and cross ranges on the N. and S. It is a table-land 4,000 to 8,000 feet above sea-level. The State is crossed by a series of parallel mountain ranges with a general N. and S. direction. The principal chains are the Virginia Mountains, the Truckee Mountains, Antelope, East Humboldt, Toyabe and Santa Rosa Mountains. Between these mountains are deep valleys; the Colorado valley having numerous abrupt ranges, and peaks rising above its plateaus. The most important ranges of the Colorado region are the Muddy, Vegas, Spring Mountain, and Kingston Mountains. There are numerous lakes, the rivers having no outlet over the mountains. The largest lakes include Winnemucca, Und, and Pyramid lakes in the extreme W., Carson Lake and Humboldt and Carson Sink, E. of the W. Humboldt Mountains, and Eagle, Franklin, and Ruby lakes in the N. E. The Humboldt river crosses the N. part of the State and empties into Humboldt Lake. The Truckee river rises in Tahoe Lake, and flows S. into Pyramid Lake. Other important rivers are the Rio Virgin, Carson, Quinn's river, Reese river, and the Colorado river, which forms a large part of the S. E. boundary.

Geology.—The mountains of Nevada show formations of nearly every epoch, from the Azoic to the late Jurassic. The volcanic nature of the State is shown by the ancient and modern eruptive rocks, and by the lava beds of the N. W. The mountain ranges are in places composed entirely of limestone, in others of granite, syenite, porphyry, slate, or quartzite.

Mineralogy.—Nevada is rich in minerals, though, excepting silver and gold they have been worked but little. The Comstock silver lode, discovered in 1859, was for years the most valuable in the world. In 1899 the gold production was 107,364 fine ounces, valued at $2,219,000; silver, 843,400 fine ounces, valued at $1,090,457; copper, 556,775 pounds, and lead, 3,388 short tons. Other minerals mined included tungsten, antimony, platinum, zinc, cinnabar, tin, manganese, plumbago, nickel, cobalt, and iron. Beds of sulphur, gypsum, rock salt, borax, saltpeter, and carbonate of soda are extensive. The building stones include limestone, granite, slate, sandstone, agate, and


OREGON
IDAHO
NEVADA
HUMBOLDT
CHURCHILL
LANDER
EUREKA
WHITE PINE
ELKO
LINCOLN
CLARK
NYE
LYON
STOREY
WASHOE
CARSON CITY
TOOELE
Winnemucca
Black Butte 6600'
Winnemucca Pk.
Kumiva Pk. 7340'
Disaster Pk. 7400'
Twin Pk.
Thousand Cr.
Hot L.
Pelican L.
Ft. Bidwell
Mud L.
Upper Lake
New Year L.
Alkali L.
Massacre L.
Middle L.
West L.
Lake City
Cedarville
Middle Lake
Eagleville
Lower Lake
Hausen
Mt. Fox Range
Division 6865
Black Rock Range
Black Rock Desert
Granite Range
Alkali L.
Granite Cr. Desert
Buffalo Meadows
Deephole
Roop
Salt Marsh Sta.
Sheepshead
Amedee
Honey L.
Round Hole
Smoke Creek Desert
Mud Lake
Lake Range
Nightingale Mts.
Pyramid Lake
Pyramid
Wadsworth
Nixon
Reno
Sparks
Verdi
Vista
Patrick
Truckee
Boca
Floriston
Hunters
Steamboat
Washoe
Gold Hill
Virginia City
Silver City
Dayton
Mound House
Empire
Carson City
Lake Tahoe
Glenbrook
Stateline
Zephyr Cove
Tahoe City
Meeks Bay
Emerald Bay
Minden
Gardnerville
Genoa
Sheridan
Buckskin
Yerington
Nordyke
Schurz
Walker River
Gillis
Mason
Rio Vista
Eagleville
Churchill Sta. (Ft. Churchill P.O.)
Fairview
Carson Sink
Carson Val.
Carson L.
Stillwater
Fallon
Saint Clair Hill
Hazen
Leetrille
Ramsey
Hawes
Apache
Pawnee
Churchill Canal
Lovelocks
Granite Point
Humboldt L.
Huxley
Parran
Marsala
Leete
Upsal
Falais
Massie
Olinghouse
Derby
Clarks
Purdys
Wedekind
Lura
Patna
Fairlawn
Humboldt Salt Marsh
Boyer
Bernice
Mt. Grant
Alpine
Hercules
Wonder
Newpass
Austin Jc.
Austin
Mt. Airy
Clan Alpine Mts.
Silver Mts.
Desatoya Mts.
Smiths Cr. Val.
Dry L.
Pilot
Kingston
Phonolite
Duluth
Marble
Mt. Anna
Midas
Toi-y-abe Nat. For. Res.
Alkali Flat
Millett
Antelope
Potts
Dry Valley
Smoky Valley
Pine Forest Range
Pueblo Valley
Quinn River
Quinn River Val.
Quinn River Range
Trout Cr. Val.
McDermitt
Denio
Old Camp McDermitt Mil. Res.
Old Camp McGarry
Ashdown
Rebel Creek
Cottonwood Range
Paradise Valley
Amos
Willowpoint
Humboldt R.
Antelope Range
Rock Spring Range
Battle Mt. & G. & A.
Iron Point
North Ranch
Tule
Golconda
Rose Creek
Cosgrave
Stonehouse
Valmy
Adelaide
Battle Mountain
Mote
Mill City
Humboldt House
Seven Troughs
Vernon
Star
Unionville
Oreana
Fitting
Woolsey
Foltz
Humboldt Range
Humboldt R. Valley
Humboldt Mts.
Jersey Val.
Pleasant Val.
Indian Pk. Range
Kennedy
Ryepatch
Dry L.
Lovelocks
Granite Point
Browns Jc.
Miriam
Ocala
Whiteplains
Zelda
Leete
Upsal
Falais
Massie
Olinghouse
Derby
Clarks
Purdys
Wedekind
Lura
Patna
Fairlawn
Humboldt Salt Marsh
Boyer
Bernice
Mt. Grant
Alpine
Hercules
Wonder
Newpass
Austin Jc.
Austin
Mt. Airy
Clan Alpine Mts.
Silver Mts.
Desatoya Mts.
Smiths Cr. Val.
Dry L.
Pilot
Kingston
Phonolite
Duluth
Marble
Mt. Anna
Midas
Toi-y-abe Nat. For. Res.
Alkali Flat
Millett
Antelope
Potts
Dry Valley
Smoky Valley
Pine Forest Range
Pueblo Valley
Quinn River
Quinn River Val.
Quinn River Range
Trout Cr. Val.
McDermitt
Denio
Old Camp McDermitt Mil. Res.
Old Camp McGarry
Ashdown
Rebel Creek
Cottonwood Range
Paradise Valley
Amos
Willowpoint
Humboldt R.
Antelope Range
Rock Spring Range
Battle Mt. & G. & A.
Iron Point
North Ranch
Tule
Golconda
Rose Creek
Cosgrave
Stonehouse
Valmy
Adelaide
Battle Mountain
Mote
Mill City
Humboldt House
Seven Troughs
Vernon
Star
Unionville
Oreana
Fitting
Woolsey
Foltz
Humboldt Range
Humboldt R. Valley
Humboldt Mts.
Jersey Val.
Pleasant Val.
Indian Pk. Range
Kennedy
Ryepatch
Dry L.
Lovelocks
Granite Point
Browns Jc.
Miriam
Ocala
Whiteplains
Zelda
Leete
Upsal
Falais
Massie
Olinghouse
Derby
Clarks
Purdys
Wedekind
Lura
Patna
Fairlawn
Humboldt Salt Marsh
Boyer
Bernice
Mt. Grant
Alpine
Hercules
Wonder
Newpass
Austin Jc.
Austin
Mt. Airy
Clan Alpine Mts.
Silver Mts.
Desatoya Mts.
Smiths Cr. Val.
Dry L.
Pilot
Kingston
Phonolite
Duluth
Marble
Mt. Anna
Midas
Toi-y-abe Nat. For. Res.
Alkali Flat
Millett
Antelope
Potts
Dry Valley
Smoky Valley
Little Owyhee R.
Silver L.
Haystack Peak
Hillgan
Wolf Cr.
Chino Cr.
Bull Run Mts.
Owyhee R.
Owyhee
Whiterock
Edgemont
Agra
Columbia
Deep Creek
Northfork
Anderson
Mt. Blitzen
Tuscarora
Fairlawn
Beaver Pk.
Tuscarora Mts.
Independence Valley
Valley of the N. Fork
Humboldt R.
Weiland Sta.
Monument
Swails
Mt.
Osino
Elko
Moleen
Shoshone
Carlin
Palisade
Argenta
Beowawe
Cluro
Dean
Lander
Tenato
Cortez
Watts
Bridgeport
Canyon
Walters
Ravenswood
Vaughns
Curtis
Spencer
Silver Cr.
Catons
Simpson Park Mts.
Grass Val.
Roberts Mts.
Diamond Mts.
Diamond Val.
Sulphur
Eureka
Ruby Hill
Prospect
Dixie Val.
Dixie
Raines
Evans
Dullion
Harranch
Union
Mineral Hill
Mineral
Alpha
Pine
Tonkin
Oak
Romano
Garden
Summit
Cold Creek
Alkali
Strawberry
Flat
Sherman
Hobson
Ruby L.
Huntington Val.
Huntington
Ruby
Cavecreek
Mt. Taylor
Ruby Val.
Franklin Stough
Franklin L.
Lamoille
Blaine
Schley
Voight
Arthur
Clover
Flower L.
Pass
Wood
Snow Water L.
Bewl
Wells
Deeth
Tuscarora
Jude
Tulas
Cedar
Holborn
Moors
Toano
Cobre
Loray
Gravel Pit
Silver Zone Pass
Wells Pass
Pequop
Pequop Mts.
Independence Val.
Independence Mts.
Fenelon
Montello Sta. (Bauvard P.O.)
Ullin
Umbria
Lucin
Tecoma
Great Salt Lake Desert
Great Salt Lake
Saldbra
Deep Creek Mts.
Deep Creek
Ibapah
Pleasant Valley
Aurum
Kern Mts.
Regan
Schellbourne
Cherry Creek
Antelope Range
Antelope Val.
Butte Valley
Butte Mts.
Long Valley
Warm Sprs.
Steptoe Range
Steptoe Valley
Steptoe
Siegel
Muncy
Smithville
Kent
McGill
Ely
Illipah
Kimberly
Ruth
Lane
Cleveland
Taylor
Osceola
Blackhorse
Ward
Barnes
Preston
Lund
Duckwater
White Pine Mts.
White Sage Val.
Spring Valley
Snake Range
Snake Valley
Garrison
Burbank
Confusion Range
Newark Val.
Seligman
Hamilton
Gosiute Mts.
Gosiute Lake
Greens
Currie
Goslute
Spruce
Antelope
Nelson Cr.
Ruby Mountains Nat. For. Res.
Franklin Mts.
Ruby Mts.
Jarbidge Mts.
Jarbidge R.
Bear Mt.
San Jacinto
Contact
O'Neil
Mortan
Charleston
Gold Creek
Rowland
Mountain City
Owyhee
Indian Res.
Dack Valley
Bruneau R.
Bruneau
Salmon R.
Salmon Trout Cr.
Silver Cr.
White Pkss
Thousand Spring Cr.
Independence Nat. For. Res.
Lincoln Highway
Pac.
Sou. Pac.
Wes. Pac.
Alkali Desert
Alkali Val.
Alkali L.
Alkali Flat
Alkali Spring Val.
Alkali Deert
Alkali Strawberry Flat
Alkali Desert
Alkali Val.
Alkali L.
Alkali Flat
Alkali L.
Alkali Flat
Alkali Val.
Alkali Deert
Alkali Strawberry Flat
Alkali Desert
Alkali Val.
Alkali L.
Alkali Flat
Alkali L.
Alkali Flat
Alkali Val.
Alkali Deert
Alkali Strawberry Flat
Alkali Desert
Alkali Val.
Alkali L.
Alkali Flat

NEVADA

SCALE OF MILES

0 10 20 30 40 50 60

Indian Reservations

Forest Reservations

State Capitol ⊛ County Seats ⊙

Size of type indicates relative importance of places

Hammond's 8 x 11 Map of Nevada
Copyright, 1907, by C.S.Hammond & Co., N.Y.

Longitude West from Greenwich

120° B 119° C 118° D 117° E 116° F 115° G 114°

38 5 6 7 37 36 35

marble. Amethysts, carnelions, and tourmalines are also found.

Soil and Productions.—With the exceptions of the river valleys there is scarcely any arable land in the State. The valleys and basins however are well watered and adapted to agricultural pursuits, and under proper irrigation considerable mountain land has been made productive. The principal crops are hay, wheat, oats, and barley. The forest trees are chiefly pines, firs, and spruces, of great size. The foothills are covered with mountain mahogany, dwarf cedar, willow, beech, cottonwood, and wild cherry. Apple, peach, pear, and plum trees flourish and bear excellent fruit. Stock raising and dairy farming are leading industries.

Manufactures.—In 1900 there were reported by the United States census, 261 manufacturing establishments, employing $1,531,789 capital and 617 persons; paying $426,692 in wages, and $832,058 for raw materials; and having an annual output valued at $1,673,880. The principal articles of manufacture include railroad cars, dairy products, flour and grist, printed material, saddlery and harness, clothing, chemicals, boots and shoes, brick and tile, wagons and carriages, confectionery, liquors, lumber and timber products, and salt.

Banking.—On Oct. 31, 1901, there was 1 National bank in operation, having $82,000 in capital, $14,692 in outstanding circulation, and $33,500 in United States bonds. There were also 3 State banks, with $400,000 in capital, and $110,199 surplus; and 1 private bank with $25,000 capital and $74,529 in resources.

Education.—At the close of the school year 1899–1900 there were reported 9,260 children of school census age; enrollment in public schools, 6,676; and average daily attendance, 4,698. There were 324 teachers, 231 buildings used for public school purposes, and public school property valued at $284,563. The receipts for the year amounted to $225,926, and tne expenditures, $225,622. For higher education there were public high schools, at Austin, Carson City, Elko, Eureka, Gold Hill, Reno, and Virginia City, and the State University of Nevada at Reno.

Churches.—The strongest denominations in the State are the Roman Catholic; Protestant Episcopal; Mormons; Methodist Episcopal; and Presbyterian. In 1899 there were 59 Evangelical Sunday-schools, with 868 officers and teachers, and 3,342 scholars.

Postoffices, Periodicals, and Railroads.—In 1901 there were 188 postoffices of all grades; and 30 periodicals, of which 7 were daily, 2 semi-weekly, 20 weekly, and 1 semi-monthly. The total length of railroads within the State was 920 miles.

Finances.—On Jan. 1, 1901, the total bonded debt of the State was $276,600; floating debt, $17,852; and cash in treasury, $260,258. The total assessed valuation in 1899 was $23,692,709, divided as follows: real estate, $15,862,249; personal property, $7,704,209; and net proceeds of mines, $126,251. The State tax rate for 1901 was $8.00 per $1,000.

State Government.—The governor is elected for a term of four years and receives a salary of $4,000 per annum. Legislative sessions are held biennially and are limited in length to 50 days each. The Legislature had 15 members in the Senate and 33 members in the House, each of whom receives $10 per day and mileage. There is one Representative in Congress. In 1901 the Legislature had a Democratic majority, while the governor was a Populist.

History.—Nevada is part of the territory acquired by the United States from Mexico, by the treaty of Guadalupe Hidalgo. The first immigrants were the Mormons, who located in the Carson and Washoe valleys in 1848. The discovery of gold in California in the following year brought more settlers, and the discovery of silver still added to Nevada's growth. It was organized as a Territory March 2, 1861, and admitted to the Union in 1864. In 1866 its area was increased to the present size by parts of Arizona and Utah. REINHOLD SADLER.

Nevada, Emma, stage name of EMMA WIXOM, an American opera singer; born in Austin, Nev., in 1862. She studied in Paris and made her first appearance as an opera singer in London in 1880. She sang with success in Paris, Italy, and the United States. In 1885 she was married to Dr. Raymond Palmer.

Nevada State University, a coeducational, non-sectarian institution at Reno, Nev.; opened in 1888; has grounds and buildings valued at over $475,000; endowment, $145,000; scientific apparatus, etc., $105,000; volumes in the library, 16,000; average number of faculty, 40; average student attendance, 325; graduates, over 600.

Nevers (nē-ver′), the capital of the French department of Nièvre, formerly of the province of Nivernais. It is picturesquely seated on a hillside, 600 feet above sea level, at the influx of the Nièvre to the Loire, 159 miles S. S. E. of Paris. The Noviodunum of Cæsar, it has been the seat of a bishop since 506; its beautiful cathedral, restored in 1879, belongs mainly to the 13th century. The stately court house, dating from 1475, was formerly the castle of the Dukes of Nevers. The city contains a fine public garden, a bridge of 14 arches over the Loire, a mediæval gateway, and a triumphal arch (1746) commemorating Fontenoy. The industries comprise the manufacture of cannon, iron cables

and chains, porcelain (introduced by Italians about 1565), etc. Pop. (1901) 27,673.

Neviansk, a town of Russia, in the government of Perm, 50 miles N. of Ekaterinburg; located on the Siberian side of the Ural Mountains, and on a tributary of the Tobol. The surrounding district is famous for its mineral wealth, particularly gold and iron. Pop. 16,066.

Neville, Henry, an English actor; born in Manchester, England, June 20, 1837. He achieved great success on the London stage in "The Ticket of Leave Man," which was produced at the Olympic in May, 1863, and played 409 nights without intermission. He wrote several successful dramas, "Gesture," and a work entitled "The Stage, Its Past and Present, in Relation to Fine Art."

Nevin, William Channing, an American journalist; born in New Athens, O., Jan. 1, 1844. He was admitted to the bar in 1871; and wrote for Philadelphia journals. His works include: "History of All Religions" (1871); "Ghouls and Gold" (1885); "In the Nick of Time" (1886); "A Summer School Adventure" (1887); "A Layman's Theology" (1888).

Nevis, an island of the West Indies, belonging to Great Britain. It forms one of the Leeward Islands, and is 2 miles S. E. of St. Christopher, with which it has been since 1882 administratively connected. It is circular in form, rises in the center to a wooded ancient crater (3,200 feet), and has an area of 50 square miles. The lower slopes are cultivated, the sugar cane being the principal crop, though limes and oranges are grown to a small extent. The capital is the port of Charlestown. Nevis was discovered by Columbus in 1498 and colonized by England in 1628. In the 18th century it was twice taken and restored by the French. As long as the slave trade lasted it was one of the principal marts for slaves in the West Indies. The island has suffered much at various times from hurricanes and earthquakes. Pop. (1901) 12,774.

New Albany, a city and county-seat of Floyd co., Ind.; on the Ohio river, and on the Baltimore and Ohio Southwestern, and the Louisville, New Albany, and Chicago railroads; opposite Louisville, Ky. A bridge 2,453 feet long, erected at a cost of $2,000,000, connects the city with Louisville. Here are the court house, DePauw College for Women, National and State banks, street railroads, electric lights, and several daily and weekly newspapers. The city has manufactories of engines, cars, and boilers, planing, rolling, and flour mills, pork-packing houses, iron foundries, shipyards, and plate-glass works, and an assessed property valuation of $8,500,000. Pop. (1890) 21,059; (1900) 20,628; (1910) 25,275.

New Albion, the name given by Sir Francis Drake, in 1578, to the part of the W. coast of North America now comprised within the limits of the United States. The name was later restricted to the region lying within the boundaries of the present States of Oregon and Washington.

New Amsterdam, the name conferred on the present city of New York by its original Dutch settlers.

New Archangel. See SITKA.

Newark, a city, port of entry, and county-seat of Essex co., N. J.; on the Passaic river, and the Pennsylvania, the Central of New Jersey, the Lackawanna, and the Erie railroads; 9 miles W. of New York city; area, 19 square miles; pop. (1890) 181,830; (1900) 246,070; (1910) 347,469.

Municipal Improvements.— The city owns an extensive waterworks system, costing $9,618,325. The reservoirs have a storage capacity of 50,000,000 gallons daily, and the water is distributed through 257 miles of mains. The consumption averages 25,000,000 gallons per day. There are in all 220 miles of streets, of which 102 miles are paved. The sewerage system covers about 157 miles. The city is lighted by gas and electricity at a cost of $208,000 per annum. The annual cost of the police department is about $390,000, and that of the fire department $300,000. The annual death rate averages 18.90 per 1,000.

Notable Buildings.— The chief public buildings are the United States Government Building; the home quarters of the Prudential Life Insurance Company, the Free Public Library, the New Jersey Historical Society, the Fidelity Title and Deposit Company, new public high school, and several large department stores. Plans for a new city hall, to cost about $300,000, were accepted late in 1901.

Manufactures.— Newark is noted for the variety of its manufactures. In 1900 there were reported 3,339 manufacturing establishments, employing $103,191,403 capital and 54,059 persons; paying $29,534,311 for wages and $67,105,944 for materials; and yielding products of a combined value of $126,954,049. The principal articles were leather ($10,857,192); malt liquors ($8,236,468); jewelry ($7,364,247); foundry and machine shop products ($5,536,893); fur hats ($3,453,619); varnish ($2,401,849).

Banking.— On Dec. 3, 1900, there were 9 National banks in operation, having a combined capital of $2,950,000, and a surplus of $1,400,000.

Education.— The city has 57 buildings used for school purposes. At the close of the school year 1898–1899 the children of school age numbered 60,453; the enrollment in the public schools was 36,711, and in private and parochial schools (largely esti-

mated) 3,965, and the average daily attendance in public schools was 24,972. There were 701 teachers; and public school property valued at $2,262,875.

Finances.— On Jan. 1, 1901, the total bonded debt of the city was $16,474,000; the sinking funds, $4,295,359; net debt, $12,178,641, including the water debt. The assessed valuations in 1900 were: Real estate, $129,832,105; personal property, $22,799,577; total, $158,585,635; tax rate, $21.40 per $1,000.

History.— In 1666 Newark was settled by families from Milford and New Haven, Conn.; in the following year these were joined by other settlers, led by Rev. Abraham Pierson. The latter came from Guilford and Branford, Conn. The settlement which was named after Pierson's English home, was rigorously religious, and only members of the Congregational Church held the privilege of franchise. In 1713 Newark received its first charter; in 1777 it was taken, plundered, and nearly destroyed by the British. It was chartered as a city in 1836. Lafayette received a grand ovation here on his visit to the United States after the Revolutionary War. Several parts of the new county system of public parks are within the city or on its borders, and in the older parks are statues of Gen. Philip Kearny; Frederick T. Frelinghuysen, formerly United States Secretary of State; and Seth Boyden, the inventor; a bust of Dr. Abram Coles; and other attractions. Newark is the seat of a Roman Catholic bishopric, and a new cathedral, to cost $1,000,000, has been in course of construction for several years. Besides its manufactures the city is widely known for its extensive fire and life insurance interests.

Newark, a city and county-seat of Licking co., O.; at the junction of three branches of the Licking river, on the Ohio canal, and on the Pittsburg, Cincinnati, Chicago, and St. Louis, and the Baltimore and Ohio railroads; 33 miles N. E. of Columbus. It is the seat of Denison University (Bapt.), Shepardson College for Women, Granville Female College, and Doane Academy. In the vicinity are petroleum refineries, a coal mine, and sandstone quarries. The city contains railroad car shops, machine, stove, boiler, and other industrial plants, and glass works, and has an assessed property valuation of over $6,000,000. Pop. (1890) 14,270; (1900) 18,157; (1910) 25,404.

Newark, The, a steel, twin-screw protected cruiser of the United States navy; 4,098 tons displacement; length, 310 feet; breadth, 49 feet 2 inches; mean draft, 18 feet 9 inches; horsepower, 8,869; armament, **main battery,** twelve 6-inch breechloading rifles; secondary battery, four 6-pounder rapid-fire guns, four 3-pounder rapid-fire cannons, four 37-millimeter Hotchkiss revolving cannons, and four Gatlings; speed, 19 knots an hour; crew, 34 officers and 350 men; cost, $1,379,897.

Newark-upon-Trent, a town of Nottinghamshire, England, on a branch of the Trent; 18 miles N. E. of Nottingham and 120 N. by W. of London. It has a fine parish church, built mainly between 1350 and 1480. Newark has an important corn market and great malting industries, besides iron and brass foundries, manufactures of boilers and agricultural implements and plaster of paris works. A British town and Roman station, Newark in Saxon times became the seat of a castle, which was rebuilt in 1125 by Alexander, Bishop of Lincoln (hence the name New Wark), and which long bore the name of the "key of the North." King John died in it (1216); and in the Great Rebellion it stood three sieges. In 1646 it was dismantled, and is now represented only by a picturesque ruin. Pop. (1901) 14,985.

New Bedford, a city, port of entry, and one of the county-seats of Bristol co., Mass.; on Buzzards Bay, and on the New York, New Haven, and Hartford railroad; 55 miles S. of Boston. It contains a custom house, county court house, St. Mary's Home, St. Luke's Hospital, St. Joseph's Hospital, a high school, an orphan asylum, a Quaker academy, public library, National and savings banks, waterworks, electric lights, electric street railroads, and daily and weekly newspapers. Since 1755 New Bedford has been the most important center of the American whaling industry, which was extensively carried on in 1818–1857, and then rapidly declined owing to the scarcity of whales and the introduction of petroleum. It has manufactories of soap, candles, Prussian blue, glass, paint, flour, cordage, photographic materials, woolen goods, leather, lubricating oil, fertilizers, furniture, clothing, watches and clocks, etc. The assessed property valuation is nearly $58,000,000. The British destroyed a large part of New Bedford in 1778, in retaliation for the injury done to British commerce by privateers from that port. Pop. (1890) 40,733; (1900) 62,442; (1910) 96,652.

Newbern, a city, port of entry, and county-seat of Craven co., N. C.; at the junction of the Neuse and Trent rivers; and on the Wilmington, Newbern, and Northern, and the Atlantic and North Carolina railroads; 108 miles E. S. E. of Raleigh. It has steamship communication with Norfolk, Baltimore, and New York. Here are a public library, and several National and State banks. The city exports fish, cotton, turpentine, lumber, vegetables, and naval

stores. It has grist and sawmills, turpentine distilleries, carriage and tobacco factories, manufactories of agricultural implements, etc., and an assessed property valuation of nearly $2,000,000. During the early part of the Civil War Newbern was strongly fortified by the Confederates, but on March 4, 1862, it fell into the hands of General Burnside, after a sharp action. Pop. (1900) 9,090; (1910) 9,961.

Newberry, John Strong, an American geologist; born in Windsor, Conn., Dec. 22, 1822; was graduated at Western Reserve College in 1846, and at the Cleveland Medical College in 1848. In 1851–1855 he practised medicine in Cleveland. He was assistant surgeon and geologist to the government expedition that explored the country between San Francisco and the Columbia river; also accompanied Lieutenant Ives in his exploration of the Colorado river; and the expedition under Captain Macomb in its exploration from the Santa Fé to the junction of the Grand and Green rivers. At the beginning of the Civil War he became attached to the United States Sanitary Commission, and later became secretary of its Western Department. He was appointed Professor of Geology at the Columbia College School of Mines, in 1866; which post he retained till his death. Among his publications are: "Geology of the San Juan Expedition" (1875); "Our Later Extinct Floras" (1869); "Catalogue of the Plants of Ohio" (1860); "Circles of Depositions in American Sedimentary Rocks" (1873); "Palæozoic Fishes of North America" (1889); etc. He died in New Haven, Conn., Dec. 7, 1892.

Newberry College, a coeducational institution in Newberry, S. C.; founded in 1858 under the auspices of the Lutheran Church; has endowment of over $135,000; grounds and buildings valued at over $120,000; scientific apparatus, etc., $8,000; volumes in the library, 11,000; average number of faculty, 15; average student attendance, 250; ordinary income, about $15,000.

Newbery, John, an English bookseller, intimately associated with Dr. Johnson, Goldsmith, Christopher Smart, Smollett, and many other men of letters; born in Waltham, St. Lawrence, England, about midsummer, 1713. He had first a shop for general wares at Reading, and about 1744 settled in London as a vender of books and medicines. He was the first to publish popular little books for children, and he was himself, in conjunction with Giles and Griffith Jones (1722–1786), and perhaps Goldsmith, part author of some of the best of the series, as the histories of "Goody Two-Shoes," "Giles Gingerbread," and the "Travels of Tommy Trip." In Goldsmith's "Vicar of Wakefield," John Newbery has been immortalized as "the philanthropic bookseller in St. Paul's Churchyard, who has written so many little books for children. He called himself their friend, but he was the friend of all mankind." He died in London, Dec. 22, 1767.

Newborn, the name of a sect of Antinomians, which had a short existence in the United States in the early part of the 18th century. Its founder was a German immigrant, named Mathias Bowman (who died 1727). They held the doctrine of the deification of humanity, with its consequence of denying that any act could be sinful in persons so deified.

New Brighton. See STATEN ISLAND.

New Britain, a city in Hartford co., Conn.; on the New York, New Haven, and Hartford, and the New York and New England railroads; 10 miles S. W. of Hartford. Here are a high school, State Normal School, public library, New Britain Institute, hospital, electric lights, street railroads, waterworks on the gravity system, daily and weekly newspapers, and several National banks. It has manufactories of hardware, electrical supplies, hosiery, cutlery, gas and water motors, steam engines and boilers, bolts and hinges, malleable castings, plain and fancy locks, machine needles, brick, edge tools, wood screws, etc. The assessed property valuation exceeds $10,000,000. Pop. (1890) 16,519; (1900) 25,998; (1910) 43,916.

New Britain, New Pommeru, or **New Pomerania,** the largest of a group of islands in the Pacific Ocean; occupied by Germany; belongs to the Bismarck Archipelago; is 300 miles in length and has an area of 12,000 square miles. The inhabitants, of whom the number is unknown, are good agriculturists, but still practise cannibalism to some extent. The Germans, since their occupation of the island, have started cotton plantations.

New Brunswick, a province of the Dominion of Canada, on the E. coast of North America; bounded W. by the State of Maine; N. W. by the province of Quebec; N. by Chaleur Bay; E. by the Gulf of St. Lawrence and Northumberland Strait, the latter separating it from Prince Edward Island; and S. by the Bay of Fundy and part of Nova Scotia; area, 28,200 square miles; pop. (1901) 351,120.

The coast line is interrupted only at the point of junction with Nova Scotia, where an isthmus of not more than 14 miles in breadth connects the two territories, and separates Northumberland Strait from the Bay of Fundy, which it is proposed to unite by means of a canal. The general surface of the country is level, but hilly in the N. W. The principal rivers are the St. John, 450 miles in length, and navigable

for vessels of 100 tons to Fredericton, 90 miles from its entrance into the Bay of Fundy; and the Miramichi, 225 miles in length, which falls into the bay of the same name, and is navigable for large vessels 25 miles from the gulf. There are a number of lakes, the largest, Grand Lake, being 25 miles long by about 5 miles broad. Coal is plentiful, and iron ore abundant; the former is said to extend over 10,000 square miles or above one-third of the whole area. The climate, like that of other portions of Canada, is subject to extremes of heat and cold, but is, on the whole, healthy. After agriculture, lumbering and fishing are the main occupations of the inhabitants, though many are engaged in mining and manufacturing. A very large portion of the soil is adapted for agriculture, but only a small part is developed. Cereals are largely grown and the fruit industry is important. Great attention is given to the improvement of live stock.

New Brunswick is one of the most amply wooded countries in the world, and the forests supply three-fourths of the total exports. The fisheries are very valuable. In 1899 they yielded over $4,000,000. The minerals exported include coal, gypsum, antimony ore, copper ore, manganese, plumbago, and unwrought stone. Owing to its cheap coal and proximity to the markets of the world, New Brunswick is expected to develop as a manufacturing country, especially now that the railway system has been completed throughout the interior of the province.

The province is divided into 15 counties, and is administered by a lieutenant-governor, an executive council consisting of seven members, a legislative council of 18 members appointed for life, and a Legislative Assembly of 45 (1901) representatives. The province has 10 seats in the Dominion Senate and 16 in the House of Commons. Religion is abundantly provided for, as is education, both high and elementary. The latter is free, but not compulsory. New Brunswick was discovered by Sebastian Cabot in 1498; it formed, with Nova Scotia, the French colony of Acadia (1604–1713); was twice ceded to the British (1713 and 1763); received Tory settlers from the United States at the close of the Revolution; was erected into a separate province in 1786; was granted responsible government in 1848; and in 1867 became an original province of the Dominion of Canada. The capital is Fredericton, but the chief commercial center is St. John (pop. 40,711), which has one of the finest harbors on the North Atlantic.

New Brunswick, a city and county-seat of Middlesex co., N. J.; on the Raritan river, the Delaware and Raritan Canal, and the Pennsylvania railroad; 32 miles S. W. of New York. Here are Rutgers College (Reformed), Theological Seminary of the Reformed Church, Wells Memorial Hospital, electric street railroads, daily and weekly newspapers, and several National banks. The principal manufactures are hosiery, carpets, wallpaper, shoes, harness, india-rubber goods, medical supplies, cigars, boilers, etc. The property valuation exceeds $10,000,000. Pop. (1900) 20,006; (1910) 23,388.

Newburgh, a city of New York; situated in Orange co., on the Hudson river, and on the West Shore and the Erie railroads, 60 miles N. of New York city. Newburgh is built on sloping ground rising 300 feet above the river. It contains St. Luke's Hospital, a public library, an academy, National and savings banks, Home for the Friendless, Home for Children, waterworks, and electric light and street railroad plants. It is a shipping point for grain, dairy products, flour, coal, etc., and has flour, cotton, woolen, plaster, and paper mills, tanneries, foundries and machine shops, and other manufactories. Washington's Headquarters (the "Hasbrouck House") is owned by the State and is used as a museum for Revolutionary relics. On the grounds is the "Tower of Victory," commemorating the close of the Revolutionary War. Here were circulated the "Newburgh Addresses," letters urging action to redress the wrongs of Revolutionary soldiers, and here the American army was disbanded in 1783. Pop. (1900) 24,943; (1910) 27,805.

Newbury, a thriving market-town of Berkshire, England, on the Kennet, 17 miles W. by S. of Reading, and 55 from London. It has an old church built in the reign of Henry VII. The grammar school claims King John for its founder (1216). The town has many ancient and wealthy charities. It was incorporated by Elizabeth in 1596. Two hard-fought battles took place here in the Great Rebellion — one in 1643; the other in 1644.

Newburyport, a city, port of entry, and one of the county-seats of Essex co., Mass.; on the Merrimac river, and on the Boston and Maine railroad; 37 miles N. E. of Boston. It contains the Putnam Free School, Anna Jacques Hospital, high school, public library, an Old Ladies' Home, Marine Museum, the house in which William Lloyd Garrison was born, the Old South Church, where the remains of Whitefield are buried, electric light and street railroad plants, daily and weekly newspapers, and National and savings banks. It has manufactories of machinery, cotton goods, boots and shoes, fiber braid, collars and cuffs, hats, combs and brushes, and silverware, and an assessed property valuation of over $10,000,000. Pop. (1900) 14,478; (1910) 14,949.

New Caledonia, an island in the Pacific Ocean; about 800 miles E. of Australia. It is of volcanic origin and is surrounded by sand bars and coral reefs. It was discovered by Captain Cook in 1774, and appropriated by the French as a convict settlement in 1854. The capital is Noumea, near the S. end of the island, with a fine harbor. The island is mountainous, well watered and wooded, and yields coffee, maize, tobacco, sugar-cane, grapes, mamoc, and pineapples. Stock-raising is an important industry. The climate is hot but healthy. There are nickel mines, and also mines of copper and cobalt, considerable quantities of which are raised and exported, as also chrome, copra, coffee, etc. With the adjacent Loyalty Islands the area is estimated at 7,700 square miles. The native population, of Melanasian race, and cannibals, has diminished greatly since the French occupation. The attempt of the French to work the settlement both as a free and as a penal colony has not succeeded, and the frequent escape of convicts to Australia has been a source of trouble and international dispute. Pop. (1901) 51,415, of whom 12,253 were free Europeans.

Newcastle, a city in Newcastle co., Del.; on the Delaware river and on the Philadelphia, Wilmington, and Baltimore railroad; 5 miles S. of Wilmington. It has a fine harbor in which navigation is open nearly all the year. The city contains a State bank, public library, and several daily and weekly newspapers; and has manufactories of woolen goods, agricultural implements, piping, and rolling-mill products, and an assessed property valuation of about $1,400,000. Pop. (1890) 4,010; (1900) 3,380.

Newcastle, a city and county-seat of Lawrence co., Pa.; at the confluence of the Neshannock and the Shenango rivers, and on the Pittsburg and Lake Erie, the Pennsylvania, the Erie, the Pittsburg and Western, and the Western New York and Pennsylvania railroads; 50 miles N. E. of Pittsburg. It contains the Shenango Valley Hospital, waterworks, electric street railroads, gas and electric lights, daily and weekly newspapers, and several National banks. It is in a section rich in sandstone and limestone, iron ore, fire clay, and bituminous coal. It has manufactories of sewer pipe, glass, fire brick, iron, steel, boilers, wire nails, coke, tin plate, etc., and an assessed property valuation of over $13,000,000. Pop. (1900) 28,339; (1910) 36,280.

Newcastle-under-Lyme, a parliamentary and municipal borough of Staffordshire, England, on the Lyme brook, 147 miles N. W. by N. of London. Brewing, malting, and the making of paper and army clothing are the principal industries, while the surrounding district is noted for its potteries, and numerous coal mines are worked. Pop. (1901) 19,914.

Newcastle-upon-Tyne, a city in Northumberland co., England, on the Tyne, 54 miles E. of Carlisle. It is built on an acclivity extending along the river on the site of an old Roman camp. The principal buildings are St. Nicholas' Church, the Mansion House, the Trinity House, Exchange, and Moot Hall. In Grey street is erected a column 136 feet high, and surmounted by a colossal statue of Earl Grey. The chief manufactures are glass, pottery, chemicals, iron, tin, and other metal goods. Ship building is carried on largely. Its importance is mainly owing to the coal trade from the mines along both banks of the Tyne. In 1891 there were 123,404 persons variously employed in the coal trade of the city. The proverbial expression, "Carrying coals to Newcastle," bears allusion to this city. The port of Newcastle is fourth in rank in Great Britain. Pop. (1901) 215,328.

New-chwang, or **Niu-chwang,** a city of China, province of Manchuria, on the Liao river, 20 miles from its mouth and 120 from Mukden. By the treaty of Tientsin (1858) New-chwang was opened to foreign trade. From the accumulation of alluvial soil in the lower reaches of the river, vessels are obliged to load and discharge at Ying-tzu, at its mouth. It is there the Europeans are settled, and they call Ying-tzu by the name of the treaty port New-chwang —which latter is now a greatly decayed place. Ying-tzu imports cotton, woolen, and silk goods, sugar, paper, metals, opium, tobacco, etc.; total value of imports in 1898, $2,339,942; and exports beans, silk, ginseng, skins, and horns; total value of exports in 1898, $11,562,372. The import of Indian opium has fallen from $2,860,000 in 1866 to $40,000. Large quantities of salt are manufactured in the vicinity. The port was captured by the Japanese in March, 1895; in 1896 provision was made for connecting it with the Siberian railway. The port is closed four or five months from November with ice. Since 1872 Scotch Presbyterian missionaries have been working here; there is also a Roman Catholic mission. Pop. (1908) 52,000. See MANCHURIA.

Newcomb, Simon, an American astronomer; born in Wallace, N. S., March 12, 1835; was educated by his father; came to the United States in 1853; taught in Maryland for two years; studied at the Lawrence Scientific School in Cambridge, graduating in 1858. In 1861 he was appointed Professor of Mathematics in the United States navy and assigned to the United States Naval Observatory in Washington. While there he negotiated the contract for the 26-inch telescope authorized by Congress, and

supervised its construction. He was connected with the "American Ephemeris and Nautical Almanac"; associated with the equipment of the Lick observatory in California; was secretary of the commission appointed by the United States government to observe the transit of Venus, Dec. 9, 1874; and in 1884 became Professor of Mathematics and Astronomy at Johns Hopkins University. He contributed largely to astronomical literature, especially along mathematical lines. For years he was editor of the "American Journal of Mathematics." He received the Copley, the Huygens, the Royal Society, and the Bruce medals; was an officer of the French Legion of Honor; and the only American since Franklin to be chosen an associate of the Institute of France. Among his numerous books are: "Popular Astronomy" (1878); "Geometry" (1880); "Calculus" (1884); etc. He died July 11, 1909.

Newcomen, Thomas, an English inventor; born in Dartmouth, England, in 1663. In 1705, with Cawley, a Dartmouth glazier, and Savary, the manager of a Cornish mine, he obtained a patent for what is now known as the atmospheric steam engine. Some six years later his invention was brought to use for pumping water out of mines. The mechanism employed by Newcomen was so different from that previously used that he may be considered the inventor of the first real steam engine. He died in London, in 1729.

New Connecticut, a nickname for the WESTERN RESERVE (*q. v.*).

New Dongola. See DONGOLA, NEW.

Newell, Robert Henry, ("ORPHEUS C. KERR"), an American humorist; born in New York city in 1836. He was connected with the New York "Mercury" and "World," and was editor of "Hearth and Home" from 1874 to 1876. Among his works are: "The Orpheus C. Kerr Papers" (1862–1868); "The Palace Beautiful, and Other Poems" (1864); "The Cloven Foot," a travesty of Dickens's "Edwin Drood" (1870); "Versatilities" (1871); "There Was Once a Man" (1884). He died in Brooklyn, N. Y., in August, 1901.

Newell, William Augustus, an American physician; born in Franklin, O., Sept. 5, 1817; was graduated at the Medical Department of the University of Pennsylvania in 1839; began practice in New Jersey; was a member of Congress in 1847–1851 and 1865–1867, and introduced into Congress the bill under which the UNITED STATES LIFE SAVING SERVICE (*q. v.*) was founded, in 1848. Through his efforts also the Delaware breakwater was constructed, the United States Agricultural Bureau established, and the Mount Vernon estate was purchased. He was governor of New Jersey in 1857–1859; superintendent of the United States Life Saving Service in 1860–1864; governor of Washington Territory in 1880–1884; and surgeon in the Washington State Soldiers' and Sailors' Home in 1894–1898. He died in Allentown, N. J., Aug. 8, 1901.

New England, a collective name given to the six Eastern States of the United States of America, Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut, embracing an area of 66,400 square miles. The area of New England is one-fiftieth of the total area of the United States.

New Forest, a triangular district of Southwest Hampshire, England, 9 miles S. W. of Southampton, bounded W. by the river Avon, S. by the Solent and English channel, and N. E. by Southampton Water. It measures about 14 by 16 miles, and has an extreme area of 144 square miles, or 92,365 acres, of which, however, only 64,232 belong to the crown. The district seems to have been wooded from the earliest times; its present name dates from 1079, when the Conqueror here made a "mickle deer-frith," and cleared away several hamlets. This afforestation, enforced by the savage "Forest laws," was regarded as an act of the greatest cruelty; and the violent deaths met by two of his sons, Richard and William Rufus, of whom one was killed here by a stag, and the other by an arrow, were looked on as special judgments. The deer were removed under an act of Parliament (1851); and under another of 1877 the New Forest now is managed by the court of Verderers as a public pleasure ground and cattle farm.

***Newfoundland,** an island and British colony of North America; in the Atlantic Ocean at the mouth of the Gulf of St. Lawrence, and separated from Labrador on the N. by the straits of Belle Isle. The island is 370 miles in length, 290 in breadth, and about 1,000 in circumference; area, 42,200 square miles; pop. (1901) 217,037; capital, St. Johns.

About a third of the area of the island is occupied by lakes and ponds. The coast provides a large number of excellent and sheltered harbors. The plains abound with herds of the caribou deer; these with bears, wolves, foxes, and beaver, form the principal fauna of the island, which is a favorite resort for sportsmen. In winter the cold is severe. Much of the soil, especially in the S., is unproductive; grain and root crops are the most important agricultural products; large areas are adapted to stock raising. The chief resources of the inhabitants have been in the past the cod, seal, and salmon fisheries, these industries being the most extensive of the kind in the world.

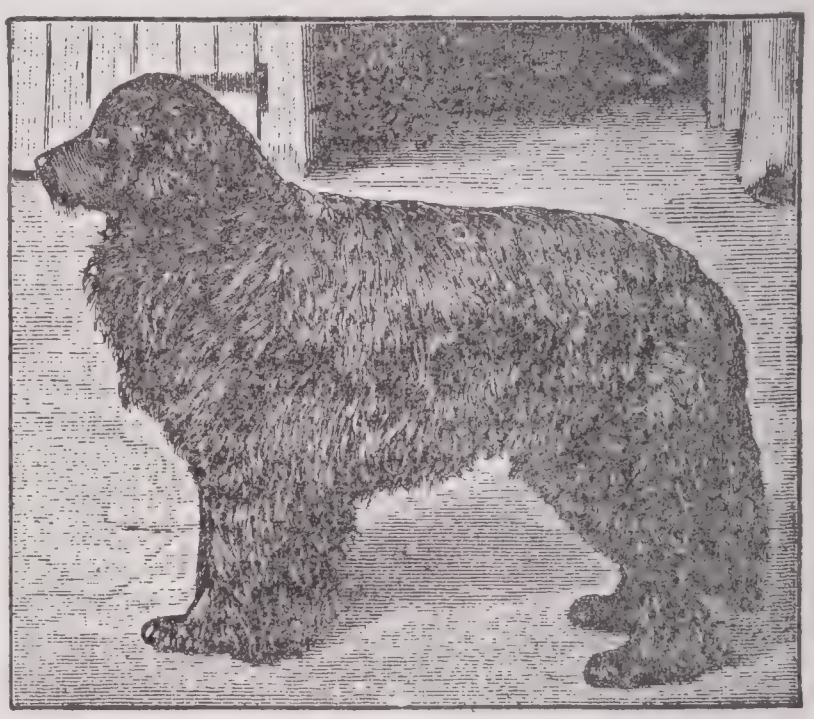
*For Map, see CANADA.

The fisheries are of two classes, those of the shore and those at the "banks." The latter term comprises a tract from 500 to 600 miles in length and about 200 in breadth. The mines are rapidly overtaking the fisheries in importance. Lead, silver, gold, copper, coal, and iron are found, Newfoundland producing a large proportion of the world's copper. Manganese exists in extensive deposits.

Newfoundland was discovered by John Cabot in 1497. In 1583, Sir Humphrey Gilbert took possession in the name of England and in 1621 Calvert made a settlement in the peninsula of Avalon. Representation was granted in 1832. In 1854 the present form of government was established. Newfoundland forms, with the department of Labrador, a crown colony. It is administered by a governor, assisted by an executive council, and a House of Assembly of 36 members.

Soon after the discovery of Newfoundland, French fishermen frequented the "banks" in larger numbers than the English, and Great Britain did not take formal possession till 1583. The first permanent settlement was made in 1623. Before the treaty of Utrecht (1713), which ceded the island to Great Britain, the French and English had frequent conflicts over the right of possession. Fishing rights were conceded to the French, and this led to long and bitter disputes which have interfered with the development of the island. The French claim the exclusive right to fish from Cape John on the E. coast, around the N. coast, to Cape Ray on the W. Great Britain has never admitted this claim. The position maintained by the French has prevented the development of the mineral resources on the N. coast. In March, 1890, a *modus vivendi* was concluded between the French and British governments, remaining in force till December 31, 1900. It caused great dissatisfaction among the people of the island. A Royal Commission, appointed in August, 1898, decided that part of the French claims should be removed by purchase or concession; that the lobster fisheries should be arranged on the same basis; that the French should be furnished free bait, on abandonment of their bounties (to expire in 1901); that they should be prohibited from interfering with the "Treaty Shore," and that smuggling should be suppressed. On the outbreak of the war in South Africa, the colony on its own initiative renewed the *modus vivendi*, in order to relieve the home government and to prove its loyalty. A new *modus vivendi* was concluded, March 27, 1901, to remain in force till the close of the year.

Newfoundland Dog, a well-known variety of *Canis familiaris;* according to Youatt it is simply a large spaniel. It is supposed to have come originally from Newfoundland, where it is employed by the natives as a beast of burden. It is the largest, the most courageous, and by far the most intelligent of the waterdogs, and has considerable webs between the toes. The hair, usually black or black and white, is thick and curly, more flowing but not so thick as in the spaniel and retriever.



NEWFOUNDLAND DOG.

New France, Canada, thus named, formerly, having been first colonized by Frenchmen.

Newgate, a celebrated London prison, standing at the W. extremity of Newgate street, opposite the Old Bailey. The exterior presents high dark stone walls, without windows. It was long the chief criminal prison of city and county, but is no longer used for prisoners to be tried at the Central Court, and is in the hands of the Court of Aldermen. The earliest prison here was in the portal of the "new gate" of the city as early as 1218; hence the name. About two centuries afterward it was rebuilt by the executors of Sir Richard Whittington, whose statue with a cat stood in a niche, till its destruction by the great fire of London, in 1666. The present edifice was erected in 1780, but the new buildings were greatly damaged by fire in the Gordon Riots of that year, when 300 prisoners, felons as well as debtors, were released and let loose upon the public. This awful scene is described by Dickens in "Barnaby Rudge." After the passing of the Prisons Bill in 1877, Newgate, being considered a very costly and redundant establishment, was gradually disused, and is now, except during ses-

sions or when the gallows is in requisition, practically closed. The "Newgate Calendar" contains biographical notices of the most notorious murderers, burglars, thieves, and forgers who have been confined within its walls.

New Glasgow, a town in Pictou co., Nova Scotia; on the East river, and on the Nova Scotia railroad; 9 miles S. E. of Pictou. It is in the heart of an immense coal and iron region; contains a high school, exhibition building, Y. M. C. A. building, many churches, and several chartered banks, and has important industries, including steel and iron works, foundries, mineral water and wood working factories, etc. New Glasgow has a high altitude, a pure and bracing air, and is a popular summer resort. Pop. (1901) 4,447.

New Guinea, or **Papua,** a large island in Australasia, next to Australia the largest on the globe; area, 305,900 square miles; length about 1,500 miles, breadth from 200 to 400. It is separated from Australia on the S. by Torres Strait, and from the Moluccas on the W. by Gilolo Passage.

The coasts are for the most part lofty, with mountains coming close to the sea, but in the neighborhood of Torres Strait the shore presents the appearance of a marshy flat covered with dense forests. In the interior there are still loftier mountains, covered with perpetual snow, and volcanoes. In the S. E. end Mount Owen Stanley rises to the height of 13,205 feet; farther W. and near the N. coast Mount Schopenhauer reaches 20,000 feet. The island is rich in tropical products, possesses a copious and peculiar flora and fauna (birds of paradise being especially numerous and gorgeous), and is suitable for tropical agriculture. The coast is miasmatic in many places; the mountainous interior is reported healthier. On the W. coast there are numerous Malay settlements, but the bulk of the inhabitants are Papuas, a race resembling the negroes of Guinea. Some are disposed to be friendly, others are fierce and intractable.

The discovery of New Guinea was made by the Portuguese early in the 16th century, but little was known of it till recently. The naturalists were the first to make incursions into its interior, and among these A. R. Wallace, who visited it in 1858, was the pioneer. The missionaries came next, and mission stations have been formed by Germans on the N. E. coast, and by the London Missionary Society at various points on the S. E. coast. Germany and the Australian colonies also began to take an interest in New Guinea, and the latter urged the home government to annex the E. part of the island, the W. portion having long been recognized as Dutch. At length the delimitation and division of the island between Great Britain, Germany and Holland was settled in 1885. That part of the island lying W. of the 141st meridian was assigned to Holland, and comprises 151,789 square miles; the N. part of the rest of the island is assigned to Germany, and the S. to Great Britain. The German territory, called Kaiser Wilhelm's Land, contains about 70,000 square miles, the English territory, 90,540 square miles.

The government of the British portion is in the hands of an administrator appointed by the crown, assisted by an executive and a legislative council. New South Wales, Victoria, and Queensland each contribute to the expense of the government. Land cannot be purchased except from the administrator. The deportation of the natives is forbidden, as is also the sale to them of firearms, intoxicating spirits, or opium. The official center is Port Moresby. The islands of Torres Strait, which are the seat of a valuable pearl-shell and trepang fishery, and which practically command the strait, have all been annexed to Queensland. A German chartered company whose object is to develop the resources of the country has stations in German New Guinea, where also the sale of firearms, gunpowder, and spirits is forbidden. The Dutch have done little or nothing for their portion of the island. The population of the Dutch portion is estimated at 200,000; of the German, 110,000; of the British, 350,000.

Newhall, Charles Stedman, an American author; born in Boston, Mass., Oct. 4, 1842. He became a clergyman, filled a college professorship and became superintendent of Forest Reserves of Northern and Central California. Besides a series of books on the trees, shrubs, and vines of Northeastern America, he wrote several books for young people; also "Sheep and the United States Reserves."

***New Hampshire,** a State in the North Atlantic Division of the North American Union; bounded by Maine, Massachusetts, Vermont, Quebec, and the Atlantic Ocean; one of the original 13 States; capital, Concord; number of counties, 10; area, 9,005 square miles; pop. (1890) 376,530; (1900) 411,588; (1910) 430,572.

Topography.—The surface of the State is rugged. The Appalachian range of mountains enters the State from Maine, and as the White Mountains crosses the State diagonally with a maximum elevation in Mount Washington of 6,285 feet. Along the W. part of the State these mountains dwindle down to a range of hills. The White Mountain district is divided by the Saco and Lower Ammonoosuc river valleys, and the "Notch" into the White and Franconia ranges. This region presents magnificent scenery and is known as the "Switzerland of America." Besides Mount

*For Map, see VERMONT.

New Hampshire

Washington, there are 28 other peaks, over 4,000 feet high. The river system is divided into five drainage basins. The Connecticut river, forming the entire Vermont boundary line, and fed by the Upper and Lower Ammonoosuc, Mascona, Sugar, and Ashuelot rivers, drains the entire W. part of the State. The Androscoggin river, rising in Lake Umbagog, drains the N. E., and the E. mountain district is drained by the Saco. The Piscataqua, with its tributaries, the Salmon Falls, and the Cocheco, forms a S. E. basin. The mouth of this river forms the harbor of Portsmouth, the only harbor on the New Hampshire coast. The Merrimac river, formed by the junction of the Pemigewasset and Winnipiseogee flows through a region of manufacturing cities to which it supplies unlimited water power. There are numerous beautiful lakes and ponds in the State, the largest being Winnipiseogee. Other lakes are the Umbagog, Squam, Sunapee, Great Bay, New Found, Connecticut, and Diamond lakes.

Geology.— The principal geological formations of New Hampshire are of Eozoic origin, this State being one of the first portions of the American continent to appear above the primal ocean. Terminal moraines and bounders illustrate the Glacial period, and deposits of Laurentian, Labradorian, Huronian, and Atlantic periods are also present. Magnetic and specular iron ore are found in places, and some copper is mined in the towns of Lyman and Monroe. Gold and silver have been found in quartz and gold is washed from brook sands. Mica is the principal mineral product, amounting in 1900, to 191,118 pounds of sheet mica, and 645 short tons of scrap mica. New Hampshire ranks first in the United States in this product with nearly one-third the entire output. Granite to the value of $870,646, was also quarried. Other mineral products include plumbago, beryl, brick clays, slate, limestone, and colored porphyries.

Soil and Productions.— The soil is light and sandy and with the exception of the Connecticut valley and portions of Coos county is not adaptable to farming. The soil is as a rule, worn out from constant tillage and makes much better pasturage than farmland. The agricultural interests have of late been turned to stock raising and dairy farming. Large quantities of maple sugar and syrup are produced. The principal farm products are hay, rye, wheat, oats, potatoes, and buckwheat. The forest trees include several varieties of pine, hemlock, spruce, and maple, oak, beech, birch, elm, hickory, butternut, chestnut, poplar, cherry, ash, and moosewood.

Manufactures.— In common with other New England States, the industrial interests of New Hampshire are devoted to manufacturing. The abundant water power produced by the Merrimac river makes Central and Southern New Hampshire one of the most important manufacturing sections of the country. In 1900 there were reported 4,671 manufacturing establishments, employing $101,000,000 in capital, and 70,000 persons, and having finished products valued at $118,000,000. The principal products were cotton and woolen goods, boots and shoes, hosiery and knit goods, leather, machine shop and foundry products, paper, flour, clothing, furniture and wood pulp. Manchester is noted for having the largest cotton mill in New England. Farmington for its boot and shoe factories, Berlin for wood pulp and lumber, and Dover for woolen mills.

Banking.— On Oct. 31, 1901, there were reported 56 National banks in operation, having $5,380,000 in capital, $4,597,769 in outstanding circulation, and $4,361,700 in United States bonds. There were also 10 State banks with $610,000 capital, and $113,907 surplus; and 6 loan and trust companies with $435,000 capital and $38,000 surplus.

Education.— At the end of the school year 1898–1899 the children of school age numbered 90,910, the enrollment in public schools, 65,193, and the average daily attendance, 47,733. There were 2,970 school teachers, 1,902 buildings used for public school purposes, and public school property valued at $3,658,143. The receipts for the year amounted to $999,556 and the expenditures $1,051,265. For higher education there were 52 public high schools; 31 private secondary schools; the State Normal School, at Plymouth; Dartmouth College, at Hanover, St. Anselm's College, at Manchester, and the New Hampshire College of Agriculture and Mechanic Arts, at Durham.

Churches.— The strongest denominations in the State are the Roman Catholic, Congregational, Methodist Episcopal, Regular Baptist, Free Will Baptist, Unitarian, Protestant Episcopal, Advent Christian, Christian, and Universalist. In 1899 there were 610 Evangelical Sunday-schools with 6,200 officers and teachers and 57,600 scholars.

Postoffices and Periodicals.— In 1901 there were 568 postoffices of all grades, and 98 periodicals, of which 14 were daily, 1 tri-weekly, 72 weekly, 1 semi-monthly, 9 monthly, and 1 quarterly.

Railroads.— On Jan. 1, 1901, the total length of railroads within the State was 1,193 miles, of which 19 miles was completed during the previous year.

Finances.— On June 1, 1901, the total funded debt was $995,300; trust funds, $786,023; total debt, $1,781,323. The net debt was $1,008,633; assets, $785,162; floating debt, $12,472. The assessed prop-

erty valuation, including taxable savings, bank savings, and insurance capital, in 1900 amounted to $295,562,474.

State Government.—The governor is elected for a term of two years and receives a salary of $2,000 per annum. Legislative sessions are held biennially, beginning on the first Wednesday of January, and are unlimited as to length. The Legislature has 24 members in the Senate, and 997 in the House, each of whom receives $200 per annum and mileage. There are 2 representatives in Congress. The State government in 1901 was Republican.

History.—New Hampshire was settled in 1629, by an English colonist named Mason, under a grant made in 1623. In 1641 New Hampshire became a portion of the Colony of Massachusetts; who maintained her authority there till 1679, when the case being brought before the highest court of appeal in England on colonial matters, it was decided that the claim of Massachusetts was illegal, and New Hampshire was constituted a separate province. In 1686, the charter of Massachusetts having been annulled, New Hampshire, Maine, Massachusetts, and Narragansett were united in one royal province, under President Dudley, and afterward under Governor Andros. In 1689, upon news of the English Revolution, the government of Andros was overthrown, and Massachusetts resumed her old charter. In 1692, the province of New Hampshire was reëstablished by the English government. In 1776, the province issued a public declaration of independence, and organized a temporary government. After taking a prominent and distinguished part in the War of the Revolution New Hampshire, in convention (1788), gave in her adhesion to the United States Constitution by a majority of 11 votes in an assembly numbering 103; and in 1807, the seat of government was permanently established at Concord. On July 1, 1869, the State ratified the 15th amendment to the National Constitution. CHESTER B. JORDAN.

New Hanover, an island of the Bismarck archipelago; off the N. E. coast of New Guinea, with an area of 570 square miles. Its physical characteristics resemble those of NEW BRITAIN (*q. v.*).

New Harmony, a town in Posey co., Ind., on the Wabash river and the Peoria, Decatur, and Evansville railroad; 15 miles N. of Mount Vernon, the county-seat. It was first settled in 1815 by a German community of religious socialists, called Harmonists, under the leadership of GEORGE RAPP (*q. v.*). In 1824 the village and domain was purchased by Robert Owen, for an experimental community founded on his system; but the society failed. Pop. (1900) 1,341.

New Haven, a city and county-seat of New Haven co., Conn.; at the head of New Haven Bay, 4 miles from Long Island Sound, and on the New York, New Haven, and Hartford railroad; 36 miles E. of Hartford. The city is the largest and most important city in the State.

Business Interests.—New Haven has daily steamboat connection with New York and carries on a large export trade. The manufacturing industries are extensive, and some of them of world-wide reputation. They include perfumery, tin plate, corset-trimmings, carriage trimmings, iron, steel, firearms, clocks, carriages, cutlery, india-rubber goods, musical instruments, edge tools, etc. There are 7 National banks, several State and savings banks, and a large number of daily, weekly and monthly periodicals. The assessed property valuations exceed $113,500,000, and the total bonded debt is about $2,260,000.

Public Interests.—New Haven has an area of 12½ square miles, 200 miles of streets, of which 65 miles are paved; a system of waterworks, with 165 miles of mains; and a sewer system covering 95 miles. The streets are lighted by gas and electricity at a cost of over $68,000 per annum; the police department costs annually about $185,000, and the fire department, about $113,000. There is a public school enrollment of over 16,000 pupils and the annual expenditure for public education is about $450,000. The annual cost of maintaining the city government averages $1,800,000. New Haven is the seat of YALE UNIVERSITY (*q. v.*), a Training School for Nurses, a Manual Training School, a Normal Training School, and of the Hopkins Grammar School (the oldest preparatory institution in the United States). The city also contains Protestant and Roman Catholic Orphan Asylums, Home for Aged Women, Dispensary, Home for the Friendless, Springside Almshouse, several hospitals, public library, Hillhouse High School, and numerous high grade seminaries and academies.

History.—New Haven was settled in 1638 by a company from London, under the Rev. John Davenport and Theophilus Easton. It formed a separate colony till, in 1662, it was united to the Connecticut colony. On July 5, 1779, it was captured and plundered by the British under General Tryon. After the Revolutionary War commerce increased rapidly, but was greatly crippled by the Embargo Act and the War of 1812. New Haven received its city charter in 1784, and for a long time prior to 1873 was one of the State capitals. Pop. (1900) 108,027; (1910) 133,605.

New Hebrides, a group of islands in the Pacific Ocean, W. of the Fiji islands, from lat. 14° to 20° S., lon. 167° to 170° E.;

area, est. at 3,500 square miles. The largest ones are Mallicollo, and Espiritu Santo. One, Tanna, has an active volcano; and in consequence probably of volcanic action, Aurora, one of the most fertile, sank out of sight in 1871. They are wooded and hilly, ebony and sandalwood being obtained; and their chief products are yams, bananas, cocoanuts, and sweet potatoes. The chief animal is a small pig, not larger when full-grown than a rabbit. The native inhabitants, belonging to the Papuan race, are in general degraded and very ferocious, except on Annatom, where there are Christian missions. These islands, according to the Anglo-French convention of 1887, are under the control of a mixed commission of French and British naval officers. Pop. 75,000.

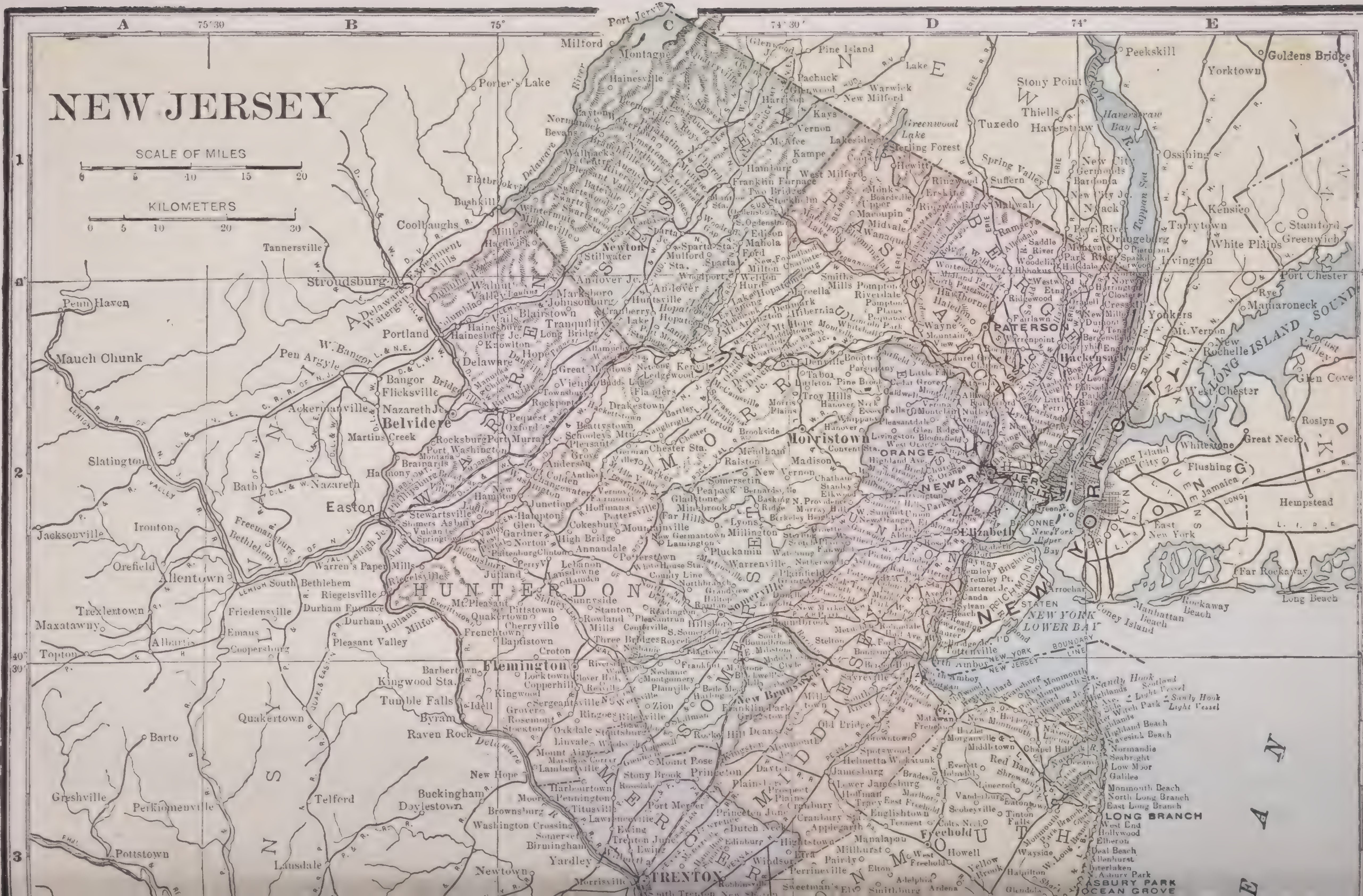
New Ireland, now NEU-MECKLENBURG, a long narrow island in the Pacific Ocean, N. E. of New Guinea; area, 4,900 square miles; length 300 miles; width, 15 miles. The hills rise to 6,500 feet, and they and the whole of the interior are richly wooded. The climate, products, and inhabitants resemble those of NEW BRITAIN (*q. v.*).

New Jersey, a State in the North Atlantic Division of the North American Union; bounded by New York, Pennsylvania, Delaware, the Atlantic Ocean and Delaware Bay; one of the original 13 States; number of counties, 21; capital, Trenton; area, 8,224 square miles; pop. (1900) 1,883,669; (1910) 2,537,167.

Topography.— New Jersey is divided into two distinct geographical divisions, the N. portion being undulating and hilly, and the S., a low sandy plain. The N. half of the State is crossed by three parallel mountain ranges running in a S. W. direction. The Blue Ridge or Kittatinny, and the Highland ranges, are part of the Appalachian chain and the third or Orange Mountains belong to a series of low ridges traced from Massachusetts across Connecticut, New Jersey and Pennsylvania. The Blue Ridge crosses the Delaware river at the Delaware Water Gap, where its altitude is 1,486 to 1,625 feet. The greatest altitude in the State is High Point, near the New York State line, 1,804 feet. Between the Blue Ridge and Highland ranges is the Kittatinny valley, 10 to 13 miles in width, and noted for its agricultural advantages. The Highland Range is in reality a deeply dissected plateau or tableland, its semi-detached portions being known as mountains, among which the highest are Hamburg Mountain, 1,488 feet, Wawayanda Mountain, 1,450 feet, Schooley's, Musconetcong, and Green Pond Mountains. The Orange Mountains are three parallel ridges of trap rock known as the First and Second Mountains, and Lang Hill, separated by narrow valleys, underlaid by sandstone. A ridge of trap extends along the New Jersey shore of the Hudson river, known as the Palisades, and is world renowned for its scenic beauty. The Navesink Highlands, a group of sandy hills S. of Sandy Hook, and other detached hills to the S. W. rise to a height of nearly 400 feet. The entire S. portion of the State is an undulating plain gradually decreasing in altitude toward the Atlantic Ocean and Delaware river. The W. portion of the State is bounded and drained by the Delaware river. The Hudson flows along the E. boundary for 30 miles but receives no drainage. The principal rivers of the State are the Passaic which, fed by the Pompton and Rockaway, empties into Newark Bay; and the Raritan, flowing into Raritan Bay. There are numerous small rivers, and creeks flowing into the Atlantic or into small bays. Among these may be mentioned the Navesink, Shrewsbury, Tom's, Manasquan, Great and Little Egg Harbor rivers. The Atlantic coast has numerous tidal bays, and the N. part of the State abounds in mountains, lakes and ponds. Among the latter are Greenwood Lake, Budd's Lake, Lake Hopatcong, and Green Pond.

Geology.— Bands of geological formation cross the State in a N. E. and S. W. direction. With the exception of the coal measures, all the geologic ages are represented. The Azoic, represented by granite, crystalline limestone, and gneiss, is interlaced with the Palæozoic sandstone, slates, shales and magnesium limestone in the N. W. The Triassic sandstone, broken by trap and basalt ridges, occupies a belt N. W. of a line from Jersey City to Trenton. This red sandstone deposit is said to have a thickness of 14,000 feet. The Cretaceous belt is just E. of the sandstone, and includes sands, marls, clays, and mixtures of the same. The S. part of the State is of drift deposits of loam, clay, sand and gravel.

Mineralogy.— For its size New Jersey is one of the richest mineral producing States in the Union. The Azoic and Palæozoic formations in the N. W. supply a large amount of magnetic iron, magnetite ore being pratically the only kind now mined, though deposits of hematite and amanite are known. Copper ores are worked in Somerset county, and the Schuyler mine at Arlington was the first copper mine worked in the United States. The zinc mines in Sussex county are among the richest in the world. Lead, plumbago, manganese, and nickel are also found. Sand for glass-making, shell marls for fertilizers, lime for mortar and for fertilizing, procelain, potters and kaolin clays are among the more useful geographical resources. In building and paving stones New Jersey stands well, the famous Jersey sandstone is largely used for building purposes, and the gneiss-gran-


NEW JERSEY
SCALE OF MILES
KILOMETERS
HUNTERDON
MORRIS
SOMERSET
MIDDLESEX
MERCER
MONMOUTH
UNION
ESSEX
PASSAIC
BERGEN
SUSSEX
WARREN
HUDSON
NEW YORK
STATEN
NEW YORK LOWER BAY
Trenton
Newark
Paterson
Elizabeth
Morristown
Orange
Hackensack
Flemington
Belvidere
Newton
Princeton
New Brunswick
Freehold
Long Branch
Asbury Park
Ocean Grove
Red Bank
Easton
Allentown
Bethlehem
Stroudsburg
Mauch Chunk
Port Jervis
Milford
Yonkers
Flushing
Jamaica
Hempstead
Coney Island
Sandy Hook
Long Island Sound

PHILADELPHIA
Camden
Woodbury
Mount Holly
Tom's River
ATLANTIC CITY
Mays Landing
Bridgeton
Salem
Cape May Court House
CAPE MAY
Wilmington
Chester
DOVER
BURLINGTON
OCEAN
CAMDEN
GLOUCESTER
ATLANTIC
SALEM
CUMBERLAND
CAPE MAY
DELAWARE
MARYLAND
ATLANTIC OCEAN
DELAWARE BAY
DELAWARE RIVER
NEW JERSEY
DELAWARE
BOUNDARY LINE
West Longitude from Greenwich
Hammond's 8 X 11 Map of New Jersey
Copyright, 1903, by C.S. Hammond & Co., N. Y.

New Jersey

ite, limestone, blue-stone, slate and trap are all of great commercial value. The output of iron in 1900 was 344,247 long tons, valued at $956,711. The values of building stones produced were granite and trap, $1,170,555; sandstone, $198,234; slate, $13,600; and limestone, $170,006; and the clay products, $10,928,423. In the latter output the State ranks third among the United States.

Agriculture.— The soil is a sandy loam admirably adapted to agriculture and in places where it has become worked out the abundant natural fertilizers soon reclaim it. The principal forest trees are the black, white, red, and pin oaks, chestnut, hickory, beech, shagbark, maple, cedar, elm, black walnut, ash, tulip, white and pitch pine, hemlock, spruce, holly, witchhazel, ironwood, cottonwood, dogwood, birch, alder, tamarack, willow, sweet gum, and wild cherry. The sand plains in the S. raise an abundance of cranberries, and the peach, apple, pear, and berry crops of New Jersey are of great value. In 1900 the principal farm crops were corn, 8,493,012 bushels, valued at $3,821,855; wheat 122,753 bushels, valued at $85,925; hay, 499,102 tons; valued at $8,010,587; and potatoes, 3,342,015 bushels, valued at $2,005,209.

Manufactures.— The manufactures of New Jersey are very extensive and varied. Newark is one of the principal general manufacturing centers of the country. Its production of jewelry, leather, and hats, is greater than in any other city in the Union. Jersey City has extensive abattoirs, stockyards, grain elevators, steel works, and sugar refineries. Paterson is noted for its silk mills and locomotive works; Trenton for its potteries; Bridgeton, Millville, Salem and Glassboro for their glass works; Bayonne for its oil refineries and boiler works; and Elizabeth for the shipyards, sewing machines, and machine shops. In 1900 there were reported 15,481 manufacturing establishments, employing $502,824,082 capital and 257,865 persons; and having an annual production valued at $611,748,933. The principal articles manufactured included hats, pottery, drugs, refined oils, chemicals, silk, machinery, boilers, bar steel and iron, aluminum goods, celluloid, household and agricultural utensils, paper, cotton, and woolen goods, tobacco, sewing machines, glass, structural iron, clothing, brick and terra cotta, scientific apparatus, soap, leather goods, boots and shoes, saddlery, brass goods, jewelry, and hard and soft rubber goods.

Banking.— In 1901 there were reported 124 National banks in operation, having $15,518,605 in capital, $8,646,017 in outstanding circulation, and $9,991,079 in United States bonds. There were also 19 State banks with $1,653,750 capital, and $1,340,894 surplus; 1 private bank, with $50,798 in deposits and $8,832 surplus; and 33 loan and trust companies, with $6,849,100 capital, and $6,703,529 surplus.

Education.— At the close of the school year 1899–1900 there were reported 457,479 children of school age, enrollment in public schools 322,575; and the average daily attendance, 207,947. There were 7,012 public school teachers, 1,885 buildings used for public school purposes, and public school property valued at $15,634,471. The receipts for the year amounted to $8,203,329 and the expenditures, $7,094,265. For higher education there were 89 public high schools, 71 private secondary schools, State Normal School, 5 local normal schools, St. Peter's College, at Jersey City, St. Benedict's College at Newark, Princeton University, at Princeton, Seton Hall College, at South Orange, Rutgers College, at New Brunswick, Stevens Institute of Technology, at Hoboken, Drew Theological Seminary, at Madison, the German Theological School of Newark, at Bloomfield, and Bordentown Female College, at Bordentown.

Churches.— The strongest denominations in the State are the Roman Catholic; the Methodist Episcopal; Presbyterian, North; Regular Baptist; Protestant Episcopal; Reformed; African Methodist; Lutheran, General Council; and Congregational. In 1899 there were 2,329 Evangelical Sunday-schools, with 40,552 teachers and officers, and 316,650 scholars.

Postoffices and Periodicals.— In 1901 there were 929 postoffices of all grades, and 374 periodicals, of which 48 were daily, 3 semi-weekly, 282 weekly, 1 bi-weekly, 3 semi-monthly, 1 bi-monthly, 35 monthly, and 1 quarterly.

Railroads.— The total length of railroads within the State on Jan. 1, 1901, was 2,257 miles, of which 5 miles were constructed during the previous year.

Finances.— On April 1, 1901, the total bonded debt of New Jersey amounted to $71,000, falling due Jan. 1, 1902, and on Nov. 1, 1901, the cash balance in the treasury was $2,251,683. The State debt is limited by law to $100,000. The assessed property valuation in 1900 was $891,237,286, besides the canal and railroad property amounting to $223,384,249.

State Government.— The governor is elected for a term of three years and receives a salary of $10,000 per annum. Legislature meets annually on the second Tuesday in January and is not limited as to length of session. The legislature has 21 members in the Senate and 60 in the House, each of whom receives $500 per annum. There are 10 representatives in Congress under the new apportionment. In 1901 the State government was Republican.

History.—The first settlement in New Jersey was made by the Dutch at Bergen Point about 1615. Many Swedes and Danes afterward settled there but the Dutch maintained possession till 1664, when it became English property and was given to the Duke of York. He divided his grant of New Jersey between Lord Berkeley and Sir George Carteret, who named it New Jersey after the Island of Jersey where he had previously been governor. In 1682 East Jersey came under the jurisdiction of William Penn, and his partners in the Commonwealth of Pennsylvania. In 1738 on the petition of the colony to have a separate administration, Lewis Morris was made governor of New Jersey, and until the beginning of the Revolutionary War the growth of the colony was peaceful. The province adopted a State constitution in 1776, and throughout the Revolutionary War it was frequently the scene of stirring events. On its soil were fought the battles of Trenton, Princeton, Red Bank, and Monmouth. The first legislature was convened at Princeton in August, 1776, and the Federal Constitution was adopted by a unanimous vote, Dec. 18, 1787. The State capital was definitely located at Trenton in 1790. The constitution of 1776, which was superseded by another on Aug. 13, 1844, was amended in 1873 and 1875. Under the original constitution women were allowed to vote till 1807. FOSTER M. VOORHEES.

New Jerusalem, the name given by the Apostle John in the Book of Revelation to heaven.

New Jerusalem, Church of the, a religious sect founded in London, England, in 1783, on the teachings of EMMANUEL SWEDENBORG (*q. v.*). The doctrines of this Church include a belief in the Trinity, God being the infinite divine essence, Christ the human manifestation of God, and the Holy Spirit, the divine power seen in all the dispensations of God; a belief in heaven and hell, with an intermediate world of spirits where both good and bad go directly after death and are there prepared respectively for heaven and for hell; a belief in the Bible, as the repository of divine truth of which the Lord Himself is the author; though the different books were written by various inspired men. The polity of the Church is a modified episcopacy, but each congregation directs its own affairs. There are associations of congregations, and a general convention composed of delegates from the associations and a number of congregations which do not belong to any association. The Church of the New Jerusalem was founded in the United States in Baltimore, Md., in 1792, since which time it has spread to many States of the Union, but has the largest number of adherents in Massachusetts. In 1910 the official reports showed: Ministers, 131; churches, 148; members, 7,243.

New Leon, or **Nuevo Leon** (nū-ā-vō lā-ōn), a Mexican state, bounded by Cohahuila, Zacatecas, San Luis Potosi, and Tamaulipas; area, 23,592 square miles. It is mountainous but fertile, and lead, gold, silver, and salt are worked; chief town, Monterey. Pop. (1900) 327,937.

New London, a city, port of entry, and one of the county-seats of New London co., Conn., on the Thames river, 3 miles from Long Island Sound, and on the New England, the New York, New Haven, and Hartford, and the Central Vermont railroads; 50 miles E. of New Haven. Here are the Bulkely School for Boys, Williams Memorial Institute for Girls, New London County Historical Society Library, public library, hospital, United States naval station, electric street railroads, electric lights, National and State banks, daily and weekly newspapers, and waterworks. It has a shoe factory, woolen mills, silk mills, iron foundry, sewing-silk mill, cotton-gins, lumber mills, hardware works, mowing-machine works, and an assessed property valuation of nearly $10,000,000. New London is protected by Forts Trumbull and Griswold. The latter was the scene of a massacre in 1781, which is commemorated by a shaft 127 feet high. Pop. (1890) 13,757; (1900) 17,548; (1910) 19,659.

Newman, Francis William, an English scholar; born in London, England, June 27, 1805; was educated at Oxford, held professorships successively in Bristol, Manchester, New and University Colleges, remaining at the latter till his resignation in 1863. His contributions to the religious thought of his time were of far reaching influence, his most important being "The Soul." Though holding different theological views from his more famous brother, Cardinal Newman, his writings are permeated with the utmost sincerity and religious fervor. His writings embrace a large variety of subjects, among them, "Lectures on Logic" (1838); "The Difficulties of Elementary Geometry" (1841); "Catholic Union" (1844); "Crimes of the House of Hapsburg" (1851); "Royal Rome" (1852); "Hiawatha Translated into Latin" (1862); "Phases of Faith"; etc. He died in Weston-super-Mare, Somerset, England, Oct. 4, 1897.

Newman, John Henry; born in London, England, Feb. 21, 1801; was ordained in 1824, and in the following year his friend Dr. Whately having been appointed head of St. Alban's Hall, Newman was by him selected as his vice principal. He was one of the most active in commencing and carrying on the so-called Oxford movement — the

great object of which was to counteract as well the Romanizing as the dissenting tendencies of the time, by restoring and bringing into notice what Newman and his friends believed to be the catholic character of the English Church. With this view he commenced, in 1833, the series known as the "Oxford Tracts," to which he was himself one of the chief contributors; and in 1838 he also became editor of the "British Critic." In October, 1845, he was admitted into the Roman Catholic Church, a step which was immediately followed by the publication of a work on the "Development of Doctrine." Soon afterward he went to Rome, where, after some preparation, he was admitted to orders in the Roman Catholic Church; and in 1848, on his return to England, he established a branch of the Congregation of the Oratory of St. Philip Neri, of which he was himself appointed the superior. In 1852 he was appointed rector of the Catholic University established in Dublin; and in 1879 he was made a cardinal by Pope Leo XIII. Newman was an opponent of ultramontanism. Among his works written after 1845 were "Callista," a tale; "Apology for my Life," "Essay on Assent," "History of Arianism," etc. Several of his hymns are well-known, particularly "Lead Kindly Light." He died, Aug. 11, 1890.

Newman, John Philip, an American clergyman; born in New York city, Sept. 1, 1826. He was ordained a minister in the Methodist Episcopal Church in 1860, and elected bishop in 1888. He was a preacher of note in Washington, and long chaplain to the Senate. In 1873 he was sent to Asia as inspector of consulates. Among his works are: "From Dan to Beersheba" (1864); "Thrones and Palaces of Babylon and Nineveh" (1875); "America for Americans"; etc. He died July 5, 1899.

Newmarket, a market-town, lying on the border of Suffolk and Cambridgeshire, England, 14 miles E. N. E. of Cambridge and 69 N. N. E. of London. Twice almost destroyed by fire, in 1683 and 1700, it chiefly consists of one long street, and contains an unusual number of hotels and fine private houses, belonging to the great patrons of the turf. Principal edifices are the Jockey Club; the adjoining Subscription Rooms; the Proprietary Club; the Rous Memorial Hospital, with almshouses for eight jockeys and trainers or their widows; St. Mary's Church, and All Saints. The town owes its prosperity to its horseraces, as old at least as 1605; and nearly half the male population are jockeys, trainers, or stablemen (Holcroft the dramatist was once one of their number). The race ground on Newmarket Heath, to the W., which is traversed by the Devil's Dyke, with its soft elastic turf, is one of the very finest in the world. Of its 10 courses, the longest is 4¼ miles in circuit. The training ground bears a like character for excellence; and 400 horses are constantly in training. There are seven annual meetings, the principal events being the Two Thousand and the Cesarewitch. Newmarket is known as the racing capital of England.

New Mexico, a former Territory in the Western Division of the North American Union; admitted to Statehood by Act of Congress, June 16, 1910; bounded by Colorado, Oklahoma, Texas, Mexico, and Arizona; organized as a Territory, Dec. 13, 1850; number of counties, 19; capital, Santa Fé; area, 122,580 square miles; pop. (1890) 153,593; (1900) 195,310; (1910) 327,396.

Topography.—The new State is a lofty plateau, crossed by mountain ranges, being the foundation of the Rocky and Sierra Madre Mountains. The Sierra Madre range passes through a series of low and often detached ranges to join the Sierra Madre range in Mexico. The Rocky Mountains, in the E. of the Territory, are the highest and often reach an elevation of 13,000 feet. The W. part is characterized by isolated peaks, lofty plateaus and deep canons. The Llano Estacado is a broad nearly barren plateau in the S. E. The Rio Grande valley descends from an elevation of 6,000 feet near the Colorado border to 3,000 feet in the S. The Rio Grande traverses the State in a N. and S. direction and forms the principal drainage system. The Rio Pecos runs nearly parallel to it on the E. and finally joins it in Texas. Other important rivers are the Rio Chama, Rio Puerco, San Juan, Little Colorado, and Gila, the first two flowing into the Rio Grande, and the others, being tributaries to the Colorado.

Geology.—The chief geological formations are of the Palæozoic and Carboniferous periods, broken here and there by Azoic formations. Sandstones of Palæozoic formation are overlaid in places by lava beds, while in other portions large areas of exposed beds of marl occur. Carboniferous limestones cover strata of Tertiary and Cretaceous deposits in the central portion of New Mexico. The mineral productions are quite extensive. Gold, silver, copper, lead, anthracite and bituminous coal, lignite, salt, plumbago, fire clay, gypsum, cement and marble occur in the mountain districts and fine turquoises, emeralds, sapphires, garnets, opals, agates, petrified wood, and other precious stone abound. In 1900 the coal output was 1,299,299 short tons, valued at $1,776,170; and the clay products were valued at $108,090. In 1899 the copper production was 3,935,441 pounds; gold, 28,258 fine ounces, valued at $584,100; and silver, 503,300 fine ounces, valued at $650,731.

Soil and Productions.—The soil is very productive, but as yet but little worked, though irrigation by means of wells and canals is being rapidly installed. The cereals grow well and the ordinary farm, orchard, and garden fruits, are raised to a considerable extent. The hills and valleys are covered with a short grass, which provides excellent grazing facilities. Stock raising, especially of sheep, is carried on extensively. The most valuable farm crops are wheat, hay, corn, oats, and potatoes. New Mexico is but sparsely wooded. The evergreens, pine, spruce, and fir grow on the mountains and lower down, the cedar, mesquite, nut-pine, oak, ash, maple, walnut, sycamore, and cottonwood. The Territory is noted for its many species of yucca and cactus.

Manufactures.—In 1900 there were reported by the United States census, 479 manufacturing establishments, employing $2,746,276 in capital, and 2,603 persons; paying $1,350,921 in wages and $2,920,631 for materials used; and leaving an annual output valued at $5,621,332. The principal manufacturing cities are Albuquerque, with an annual output of $1,879,413; Santa Fé, $202,123; and Sorocco, $126,889. The principal manufactures include railroad cars, flour and grist, lumber and timber products, masonry, bread and bakery products, brick and tile, foundry and machine shop products, malt liquors, boots and shoes, tobacco, and cigars.

Banking.—On Oct. 31, 1901, there were reported 10 National banks in operation, having $761,800 in capital, $476,850 in outstanding circulation, and $708,810 in United States bonds. There were also 10 State banks, with $342,119 capital, and $49,249 surplus; and 18 private banks, with $131,000 capital.

Education.—At the end of the school year 1899–1900 there were reported 53,008 children of school census age; the enrollment in public schools, 41,098; and average daily attendance, 31,800. There were 981 public school teachers, 741 buildings used for public school purposes, and public school property valued at $759,320. The receipts for the year were $529,167, and expenditures, $338,781. For higher education there were 6 public high schools, 4 private secondary schools, the Normal School of New Mexico, at Silver City, the New Mexico Normal University, at Las Vegas, and the University of New Mexico, at Albuquerque.

Churches.—The strongest denominations in the new State are the Roman Catholic; Methodist Episcopal; Presbyterian, North; Methodist Episcopal, South; Mormon; Protestant Episcopal; and Regular Baptist, North. In 1899 there were 90 Evangelical Sunday-schools, with 592 officers and teachers and 4,900 scholars.

Postoffices and Periodicals.—In 1901 there were 322 postoffices of all grades, and 69 periodicals, of which 5 were daily, 57 weekly, and 7 monthly.

Railroads.—The total length of railroads within the new State on Jan. 1, 1901, was 2,181 miles, of which 8 miles were constructed during the previous year.

Finances.—The total bonded debt on Jan. 1, 1901, was $1,205,100. In addition to the bonded debt there was outstanding about $600,000 of old militia warrants, most of which are fraudulent and none of which have been legalized. The assessed property valuation, about one-third actual, in 1900 amounted to $38,452,181; and the tax rate was $14.05 per $1,000.

Territorial Government.—The governor was appointed by the President of the United States for a term of four years, and received a salary of $4,000 per annum. Legislative sessions were held biennially, and were limited in length to 60 days. The Territorial Legislature had 12 members in the Senate and 24 in the House, each of whom received $4.00 per day and mileage. The Territorial government in 1910 was Republican.

History.—The first explorers of this region were Spaniards from Mexico, who visited it in the middle of the 16th century and found it inhabited by a superior race of Aztecs or Toltecs, who lived in walled cities, had manufactures of cotton, and wool, irrigated and cultivated the soil, and who had reached a certain standard of civilization. In 1598 a settlement was made at San Gabriel, but was abandoned in 1605, at the founding of Santa Fé. The Territory was named New Mexico, mines were opened, and the Pueblo Indians forced into slavery to operate them. They revolted and in 1680 drove the Spaniards from the country. They returned in 1694 and built several towns, founding Albuquerque in 1706. During the Mexican War the United States forces under General Stephen Kearney invaded New Mexico and captured Santa Fé, Aug. 18, 1846. By the treaty of Guadaloupe Hidalgo, 1848, the entire Mexican possessions, now included in the United States, were ceded to the United States, and in 1850 they were organized as the Territory of New Mexico. Since then the area has been reduced by the cutting off of Arizona, and parts of Colorado, and Nevada. Several attempts have been made to secure statehood, and in 1894, an enabling act was passed by Congress, but its adjournment prevented anything further being done.

J. W. Raynold.

New Netherlands, the collective name of the early Dutch settlements in what is now New York State.

109° A 108° B 107° C 106° D 105° E 104° F 103°

1 2 3 4

37° 36° 35°

UTAH

COLORADO

NEW MEXICO

OKLA.

Dolores R. · Hermosa · Durango · Hesperus · Walsenburg · Alamosa · Pagosa Spgs. · Dyke · Conejos · San Luis · Trinidad · Purgatory R.

SOUTHERN UTE INDIAN RES.

Castelar · Elco · Laboca · Pendleton · Laplata · Riverside · Cedarhill · Aztec · Farmington · Floravista · Blanco · Turley · Largo · Bloomfield · Rosa · Navajo · Dulce · Lumberton · Monero · Azota · Juanita · Edith · Arboles · Pagosa Jc. · Tercio · Catskill · Blossburg · Gardiner · Willow Cr · Vermejo · Ponil · Van Houten · Preston · Koehler · Dawson · Baldy · Cerro · Red River · Questa · Twining · Elizabethtown · Ute Creek · Vermejo · Maxwell City · Chico · Cimarron · Corta · Springer · Gato · Taylor · Raya do Sta. · Colmor · Sauz · Nolan · Levi · Mesteno · Wagonmound · Roy · Bond · Tipton · Shoemaker · Solana · Moquero · Alta Vista · Mideo · Campana · Gallegos · Bellranch · Trementina · Atarque · Bryantine · Nara Visa · Bravo · Sand Springs · Canadian R. · Logan · Revuelto · Endee · Tucumcari · Tucumcari Mt. · Palomas · Montoya · Dodson · Puerto · Conant R. · Cuervo · Los Tanos · Santa Rosa · Puerto de Luna · Pintada · Guadalupe · Pastura · Aragon · Leoncita · Salado · Guadaloupe · Fort Sumner · Taiban · Texico · Arroyo · Texline · Clayton · Royce · Mt. Dora · Grenville · Grande · Folsom · Des Moines · Veda · Cuates · Alps · Emory Gap · Valley · Dry Cimarron R. · Devoys Pk. · Emorys Pk. · Carisbrook · Bell · Dillon · Clifton House · Hebron · Dorsey · Green Mt. · Tinaja · Kiowa · Palo Blanco · Mt. Clayton · Tripod Mt. · Rabbit Ear Mt. · Gladstone · Pasamonte · Barney · Clapham · Beenham · Miera · Tramperos · Major · Bueyeros · Albert · Leon · Roy · Carrizo Cr. · Ute Cr. · Longs · Dehaven Cr. · Perico · Arroyo · Carrizo · Arroyo · Ute Cr. · Alamosa · Cr. · Currampaw · Cr. · Cr. · Cr.

NEW MEXICO
SCALE OF MILES
10 0 10 20 30 40 50 60
Territorial Capital
County Seats
Military Reservation Boundaries
Indian " "
Forest " "
Size of type indicates relative importance of places
Hammond's 8 x 11 Map of New Mexico
Copyright, 1908, by C.S. Hammond & Co., N.Y.
109° 108° 107° Longitude West 106° from Greenwich 105° 104°
A B C D E F
31° 32° 33° 34°
5 6 7
SOCORRO
LINCOLN
CHAVES
SIERRA
OTERO
EDDY
LUNA
GRANT
DONA ANA
TEXAS
MEXICO
Silver City
Deming
Lascruces
Mesilla
Alamogordo
Tularosa
Lincoln
Roswell
Carlsbad
El Paso
Juarez
Rio Grande
Pecos River
Mescalero Ridge
Sierra Oscura
Capitol Pk.
Salinas Pk.
Pilot Knob
Point of Rocks
Las Cornudas
Cornudas Mts.
Hueco Mts.
Sacramento Mts.
Mogollan Mt.
Black Range
Gila River
Animas Range
Big Hatchet Mts.
Peloncillo Mts.
Gabilan Pk.
Cooks Pk.
Cerro Robledo
Mt. Riley
Jacks Pk.
Jicarilla Mts.
Capitan Mts.
Indian Res.
Mescalero Apache
Pajarito Mt.
Sierra Blanca
Old Baldy
Magdalena Mts.
Horse Mt.
Tuscan Mts.
Elk Mts.
Rio Gila
Rio Alamosa
Rio Felix
Rio Penasco
Salt Cr.
Rio Hondo
Black R.
Rio Grande
Mt. Riley
Red Mt.
Tres Mts.
Hermanas
Columbus
Guzman
Sabinal
San Pedro
Coralitas
Fabens
Polvo
Fort Hancock
Malone
Eagle Flat
Tarbert
Mesa
Terra Blanca
Samalayuca
Los Medanos
Candelaria
Rancheria
San Jose
Carmen
Los Minas
Pelea
Acacia
Anthony
Berino
Chamberino
Mesquite
Earlham
Aden
Kenzin
Afton
Lanark
Vevay
Strauss
Mastodon
Noria
Portillo
Mt. Riley
Monument
Malpais
Arena
Columbus
Mimbres
Hermanas
Tomerlin
Hachita
Victoria
Baker
Playas
Animas
Pratt
Rodeo
Brockman
Steins
Robert
Conrad
Lordsburg
Goldhill
Ulmoris
Lisbon
Separ
Valdimir
Wilna
Mongola
Gage
Taylor
Whitney
Tunis
Mirage
Luxor
Zuni
Myndus
Cambray
Chappel
Cybar P.O. or Florida Sta
Easley
Nutt
Hockett
Hatch
Rincon
Detroit
Tonuco
Selden
Leasburg
Donna Ana
Organ
Modoc
Mesilla Park
Organ Mts.
Hurley
Dwyer
Osceola
Swarts
Sherman
Santa Rita
Teel
Mimbres
Hawkins
Central
Fort Bayard
Georgetown
Hanover
Pinos Altos
Fierro
Cliff
Steeplerock
Duncan
Redrock
Summit
Veitch
Alpine
Luna
Joseph
Reserve
Frisco
Cooney
Mogollon
Alma
Clear Creek
Mogollan Range
Phillipsburg
Chloride
Fairview
Monticello
Cuchillo
Hermosa
Las Palomas
Andrews
Kingston
Hillsboro
Arrey
Lake Valley
Garfield
Grama
Upham
Cutter
Aleman
Englo
Crocker
Lava
Jornado
Pope
Parajo
Clyde
San Marcial
Rosedale
Elmendorf
San Antonio
Bullings
Clernow
Rio Grande
Temporal
Tularosa
Laluz
Alamogordo
Dog Canon
Escondida
Brice P.O. or Jarilla
Turquoise
Orogrande
Soledad
Desert
Hueco
Hereford
Longhorn
Fort Bliss
Coyote
Jicarilla
Ancho
Whiteoaks
Richardson
Carrizozo
Walnut
Coalora
Nogal
Capitan
Parsons
Oscuro
Bonito
Angus
Fort Stanton
Alto
Three Rivers
Ruidoso
Glencoe
Analla
Hondo
Picacho
Arabela
Lincoln
Roswell
South Springs
Orchard Park
Dexter P.O. or Greenfield Sta.
Hagerman
Elida
Kenna
Boaz
Elkins
Campbell
Artesia
Hope
Dayton
Lakewood
Avalon
Otis
Francis
Florence
Malaga
Red Bluff
Monument
Felix
Elk
Lower Penasco
Cloudcroft
Cox Canon
Maybill
Russia
Weed
Highrolls
Sierra Blanca
Salt Cr.
Rio Hondo
Rio Felix
Rio Penasco
Black R.
Rio Grande

Newnham College, an institution for the higher education of women, just outside of Cambridge, England. It may be said to have commenced in 1871, when the Newnham Hall Company opened a house for five resident women students. The numbers steadily increased, and in 1875 Newnham Hall was built, providing rooms for the principal, a lecturer, and 26 students. Scholarships were given by the London Companies and private friends, the library grew, a chemical laboratory and gymnasium were added, and the machinery of the college became more and more complete till, in 1879, the Newnham Hall Company was amalgamated with the Association for the Promotion of the Higher Education of Women. Additional land was acquired, and a second, and finally a third hall was added. These three halls, Old Hall, Sidgwick Hall, and Clough Hall, now form Newnham College, where about 150 students, under the charge of a principal, two vice-principals, and five lecturers, receive instruction, partly by lectures delivered at Newnham, partly by such lectures of the university and colleges of the university as are open to them. In the year 1881 the University of Cambridge opened to students of Newnham and Girton its tripos and previous examinations, and in 1889, out of 35 students of Newnham who entered for the tripos examinations, six took a first-class; 16 a second-class, and nine a third-class; while in 1890 Miss Fawcett was placed above the senior wrangler. Careful superintendence is here combined with a large amount of liberty and responsibility. The greater number of students work for tripos and stay for three or four years, but special courses of work can be taken without examination. The fees are about $375 a year.

New Orleans, a city and port of entry of Louisiana; on both sides of the Mississippi river, 100 miles above the delta, and on the Yazoo and Mississippi Valley, the Louisiana Southern, the New Orleans and Western, the Queen and Crescent, the New Orleans, Fort Jackson and Grand Isle, the New Orleans, the Spanish Fort, and Lake railroads; 700 miles S. of St. Louis. It is the most important city in population and trade in the Gulf States. Area, 42 square miles; pop. (1890) 242,039; (1900) 287,104; (1910) 339,075.

Municipal Improvements.—There is a waterworks system, costing $3,500,000. The reservoirs have a storage capacity of 47,000,000 gallons; the water is distributed through 124½ miles of mains; and the consumption averages 12,460,000 gallons daily. There are in all 700 miles of streets; of which 205 miles are paved, and 163 miles of electric street railways. The city is lighted by electricity at an annual cost of $120,000. The average cost of the police department is about $205,000 per annum, and that of the fire department about $225,000. The annual death rate averages 27.49 per 1,000.

Notable Buildings.—The principal public buildings are the United States Government Building; the United States Branch Mint; the Criminal Court and jail; the Cotton Exchange; the Court Houses; the Sugar Exchange; Board of Trade; Hebrew Athenæum; Howard Memorial Library, Fisk Public Library; Masonic and Odd Fellows' Hall; Y. M. C. A. Hall; Hotel Diew; Tours Infirmary; Temple Sinai; Washington Artillery Hall; Poydras Female Orphan Asylum; Charity Hospital; German Protestant Asylum; Jewish Widows' and Orphans' Home.

Manufactures.—According to the Federal census of 1900 there were 1,525 manufacturing establishments, employing $46,080,061 capital and 19,657 persons; paying $7,668,167 for wages and $43,386,680 for materials; and having a combined output valued at $63,574,388. The principal articles were sugar and molasses ($22,684,920); bagging ($3,443,468); rice ($2,924,564); foundry and machine shop products ($2,199,854); bakery products ($2,135,738); and men's clothing ($2,036,069).

Commerce.—The city is the greatest cotton market in the world, handling 3,000,000 bales per annum. In the fiscal year ending Dec. 31, 1900, the imports of merchandise aggregated in value $1,574,835; and the exports $19,137,733. The movement in gold and silver reported for the New Orleans custom district was, imports, $498,037; exports, $19,930. From Oct. 1, 1899, to Nov. 30, 1901, there were 75,991 horses and 67,059 mules, valued at $13,483,052, shipped to the British military authorities in South Africa.

Banks.—On Dec. 3, 1900, there were 7 National banks in operation, having a combined capital of $2,300,000, and a surplus fund of $2,645,000. The exchanges at the United States clearing house in the year ending Sept. 30, 1900, aggregated $500,817,071, an increase over the preceding year of $65,714,770.

Education.—At the close of the school year 1898–1899 there were 66 buildings used for school purposes; 683 teachers; and public school property valued at $1,500,000. The enrollment of pupils in private and parochial schools was 7,066, and the number enrolled in public day schools was 30,770, with an average daily attendance of 21,845. The institutions of higher education include the College of the Immaculate Conception, Tulane University, and its branch for women, Sophie Newcombe College, and the Straight University, Leland University, and the Southern and New Orleans Universities for negroes.

Finances.—On July 1, 1901, the total bonded debt of the city was $17,422,910. The assessed valuations in 1800 were: Real estate, $101,917,635; personal property, $37,317,466; total, $139,235,101; tax rate, $29.00 per $1,000.

History.—The French first occupied New Orleans under Jean de Bienville in 1718. It was made the capital of Louisiana in 1722. Forty years later it passed under the control of Spain when Louisiana was ceded to that country. The French again obtained possession of the province in 1800 and sold it to the United States in 1803. New Orleans was chartered as a city in 1804. On Jan. 8, 1815, it was the scene of a world-renowned battle in which General Jackson defeated the British. In 1862 Admiral Farragut forced it to surrender and it was occupied by Union troops under General Butler, who was appointed military governor. The prosperity of the city was interrupted by the war, but it has grown very rapidly since 1866. A great industrial and cotton exposition was held here in 1884. PAUL CAPEVIELLE.

New Orleans, Battle of, an engagement fought on Jan. 8, 1815, between a force of 12,000 British under Sir Edward Pakenham, and one of 6,000 Americans under Gen. Andrew Jackson. The latter were in a strongly intrenched position and awaited Pakenham's assault on their lines. The battle lasted only 25 minutes, when the British fled, leaving behind them 2,600 killed and wounded. Pakenham was among the slain. The Americans' loss was only 8 killed and 13 wounded.

New Orleans, The, a cruiser of the United States navy; 300 feet long, 43 feet 9 inches wide; draft, 16 feet 10 inches; displacement, 3,600 tons. Her engines are of 7,500 horse power, and coal capacity, 800 tons. Speed, 20 knots an hour. Her armament consists of six 6-inch and four 4-inch breech-loaders, two 3-inch field guns, fifteen 6-pounders, eight 1-pounders, four Maxim automatic guns, and three torpedo tubes. The armor of her deck varies from 1.2 inches to 3.5 inches in thickness. She carries a crew of 300 men.

New Orleans University, a coeducational institution in New Orleans, La.; founded in 1873 under the auspices of the Methodist Episcopal Church; has preparatory, collegiate, normal, medical, musical, and theological departments; property valued at over $200,000; volumes in the library, about 5,000; average number of faculty, 50; average student attendance, 900; ordinary income, about $35,000.

Newpore, Fort, name of an old fortification on Ward creek, a tributary of Oneida Lake, New York State.

New Pomerania. See NEW BRITAIN.

Newport, a city in Campbell co., Ky.; at the confluence of the Licking and Ohio rivers, and on the Louisville and Nashville, and the Chesapeake and Ohio railroads; opposite Cincinnati, O. Two bridges here cross the Ohio, and two the Licking river, connecting Newport with Cincinnati and Covington. The city contains Mount St. Martin's Academy, waterworks, National banks, gas and electric lights, and two high schools. It has iron mills, manufactories of watch cases, nuts, bolts, and carriages, and an assessed property valuation of nearly $11,000,000. Pop. (1890) 24,918; (1900) 28,301; (1910) 30,309.

Newport, a city, port of entry, county-seat of Newport co., and one of the capitals of Rhode Island; on the island of Rhode Island, in Narragansett Bay, and on the New York, New Haven and Hartford railroad; about 30 miles S. E. of Providence. Its principal importance is as a summer resort, to which the coast near by is wholly given up. The bathing facilities are unsurpassed. There are many beautiful summer residences, and during the fashionable season Newport is filled with the wealthiest society of Boston, New York, and other cities. The harbor, one of the best on the coast, is defended by Fort Adams, one of the strongest forts in the United States. The locality has many natural curiosities, including the Hanging Rocks, Spouting Cave, and the Glen, a chasm 50 feet deep. The United States Naval War College, United States Training Station, Torpedo Station, Naval Hospital, and Marine Barracks are located here, and there are besides a public library, Newport Hospital, Hazard Memorial School, the Round Tower, or Old Stone Mill in Touro Park; the Vernon house, which was Rochambeau's headquarters, built in 1780, etc. Newport has manufactories of flour, cotton goods, copper, brass, oil, etc., and an assessed property valuation of $40,628,200. Pop. (1890) 19,457; (1900) 22,034; (1910) 27,149.

Newport, a town in Monmouthshire, England, 145 miles W. of London. Being one of the principal outlets for the produce of the extensive collieries and iron and steel works in the vicinity, its shipping trade has of late years greatly increased, and with it, as a result, its dock accommodation, which now covers more than 80 acres. Newport has manufactures of india-rubber, gutta-percha, and railway and telegraph plants and wagons, and several important brass and iron foundries are in operation, as well as breweries and pottery works. On Nov. 4, 1839, the town was the center of a Chartist outbreak. Pop. (1901) 61,474.

Newport News, a city, port of entry, and county-seat of Warwick co., Va.; on the James river, Hampton Roads, and the Chesapeake and Ohio railroad; 14 miles N.

of Norfolk. Here are the Newport News Military Academy, the Newport News Female Seminary; a grain elevator with a capacity of 1,750,000 bushels, a large shipbuilding plant, and a dry dock capable of holding the largest steamships. It has National and State banks, electric railroads, several daily and weekly periodicals, knitting mills, iron works, an extensive foreign export trade, and an assessed property valuation of over $6,000,000. Pop. (1900) 19,635; (1910) 20,205.

New Red Sandstone, the lowest group of Secondary rocks, lying between the Permian below and the Lias above. See GEOLOGY.

Newry, a seaport and parliamentary borough of Ireland on the Newry river; 38 miles S. S. W. of Belfast. A canal connects it with Carlingford Lough and with Lough Neagh. The port does a large trade with Glasgow and Liverpool in cattle and other agricultural produce. Flax spinning and weaving, with rope and sail making, tanning, and granite-polishing, are the industries. The place dates from 1131; its castle was taken by Edward Bruce in 1318.

New Salle. See RABOT.

New Sarum. See SALISBURY.

New Shetland, a group of islands almost destitute of vegetation, in the Antarctic Ocean, about 600 miles S. E. of Cape Horn. They were discovered in 1819, and are sometimes frequented by whalers.

New Siberia, a group of uninhabited islands in the Arctic Ocean, off the coast of Siberia, between the mouth of the Lena and the mouth of the Indigirka. The principal are Kotelnoi (the largest), Liakhov, Fadeyeff, and New Siberia. The coasts are rocky, and ice-bound all the year round. Reindeer, foxes and white bears are found on the island. The soil contains immense quantities of fossil ivory, of the mammoth, etc.

News Letter, the name given to the little printed sheets or letters, issued weekly in the early part of the 17th century, the news for which was collected by the newswriters in the coffee houses. Originally they were literally letters of news written by professional newswriters, and sent by them to their employers weekly.

New South Wales, the oldest of the colonies of Great Britain, in Austrialia, and since Jan. 1, 1901, a State in the Australian commonwealth. At one time it comprised the E. half of Australia, but is now bounded on the N. by Queensland, on the S. by Victoria, on the E. by the Pacific Ocean, and on the W. by South Australia; area, 310,700 square miles. A mountain range (the Great Dividing Chain) extends from N. to S. nearly parallel to the coast, at the distance of from 30 to 50 miles inland. The highest summits are Mount Kosciusko, Mount Clarke, and Mount Townshend in the S. E. (7,353 feet), the last being the highest mountain in the colony and in Australia. The coast line, 700 miles in length, presents, in general, bold perpendicular cliffs of sandstone in horizontal strata. Among the indentations of the coast are Port Stephens, Port Hunter, Broken Bay, Port Jackson, Botany Bay, Jervis Bay, Sussex Haven, and Twofold Bay. The most important rivers are on the W. side of the great watershed, the chief being the Murray, the Murrumbrigee, the Lachlan, and the Darling, the Murray receiving the waters of the others and carrying them to the sea through South Australia. The Murray partly belongs also to Victoria, as it forms the boundary between New South Wales and that colony, and the Darling is thus the chief river of New South Wales. On the E. side of the watershed are no large rivers, the chief being the Hunter (300 miles) and the Hawkesbury (330 miles). The volume of the rivers depends greatly on the season, and their utility for inland navigation is much impaired by their shallowness. As a general rule the prevailing rock on the E. side of the mountains is sandstone, and on the W. granite. Much of the sandstone belongs to the Carboniferous system, and is accompanied with workable seams of excellent coal. The coal fields extend over an area of 10,000 acres, with more than 91 mines. The colony exports considerable quantities of coal to the W. coast of North and South America. Copper ore of the richest quality and tin exist in large quantities, and iron is very generally distributed. Gold is found in all parts of the colony, the value of the output in 1899 being $9,297,032. Most of the gold is sent to the mint for coinage.

The combined value of the silver and lead output in the same year was $6,520,275. Several varieties of precious stones have been found, notably opals. As the area of the colony extends over 11° of latitude, and as it contains a good deal of elevated ground, nearly every variety of climate is to be found. In the N. the climate is tropical, while on the table-lands severe frost is not uncommon. The interior plains are very dry, while the coast districts have abundant rains. Though the hot winds of the warm season are annoying, they are not unhealthy, while storms and electrical disturbances are comparatively rare. About one-fourth of the area of the colony consists of forest lands, which in 1887 were taken under the care of the government by the creation of a Forest Conservation Department. The scarcity of water renders

much of the surface far better adapted for pasturage than for agricultural purposes, though where the necessary moisture is present heavy crops are obtained. The agricultural land, 2,206,500 acres, is chiefly under wheat and maize, oats and barley, and there is also a considerable area under sugar-cane, vines, fruit trees, etc. Fruits and vegetables in great variety are grown, the principal fruit crops consisting of oranges. But the rearing of sheep and cattle are the chief employments of the people, and wool is the most important article of export. There are about 50,000,000 sheep in the colony. The exports in 1898 were $138,260,000, about half being wool; imports, $122,267,000. Other exports are gold, tin, tallow, coal, copper, etc. The imports are hides, leather, clothing, cotton and woolen goods, iron goods and hardware, wine, spirits, and beer, sugar, and tea. The manufacturing industries of the colony are increasing; and the industrial works embrace tanneries, woolen factories, soap and candle works, breweries, steam sawmills, shipyards, foundries, machine works, clothing factories, etc. There were in 1899 2,691 miles of railway open; the principal lines are owned and run by the government. The telegraphic wires extended over 30,000 miles.

Sydney is the capital; other towns are Newcastle, Bathurst, Goulburn, Paramatta, Maitland. There is no established religion. Among the religious sects the Church of England, Roman Catholics, Wesleyan Methodists, and Presbyterians hold the chief place. Primary education is compulsory between the ages of 14 and 16. The educational system comprises lower and higher public schools, evening schools, etc., at the top being the University of Sydney. With it are affiliated three theological colleges, for Church of England, Presbyterian, and Roman Catholic students respectively. The colony has taken measures for its own defense, and has a force, partly paid, partly volunteer, numbering more than 6,000, and including infantry, cavalry, artillery, engineers, naval brigade, etc.

New South Wales was discovered by Captain Cook in 1770, and founded as a penal settlement (at Botany Bay) in 1788. One of its early governors was the notorious Captain Bligh, who was deposed by the colonists in 1808. The most important events in its history since convict immigration ceased in 1840 are the establishment of representative institutions in 1843; the erection of Victoria into a separate colony in 1850; the important discovery in May, 1851, of extensive gold tracts; the rush to the diggings, with consequent great increase in population and prosperity; and the incorporation of the colony in the Australian commonwealth in 1901. The first railway, from Sydney to Paramatta, was opened in 1855. Among more recent events are the Sydney Exhibition held in 1879, and the Intercolonial Conference held at Sydney in 1883. The colony celebrated its centenary in January, 1888, and a special series of stamps of elaborate design was issued in commemoration of the event. On Jan. 1, 1901, Sydney was the scene of the inauguration of the first governor-general of the new commonwealth, Lord Hopetoun. Pop. (Jan. 1, 1910) 1,621,677.

Newspaper, a printed paper published at intervals of hours, days, or weeks, containing intelligence of past, current, or coming events; and at the option of the conductors presenting also expressions of opinion by editorial and other contributors and the business announcements of advertisers. The prototypes of the newspaper are supposed to be the journals called "*Acta Diurna*," which were the bulletins sent from Rome, several centuries before the Christian era, in which accounts were given of the progress of the imperial arms. These journals were communicated by the generals who received them to the officers under their command, and thus their contents became known throughout the army. The "*Acta Diurna*" seem, however, to have recorded other than military matters, *e. g.*, trials, punishments, deaths, sacrifices, prodigies. The Peking "Gazette," the oldest daily in the world, was first issued about A. D. 1350. This is still in existence, and is an official journal, forming a pamphlet of 20 to 40 pages of coarse paper, printed from wooden types on one side only, and having a paper cover. The "Notizie Scritte," published monthly in Venice, in 1562, is said to have been the first Italian newspaper; but it was in manuscript, not printed. Its price was a small coin called gazetta; hence the word gazette which came to be the popular name for a newspaper. The first numbered sheets appeared in 1612. In the British Museum there are seven copies of the "English Mercurie" of 1688, but their authenticity is questioned. A publication entitled the "Relations" was published in England as early as 1462, and in 1527 there was one called "New Tidings," but neither of these presented more than a single piece of intelligence. The earliest English newspaper in the true sense of the word was Butter's "Weekly News," of 1622, all previous to that time having been published irregularly and having been pamphlets rather than newspapers. Butter's success led to many imitations, and newspapers, such as they were, soon became common; but they were generally published at irregular intervals, and were nearly always short-lived. The publication of newspapers without license was prohibited in the reign of Charles II., and an

office was created called Licenser of the Press. Advertisements first appeared in English newspapers in 1652. "The Public Intelligencer" appeared in 1663, and "The London Gazette" in 1665. The first daily newspaper was the "Daily Courant," of London, the date of whose first issue was 1702; there is, however, a legend of a daily paper called the "Postboy," in 1695. Cologne seems to have had a newspaper as early as 1499, called the "Chronicle," and Frankfort claims as the father of journalism Egenolf Emmel, who, in 1615, is believed to have established a daily paper entitled "Der Frankfurter Oberpostamt Zeitung." France's first newspaper, the "Gazette de France," appeared May 30, 1631, Sweden's in 1644, Holland's in 1656, Russia's in 1703, Spain's in 1704, Turkey's in 1795 (printed in French). The first newspaper on the American side of the Atlantic, "Publick Occurrences both Foreign and Domestick," was a monthly, first issued in Boston, Mass., by Benjamin Harris, Sept. 25, 1690; in 1702 appeared "The Boston Newsletter," and in 1729 Benjamin Franklin's "Pennsylvania Gazette."

Newstead Abbey, the home of Lord Byron, 10 miles N. N. W. of Nottingham, England, on the border of Sherwood Forest; founded for Augustinian Canons by Henry II. in atonement for Becket's murder (1170); and in 1540, after the dissolution, was given to "Sir John Byron the Little, with the great beard." Among his descendants were the first Lord Byron, the "wicked Lord Byron" (1722–1798), and the poet Lord Byron, who made the half-ruinous old place his home in 1808, but sold it in 1818, since which time about $500,000 has been spent on its restoration. For a full description of Newstead, its lake, ruined church, superstitions, and memories, see Washington Irving's "Abbotsford and Newstead."

New Style. See STYLE.

New Sweden, the former name of the territory lying between the English colony of Virginia and the Dutch colony of New Netherlands. The Swedes founded a settlement here in 1627.

Newt, a small reptile of the family *Salamandridæ,* of which there are many varieties, the principal one being termed the great water newt, *Triton palustris.* This specimen, when it is full-grown, measures about six inches in length, and in its appearance greatly resembles the salamander. On the back the color is a dark brown; the sides are speckled with spots, and the under-surface of the body is a bright orange, variegated with black patches. The head is rather small, and the eyes are of a bright golden hue; the tail is flattened in form, and has thin edges at the extremities; and the limbs are short, the fore-feet being divided into four, and the hind into five toes. The newt inhabits shady places and stagnant waters, and lives principally on insects, of which it consumes an immense quantity. Besides the great water newt there is the common water newt, *Triton aquaticus,* found in the Atlantic States, which, in its habits and appearance, so closely resembles the former, as not to need a distinct description. Other species, from 4 to 12 inches long, are also found in the United States.

New Testament. See BIBLE.

Newton, a city in Middlesex co., Mass.; on the Charles river, and on the Boston and Albany railroad; 7 miles W. of Boston. It comprises 13 villages; contains the Newton Theological Institution (Bapt.), the Fish School for Boys, the Lasell Female Seminary, West Newton Classical School, public library, nervine hospital, high school, and several National and savings banks, and has gas and electric lights, manufactures of hosiery, shoes, paper, carriages, cordage, glue, dyes, ink, etc., and an assessed property valuation of $59,174,975. Pop. (1900) 33,587; (1910) 39,806.

Newton, Henry J., an American inventor; born in Connecticut, in 1823; best known for his invention of the photographic dry plate process; was member of a firm of piano manufacturers, and at the time of his death president of the Newton-Merritt Bronze Company. He was also president of the Camera Club of New York, and founded the Theosophical Society in 1875. He died in New York city, Dec. 23, 1895.

Newton, Hubert Anson, an American astronomer; born in Sherburne, N. Y., March 19, 1830; was graduated at Yale in 1850, and three years later became tutor of mathematics there, and in 1855 was made professor; holding the chair of mathematics till his death. Professor Newton is best known for his discoveries regarding the laws of meteoroids and comets and their connection. In 1833 Professor Olmstead, his colleague, suggested the hypothesis that meteors were part of a stream of bodies moving around the sun at a fixed rate. Professor Newton accepted and spent years in developing this theory. He also made a mathematical computation of five orbits, and determined which one of these corresponded to the actual path of the meteors. He was the first to suggest the introduction of the metric system into American arithmetics (1864). Professor Newton contributed various encyclopedic and magazine articles; was active in the formation of the National Academy of Science; was for years editor of the "American Journal of Science"; received the Smith

gold medal from the National Academy for his discoveries regarding meteors; and was president of both the Connecticut Academy of Arts and Sciences, and the American Association for the Advancement of Science. He died in New Haven, Conn., Aug. 30, 1896.

Newton, Sir Isaac, an English philosopher; born in Woolsthorpe, Lincolnshire, England, Dec. 25, 1642 (old style). Losing his father in his childhood, he received under his mother's care an excellent education. In 1654 he was sent to Grantham School, and at the age of 18 removed to Trinity College, Cambridge, where he had the learned Isaac Barrow for his tutor. After going through Euclid's Elements, he proceeded to the study of Descartes' Geometry, with Oughtred's Clavis and Kepler's Optics, in all of which he made marginal notes. It was in this early course that he invented the method of fluxions, which he

SIR ISAAC NEWTON.

afterward brought to perfection, though his claim to the discovery was unjustly contested by Leibnitz. At the age of 22 Newton took his degree of B. A., and about the same time he applied himself to the grinding of object-glasses for telescopes. Having procured a glass prism in order to investigate the phenomena of colors, the result of his observations was his new theory of light and colors. It was not long after this that he made his grand discovery of the law of gravitation; but it was not till 1689 that the Newtonian system was first published in his great work, the "Mathematical Principles of Natural Philosophy." On his return to the university, in 1667, he was chosen fellow of his college, and took his degree of M. A. Two years afterward he succeeded Dr. Barrow in the mathematical professorship, on which occasion he read a course of optical lectures in Latin. He had not finished them in 1691, when he was chosen fellow of the Royal Society, to which body he communicated his theory of light and colors, with an account of a new telescope invented by him, and other interesting papers. When the privileges of the University of Cambridge were attacked by James II., Newton was appointed to appear as one of the delegates in the High Commission Court. He was next chosen a member of the Convention Parliament, in which he sat till it was dissolved. In 1696 he was made Warden of the Mint, and afterward Master; which latter place he held with the greatest honor till his death. The reformation of the English coinage was largely his work. On his last promotion he nominated Dr. Whiston to fill his chair at Cambridge, assigning to him the profits of the place, and resigned it entirely to him in 1703. During the same year he was chosen president of the Royal Society, in which station he continued 25 years. He was also a member of the Academy of Sciences at Paris, having been chosen in 1699. In 1704 he published his treatise on "Optics"; but the whole merit of this extraordinary work was not at first appreciated. In 1705 he received the honor of knighthood from Queen Anne. Newton was not only a philosopher, but a Christian, and spent much of his time in elucidating the sacred Scriptures. When his friends expressed their admiration of his discoveries, he said, "To myself I seem to have been as a child playing on the sea-shore, while the immense ocean of truth lay unexplored before me." He died in Kensington, near London, March 20, 1727. In 1731 a monument to his memory was erected in Westminster Abbey.

Newton, John, an English clergyman; born in London, England, July 24, 1725; (old style) had little schooling; and, as his father was master of a trading ship, the boy joined him at 11 and sailed under him for six years. Next impressed on board a man-of-war, he was made midshipman, but was degraded and cruelly treated for an attempt to escape. He was allowed at Madeira to exchange into an African trader, joined a slaver at Sierra Leone, and sailed with her for two years, returning to England in 1747. He next sailed to Guinea and the West Indies as mate on a Liverpool slaver, married in 1750, and made several voyages of the same nature as master, giving his leisure to study. In 1755 he renounced his calling to become tide-surveyor at Liverpool. His religious opinions had already undergone an important change, which led him to apply in 1758 to the Archbishop of York for holy orders, but without success. In 1764 he was offered the curacy

of Olney, and he was at once ordained deacon, and next year priest, by the Bishop of Lincoln. Hither the poet Cowper came about four years later, and an extraordinary friendship quickly sprang up between the two men. Newton left Olney in 1779 to become rector of St. Mary Woolnoth, London, where he resided till his death. Newton's prose works are now but little read, save his "Authentic Narratives of some Interesting and Remarkable Particulars in my own Life." But his name can never be forgotten from its association with Cowper, and from some of his "Olney Hymns," which are well-known to the English-speaking religious world. Of these need only be named here: "Approach, my soul, the mercy-seat"; "How sweet the name of Jesus sounds"; "One there is, above all others"; and "Quiet, Lord, my froward heart." He died in London, Dec. 21, 1807.

Newton, John, an American military engineer; born in Norfolk, Va., Aug. 24, 1823; was graduated at the United States Military Academy, second in his class, and commissioned a 2d lieutenant in the Engineer Corps in 1842; promoted captain in 1856, and major in 1861; and was commissioned a Brigadier-General of volunteers in 1861; promoted Major-General in 1863; and was mustered out of the service in 1866. In the regular army he was promoted colonel in 1879 and Brigadier-General and chief of engineers in 1884; and was retired Aug. 27, 1886. His most famous engineering feat was the removal of obstructions in Hell Gate Channel, New York. After his retirement from the army he was commissioner of public works of New York city. He died in New York city, May 2, 1895.

Newton, Richard Heber, an American clergyman; born in Philadelphia, Oct. 31, 1840. After 1869 he was rector of All Souls Church, New York city. His published works include: "The Morals of Trade" (1876); "Womanhood" (1880); "Philistinism" (1885); "Social Studies" (1886); "Church and Creed" (1891); "Christian Science" (1898), etc.

Newton, Thomas, an English prelate; born in Lichfield, England, Jan. 1, 1704; was graduated at Trinity College, Cambridge; became one of its fellows, took orders, and after minor preferments was made Bishop of Bristol and Canon Residentiary of St. Paul's in 1761. He issued an edition of Milton's "Paradise Lost" and "Paradise Regained," and wrote "Dissertations on the Prophecies" (3 vols. 1754–1758). He died Feb. 14, 1782.

Newton, William Wilberforce, an American clergyman, brother of Richard H.; born in Philadelphia, Nov. 4, 1843; and after 1881, rector of a Protestant Episcopal Church at Pittsfield, Mass. His works include: "Essays of Today" (1879); "The Priest and the Man" (1883), a historical novel; "Ragnar, the Sea-King" (1888); and a series of sermons for children.

Newton Abbot, a market-town of Devonshire, England; 15 miles S. of Exeter. Ford House, a good Tudor building, has lodged both Charles I. and William of Orange, who here in 1688 was first proclaimed king.

Newtonian Philosophy, the doctrines respecting gravitation, light, etc., taught by Sir Isaac Newton in his "Principia."

Newtown, a manufacturing town of Montgomeryshire, North Wales; on the Severn river and the Montgomery canal; 13 miles S. S. W. of Welshpool; is the center of the Welsh flannel manufacture, and also produces tweeds, shawls, etc.

New Westminster, a city and former capital of British Columbia; on the Fraser river; 10 miles from its mouth, and 75 miles N. N. E. of Victoria. It has the residences of Episcopal and Roman Catholic bishops, a convent, Roman Catholic and Methodist colleges, the Dominion Penitentiary, Provincial Asylum for the Insane, sawmills, and great salmon-canning establishments.

New World, The, the Western Hemisphere. This name is of very early origin, for Ferdinand inscribed on the tomb of Columbus, "To Castile and to Leon, Columbus gave a new world."

New Year's Day, the day on which the year commences in the Gregorian calendar; the 1st of January; usually called New Year, or New Year's. The celebration of the commencement of the new year dates from high antiquity. The Jews regarded it as the anniversary of Adam's birthday, and celebrated it with splendid entertainments; a practise which they have continued down to the present time. The Romans also made this a holiday, and dedicated it to Janus with rich and numerous sacrifices; the newly elected magistrates entered upon their duties on this day; the people made each other presents of gilt dates, figs, and plums; and even the emperors received from their subjects New Year's gifts, which at a later period it became compulsory to bestow.

New York, a State in the North Atlantic Division of the North American Union; bounded by Ontario, Vermont, Massachusetts, Connecticut, New Jersey, Pennsylvania, Lake Erie, Lake Ontario, Long Island Sound, and the Atlantic Ocean; one of the original 13 States; popularly known as the "Empire State"; motto, "Excelsior"; flower, the rose; number of counties, 61; area, 49,204 square miles, of which 1,550

New York

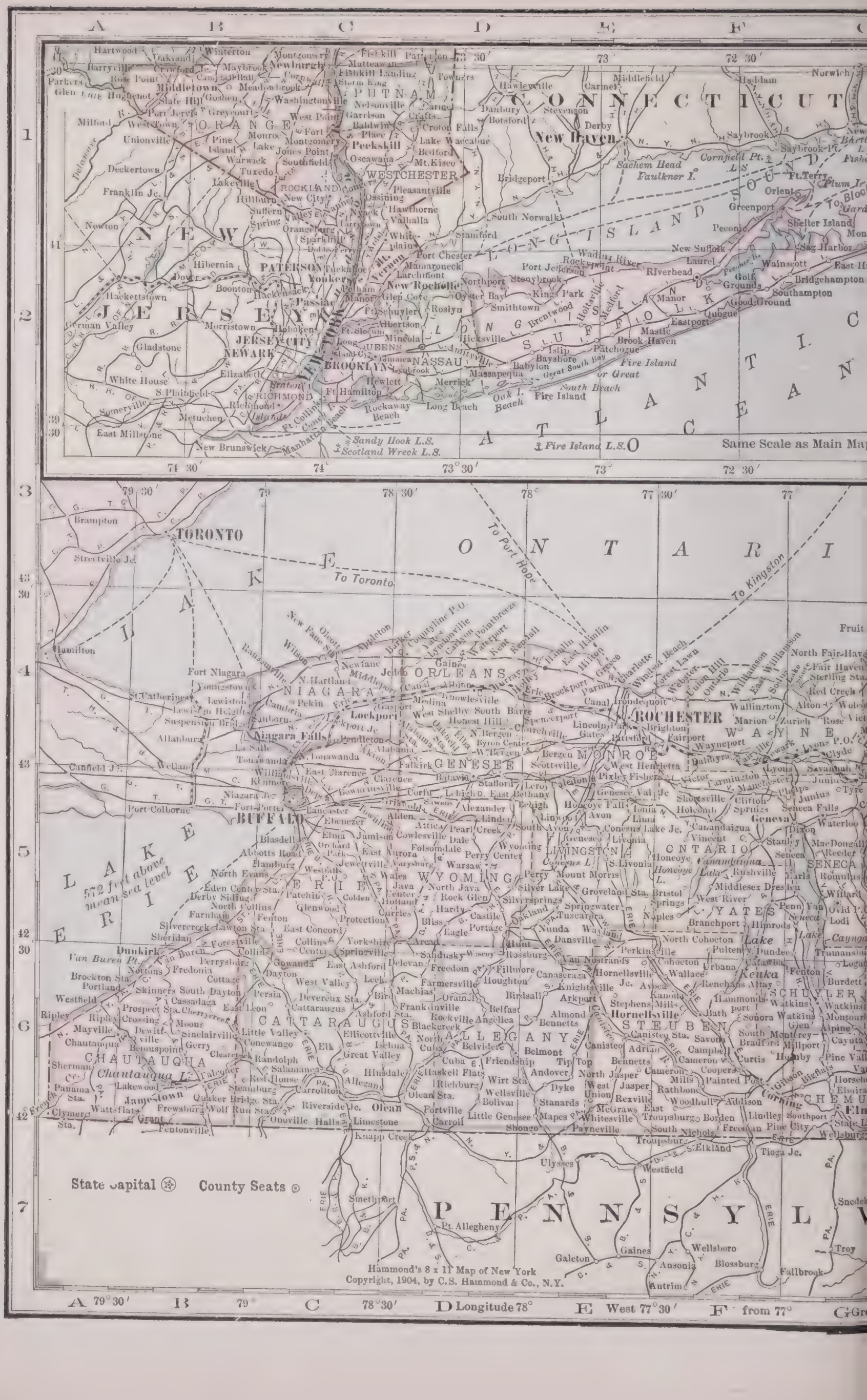
square miles are water surface; capital, Albany.

Topography.—The E. part of the State is mountainous. The Adirondack system lies in the N. E. corner, W. of Lake Champlain, and contains the only great forest remaining as a public domain within the boundaries of the State. Its highest peaks are Mount Marcy, 5,379 feet; Mount MacIntyre, 5,183 feet; and Haystack, 4,919 feet. Other high peaks are Skylight, Whiteface, Clinton, Dix, Baldface, and Hopkins. S. of the Adirondacks lie the Catskills, noted for their scenic beauty, and as a summer resort. These mountains form the termination of a chain extending into the State from New Jersey, and are a continuation of the Blue Ridge range. Another branch enters the State at its S. boundary and terminates in the Highlands on the Hudson. These mountains range in altitude from 1,500 to 3,500 feet. Among the more prominent are Beacon Hill, Bull Hill, and Butter Hill. A third range extends N. as far as the Mohawk, and reappearing on the N. side of the river continues toward Lake Champlain, connecting with the Adirondacks. The W. portion of the State is undulating, descending in rolling terraces to Lake Ontario. The river systems are divided into two divisions, one flowing N. to the Great Lakes, and St. Lawrence, and the other reaching the Atlantic by the Hudson. The Hudson river, the most important in the State, rises in the Adirondack Mountains and is navigable for 150 miles. The St. Lawrence forms 100 miles of the Canadian boundary. Other important rivers are the Mohawk, entering the Hudson at Cohoes, the Susquehanna, formed by the Chenango and Tioga, the Delaware, Niagara, Black, Genesee, Oswego, and Allegheny. The lakes are numerous and noted for their beauty. One half of Lakes Ontario and Champlain, and the E. end of Lake Erie are property of the State. Lake George, S. of Lake Champlain, is an extensive sheet of water and is a noted resort. The central portion of the State has an extensive lake system, containing Seneca, Cayuga, Oneida, Keuka, and Canandaigua lakes. The Adirondack region is full of lakes, including Long, Scroon, Upper and Lower Saranac, Placid, and Raquette. Chautauqua, in the S. W., and Saratoga and Otsego in the E., are among the many pleasure resorts. The waterfalls in the State are numerous, and include Niagara Falls, Trenton Falls, Genesee Falls, Portage, Taghkanie, and those near Ithaca, and in Watkins Glen. There are many large islands. Manhattan, containing the greater part of New York city, Long Island, Staten Island, Coney Island, and Fire Islands are on the S. shore; and the St. Lawrence river contains over 700 small islands belonging to New York. The entire State is noted for its scenery; the Palisades, Highlands, and Catskills on the Hudson, Lake George and Lake Champlain, the islands in the St. Lawrence, numerous waterfalls, chasms, inland lakes, and glens, all abound in historical traditions and are of great interest to the tourist. The chief harbors are New York, on New York Bay; Dunkirk and Buffalo, on Lake Erie; Tonawanda and Lewiston, on Niagara river; Genesee, Sodus, Oswego, Sacketts Harbor, and Cape Vincent, on Lake Ontario; Ogdensburg, on the St. Lawrence; Rouse's Point, Plattsburg, and Whitehall, on Lake Champlain; and Sag Harbor, on the E. end of Long Island.

Geology.—Nearly all the geological formations are present in New York. The Archean is represented in the Adirondacks and the Highlands on the Hudson, by gneises and granites. The Palæozoic constitutes four-fifths the area of the State and is represented by schists, slates, and metamorphosed rocks in the E. and by massive sandstones in the Catskills. The Palæozoic is represented by the Cambrian, Silurian and Devonian periods. The Triassic and Jurassic are represented by Newark sandstones and shales, in Rockland county; and the Pleistocene, by glacial drift, and lacustrinea and estuarine clays covering a great part of the State. The Pleistocene ice sheet covered the entire State and is responsible for many of the details of topography.

Soil and Productions.—About one half the area of the State is adapted to cultivation. The principal forest trees are the maple, oak, pine, elm, hickory, beech, birch, ash, hemlock, spruce, cedar, poplar, willow, whitewood, chestnut, basswood, butternut, sycamore, locust, ailantus, black walnut, yew, and sumach. Agriculture is carried on to a large extent, New York being one of the leading agricultural States in the Union. The principal farm crops in 1910 were: Corn, 26,044,000 bushels, valued at $16,408,000; wheat, 10,523,000 bushels, valued at $10,102,000; oats, 46,161,000 bushels, valued at $19,388,000; barley, 2,207,000 bushels, valued at $1,545,000; rye, 3,111,000 bushels, valued at $2,302,000; buckwheat, 7,199,000 bushels, valued at $4,679,000; potatoes, 44,676,000 bushels, valued at $21,444,000; hay, 6,351,000 tons, valued at $87,009,000; and tobacco, 7,375,000 pounds, valued at $626,875—total value, $163,503,875. Farm animals exceeded $190,000,000 in value, horses ($90,000,000) and dairy cows ($71,000,000) leading. The State ranked first among the States of the Union in the production of buckwheat, potatoes, hay, and dairy products.

Mineralogy.—The State reached its high-water mark in its output of mineral productions in the calendar year 1907, when the total value was $68,762,815. The principal productions were: Pig iron, 1,659,752 long tons, valued at $33,097,000; clay prod-


A
B
C
D
E
F
1
2
3
4
5
6
7
41
42
43
74 30′
74°
73°30′
73°
72 30′
79 30′
79°
78 30′
78°
77 30′
77°
Hartwood
Oakland
Winterton
Montgomery
Fishkill Plain
Barryville
Crawford Jc.
Maybrook
Newburgh
Matteawan
Parkers Glen
Rose Point
Camp Hill
Fishkill Landing
Middletown
Meadowbrook
Storm King
Powners
Hawleyville
Carmel
Middlefield
Haddam
Norwich
Slate Hill
Goshen
Washingtonville
PUTNAM
Nelsonville
Danbury
Stevenson
CONNECTICUT
Port Jervis
Greycourt
West Point
Garrison
Carmel
Crafts
Botsford
Derby
Milford
West Town
ORANGE
Fort Montgomery
Baldwin Place
Croton Falls
New Haven
Unionville
Monroe
Peekskill
Lake Waccabue
Saybrook
Pine Island
Lake Jones Point
Bedford
Saybrook Pt.
Warwick
Southfields
Oscawana
Mt. Kisco
Cornfield Pt.
Sachem Head
Tuxedo
WESTCHESTER
Bridgeport
Faulkner I.
Ft. Terry
Deckertown
Lakeville
Pleasantville
Orient
Franklin Jc.
ROCKLAND
New City
Hillburn
Ossining
Greenport
Suffern
Valley Falls
Nyack
Hawthorne
South Norwalk
Shelter Island
Newton
Spring Valley
Orangeburg
Tarrytown
Valhalla
Stamford
Peconic
NEW
Sparkhill
Whiteplains
New Suffolk
Sag Harbor
Dobbs Ferry
Port Chester
LONG ISLAND
Wading River
Laurel
Wainscott
Hibernia
Tuckahoe
Mamaroneck
Port Jefferson
Rocky Point
Riverhead
East H
PATERSON
Yonkers
Larchmont
Northport
Stonybrook
Golf Grounds
Bridgehampton
Dover
Pelham
New Rochelle
Kings Park
Manor
Southampton
Boonton
Hackensack
Glen Cove
Oyster Bay
Good Ground
Hackettstown
Passaic
Ft. Schuyler
Roslyn
Smithtown
Quogue
JERSEY
German Valley
Morristown
Hoboken
Albertson
Brentwood
Eastport
Ft. Slocum
Holtsville
Mastic
JERSEY CITY
Mineola
Hicksville
Gladstone
NEWARK
QUEENS
Amityville
Islip
Brook-Haven
Patchogue
Jamaica
NASSAU
Babylon
Bayshore
Fire Island
White House
Elizabeth
BROOKLYN
Lynbrook
Massapequa
Great South Bay
or Great
South Beach
S. Plainfield
Staten
Hewlett
Merrick
Somerville
RICHMOND
Ft. Hamilton
Oak I.
Fire Island
Richmond
Rockaway Beach
Long Beach
Beach
Metuchen
Island
Ft. Collins
Canal
Manhattan Beach
East Millstone
Sandy Hook L.S.
Scotland Wreck L.S.
Fire Island L.S.
New Brunswick
Same Scale as Main Map
Brampton
TORONTO
ONTARIO
Streetville Jc.
To Port Hope
To Toronto
To Kingston
Hamilton
Fort Niagara
Newfane
Gaines
ORLEANS
Youngstown
N. Hartland
Middleport
Canal
Holley
Erie
Brockport
Parma
Forest Lawn
Webster
Union Hill
Ontario
N. Williamson
East Williamson
Lake Sterling Sta.
St. Catherines
NIAGARA
Medina
Rochester
Wallington
Alton
Red Creek
Lewiston
Pekin
Gaspport
Lockport
West Shelby
South Barre
Honest Hill
Spencerport
Lincoln Park
Brighton
Marion
Zurich
Rose
Lewiston Heights
Suspension Bridge
Lockport Jc.
N. Bergen
Churchville
Fairport
Wayneport
Niagara Falls
Pendleton
Byron Center
W. Bergen
Bergen
MONROE
Scottsville
West Henrietta
Lyons
Clyde
Allanburg
La Salle
Alabama
Akron
Falkirk
GENESEE
Batavia
Pixley
Fishers
Victor
Tonawanda
N. Tonawanda
Stafford
Leroy
Caledonia
Farmington
Canfield Jct.
Wellan
Williamsville
East Clarence
Clarence
Dalkeith
Phelps
Junius
Tyre
Niagara Jct.
Bowmansville
Corfu
Lehigh
D. East Bethany
Genesee Val. Jc
Shortsville
Clifton Springs
Seneca Falls
Port Colborne
Fort Porter
Lancaster
Alexander
Holcomb
Geneva
Dixon
Waterloo
BUFFALO
Ebenezer
Attica
Pearl Creek
Linwood
Avon
Lima
Canandaigua
Blasdell
Elma
Jamison
Cowlesville
Dale
South Avon
Conesus Lake Jc.
Vincent
Stanley
MacDougall
Abbotts Road
Orchard Park
East Aurora
Folsomdale
Perry Center
Wyoming
LIVINGSTON
ONTARIO
Reeder
Hamburg
Jewettville
Varysburg
Warsaw
Conesus L.
S. Livonia
Honeoye
Canandaigua
Lake
SENECA
North Evans
Westfalls
P.O.
S. Wales
WYOMING
Perry
Mount Morris
Rushville
Earls
Romulus
LAKE ERIE
572 feet above mean sea level
ERIE
Java Center
North Java
Silver Lake
Groveland Sta.
Bristol Springs
Middlesex
Dresden
Willard
Eden Center Sta.
Patchin
Colden
Rock Glen
West River
Derby Siding
Hollett
Silversprings
Springwater
Penn Yan
Ovid
North Collins
Glenwood
Hardy
Curries
Tuscarora
Naples
YATES
Seneca
Lodi
Farnham
Fenton
Protection
Bliss
Castile
Oakland
Branchport
Himrods
Lake
Cayuga
Sheridan
Lawton Sta.
East Concord
Eagle
Portage
Nunda
Wayland
Dansville
North Cohocton
Silvercreek
Forestville
Collins
Yorkshire
Arcade
Hunt
Lake
Dunkirk
Collins
Center
Springville
Sandusky
Wyoming
Rossburg
Perkinsville
Pulteney
Dundee
Truansburg
Van Buren Pt.
Van Buren
Perrysburg
Delevan
Freedom
Van Nostrands
Cohocton
Urbana
Catawba
Logan
Nortons
Fredonia
Gowanda
East Ashford
Fillmore
Canaseraga
Hornellsville
Wallace
Keuka
Fenton
Burdett
Brockton Sta.
Cottage
Dayton
West Valley
Leek
Houghton
Knightsville
Renchans Altay
Portland
Skinners
South Dayton
Persia
Machias
Orangeville
Birdsall
Arkport
SCHUYLER
Westfield
Cassadaga
Devereux Sta.
Bird
Kanona
Hammondsport
Watkins
Prospect Sta.
Cherrycreek
East Leon
Cattaraugus
Frankinville
Belfast
Stephens Mills
Sonora
Watkins
Montour
Ripley
Ripley Crossing
Moons
Ashford Sta.
Rockville
Angelica
Almond
Bath
Glen Alpine
Mayville
Dewittville
Sinclairville
Little Valley
CATTARAUGUS
Blackcreek
Bennetts
STEUBEN
Monterey
Chautauqua
Bemuspoint
Gerry
Conewango
Elk
Ellicottville
Ischua
North
ALLEGANY
Canisteo Sta.
Savona
South Bradford
Millport
Cayuta
Clearcreek
Great Valley
Cuba
Belvidere
Belmont
Canisteo
Adrian
Campbell
Curtis
Hornby
Pine Valley
CHAUTAUQUA
Randolph
Friendship
Tip Top
Bennetts
Cameron
Sherman
Chautauqua L.
Falconer
Salamanca
Haskell Flats
Andover
North Jasper
Cameron
Coopers
Gibson
Bigflats
Corning
Lakewood
Red House
Allegany
Richburg
Wirt Sta.
Dyke
West Jasper
Mills
Painted Post
Horseheads
Panama Sta.
Steamburg
Carrollton
Olean Sta.
Wellsville
Union
Rexville
Rathbone
Elmira
Jamestown
Quaker Bridge Sta.
Riverside
Olean
Bolivar
Stanards
Woodhull
Addison
CHEMUNG
Wattsflats
Frewsburg
Wolf Run Sta.
Portville
McGraws
East Troupsburg
Borden
Lindley
Southport
Clymer
Grant
Onoville
Halls
Limestone
Carroll
Little Genesee
Whitesville
Elmira
Sta.
Fentonville
Shongo
Mapes
Payneville
South Nichols
Freeman
Pine City
Wellsburg
Knapp Creek
Troupsburg
S. Elkland
Tioga Jc.
Ulysses
Westfield
State Capital
County Seats
Smethport
PENNSYLVANIA
Pt. Allegheny
Galeton
Gaines
Wellsboro
Troy
Ansonia
Blossburg
Fallbrook
Antrim
Hammond's 8 x 11 Map of New York
Copyright, 1904, by C.S. Hammond & Co., N.Y.
Longitude 78°
West 77°30′
from 77°

NEW YORK

SCALE OF MILES

0 5 10 20 30 40

H 76 J 75 30′ K 75 L 74 30′ M 74 N 73 30′ O

45 44 43 42 41

1 2 3 4 5 6 7

30

Cornwall · Fort Covington · Clinton Mills · Moores Jc. · Moores P.O. · Champlain · Rouse Point · Altona · Chazy · Ingraham · North Hero · Alburg

Massena · Hyndo · Massena Springs · Helena · Bombay · E. Constable · Chateaugay · Ellenburg Sta. · Malone · Burke · Alderbend · West Chazy · Sciota

Morrisburg · Chase Mills · Waddington · Plumbrook · Raymondville · Moira · Bangor · Whippleville · Bradley Pond · Beekmantown · Dannemora · Chazy Lake · Plattsburg

Chipman · Lisbon P.O. · Madrid · Lawrence · Lawrenceville · Chasmfalls · Owlshead · Mountainview · Russia · South Jc.

Prescott · Ogdensburg · Bucksbridge · Norwood · Fort Jackson · Potsdam · Dickinson Center · St. Regis Falls · Wolf Pond · Moffitsville · Clayburg · Peru

Holden · Heuvelton · Parishville · Santa Clara · Weidman · Loon Lake · Port Kent

Brockville · Morristown · Canton · West Parishville · Wick · South Colton · Madawaska · Lake Kushaqua · Onchiota · Disco · Keeseville

Brierhill · Depeyster · Pierrepont · North Hammond · Edenton · DeKalb Jc. · Brandon · Paul Smiths · Vermontville · Ausable Forks · Rogers · Burlington

Hammond · Black Lake · Macomb · Hermon · Clare · Hollywood · Bay Pond · Lake Clear Jc. · Bloomingdale · Haselton · Willsborough

South Hammond · Richville Sta. · Elmdale · Gouverneur · Degrasse · Clarksboro · Kildare · Saranac Inn · Undercliff · Upperjay · Essex

Alexandria Bay · Edwards · Sevey · Saranac Lake · Lake Placid · Essex Sta.

Point Vivan · Redwood · Matoon · Emeryville · Childwold · Raybrook · Lewis · Wadhams

Grindstone Islands · Plessis · Keenes · Windfall · Pierrefield · Central Jc. · Cascadeville · Elizabethtown · Mills

Clayton · Theresa · East Pitcairn · Newtonfalls · Tupper Lake · Corey's · Vergennes

Orleans Corners · Antwerp · Harrisville · Coffins Mills · Cranberry Lake · Moody · Howards

Vincent · Philadelphia · Benson Mines · Jayville · Horseshoe · Mt. Seward · Adirondack · Mt Marcy · Mineville

Evans Mills · Sterlingville · Lake Bonaparte · Sabattis P.O. · Port Henry

Mile Bay · Chaumont · Leraysville · Diana · Natural Bridge · Bog Lake · Long Lake · Middlebury

Brownville · Greatbend · Sylvan Lake · Nehasane

Dexter · Watertown · Carthage · Indian River · Partlow · Longlake · Newcomb · Blueridge · Crown Point

Black River · Brandreth Lake · Grove · Tahawus · Boreas River

Alversons · Deer River · Copenhagen · Rices · Kirchnerville · Beaver · Blue Mountain Lake · Severance · Addison Jc

Smithville · Castorland · Adams Center · Crystaldale · Woods Lake · Coch Muller · Ticonderoga

Barnes Corners · Bigmbose · Uncas Road · Raquette Lake · Schroon L. · Wright

Belleville · Adams · Lowville · Chaselake · Indian Lake · Minerva · Graphite · Putnam

Ellisburg · Lorraine · Martinsburg Sta. · Clearwater · Eagle Bay · Sabael · Igerna · Silverbay

Mannsville · Glenfield · Fulton Chain · Indian L. · Northcreek · Dresden

North Boylston · Hooker · Turin · Greig · Nelson Lake · Chestertown · South Horicon

Sandycreek · Lacona · Greenboro · Collinsville · Lyon Falls · McKeever · Cedar Lakes · Lake

Port Leyden · Otterlake · The Glen · Whitehall

Pulaski · Richland · Redfield · Constableville · Atwell · Garnet

Daysville · Altmar · Mohawk Hill · White Lake · Honnedaga · Speculator · Thurman P.O. · George

Fernwood · Osceola · Thurman · Kattskill Bay · N. Granville

Mexico · South Albion · West Leyden · Boonville · Tarnesda · Knowlehurst · Caldwell · Crosbyside · Fort Ann

Union Square · Kasoag · Williamstown · Forestport · Piseco · Lake Pleasant · Rudeston · Granville

Parish · West Camden · Aldercreek · Witmurt · Morehouseville · Wells · Stonycreek · French Mountain · Kingsbury · Smiths Basin

Palermo · Jerry · Amboy · Camden · East Steuben · Northwood · Conklinville · Glens Falls · Sandy Hill · Hartford

Fulton · Mallory · Center · Remsen · Hinckley · Hopefalls · South Glens Falls · Fort Edward

Central Square · McConnellsville · Prospect · Prospect Jc. · Benson Center · Benson · Westday · Argyle · Rupert

Pennellville · Caughdenoy · Cleveland · Holland Patent · Gray · Northville · Batchellerville · Corinth · WASHINGTON

Phoenix · Rome · Stittville · Poland · Norway · Stratford · Gansevoort

Clay Sta · Statebridge · New London · Whitesboro · Utica · Newport · Middleville · Emmonsburg · Granberry Creek · North Greenfield · Summit

Woodard · Liverpool · Eastwood · Fayetteville · Vernon · Clinton · Little Falls · Dolgeville · Broadalbin Jc. · Mayfield · Gloversville · Johnstown · Ballston Spa · Saratoga Springs · Schuyler Jc. · Cambridge

SYRACUSE · Kenwood · Manlius · Siloam · Deansboro · Sauquoit · Frankfort · Cork · Galway · Saratoga Lake · Lees

Onondaga Castle · Stockbridge · Oriskany Falls · Paris · Clayville · Mohawk · Deck · Hagaman · Rockton · Amsterdam · Mechanicsville · Johnsonville · Hoosick Falls

ONONDAGA · Cazenovia · Waterville · Columbia · Millers Mills · Palatine Bridge · Fultonville · Hoffmans · Elnora · Usher's · Valley Falls

Lafayette · Berwyn · Delphi P.O. · Winfield · Canajoharie · Rotterdam Jc. · Crescent · Waterford · Boyntonville

Otisco L. · Apulia · Erieville · Hamilton · MADISON · Brookfield · Leonardsville · Richfield Springs · Charleston · Aqueduct · Lansingburg

Skaneateles L. · Tully · Fabius · Randall · Canandaigua Lake · Sharon Springs · Stonyville · Duanesburg · Cohoes · Troy · Berlin

Glenhaven · Keeney · Deruyter · Earlville · Lebanon · Poolville · W. Edmeston · Schuyler Lake · Sharon · Esperance · Watervliet · Green Island · Petersburg

Truxton · Cuyler · Otselic · Tallette · Edmeston · Otsego Lake · Cooperstown · Schoharie Jc. · Richmondville · Howe Cave · Altamont · Albany · RENSSELAER

Homer · East River · Mariposa · Smyrna · Sherburne · Edmeston · OTSEGO · Maple Valley · Cobleskill · Schoharie · Voorheesville · Rensselaer · Center Berlin

CORTLAND · Sherburne · Four Corners · New Berlin · Phoenix Mills · Hartwick Seminary · Beards Hollow · Berne · Feura Bush · Delmar · South Berlin

Cortland · McGrawville Sta. · Galena · Pittsfield · Lena · SCHOHARIE · ALBANY · Luther

Pitcher · Chenango Lake · New Milford · Worcester · Middleburg · Selkirk · Stephentown

Splon · McLean · Cincinnatus · Norwich · Portlandville · Fairland · Schenevus · Jerome · Breakabeen · South Bethlehem · Castleton · Nassau

Blodgetts Mills · McDonough · Morris · Laurens · Maryland · Dormansville · Cocyman · Brainard · New Lebanon

Geebrook · Holmesville · Gilbertsville · Colliers · Junction · Fergusonville · Livingstonville · S. Westerlo · Schodack Landing

Virgil · Willett · CHENANGO · Rockwells Mills · Oneonta · Davenport Center · South Jefferson · Mackey · Valatie · Rayville · Pittsfield

North Hartford · Sta. · Landers · Oxford · Guilford · Smithville · Stamford · Conesville · Greenville Center · New Baltimore · Kinderhook · East Chatham

Marathon · Hartford Mills · Killawog · Flats · Parker · Unadilla · Otego · East Meridith · Franklin · Hobart · Grand Gorge · Cornwallville · Coxsackie P.O. · Newton Hook · Chatham

Richford · Lisle · Triangle · Brisben · Sidney · Bloomville · Kortright · Windham · Coxsackie · Cairo · Leeds · Ghent · Austerlitz

Berkshire · Whitney Point · Barker · Greene · Bainbridge · E. Sidney · Franklin · Delhi · South Kortright · Vega · Big Hollow · COLUMBIA · Pulvers

Wilseyville · Youngs · Roxbury · GREENE · Cairo · Philmont

Snider · Chenango Forks · Willards · Northfield · Fraser · Lexington · Catskill · Hudson

Candor · Newark Valley · Afton · Loomis · Ogdens · Lake Delaware · Denver · Halcott · Hunter · Catskill · Martindale

Spencer · W. Chenango · Fenton · Nineveh Jc. · Walton · Andes · Kellys Corners · Tannersville · Craryville · Hillsdale

Swifts · Nineveh · China · DELAWARE · Center · Grand Gorge · MOUNTAINS · Linlithgo · Copake · Iron Works

Owego · Lestershire · Hoopes Union · BROOME · East Windsor · Beerston · Margaretville · Arkville · Hotel · Shamtaken · Lanesville · Malden · Germantown · Copake

Binghamton · Rockrift · Arena · Big Indian · Phoenicia · Saugerties · W. Taghkanick

Apalachin · Langdon · Windsor · Deposit · Apex · Shavertown · Colchester · Belleayre · P.O. · Wittenberg · Tivoli · Elizaville · Boston Corners

Vestal Center · Tuscarora Sta. · Riverside · State Line · Oquaga Lake · Readburn · Hardenburg · Cold Brook · Mt. Marion · Croker-town · Silverna · Cohaan

Nichols · Vestal · Caosia · East Branch · Lake Katrine · Red Hook · Pine Plain · Mt Rira

Eddy · Beaverkill · Frost Valley · Brown Sta. · Rhinebeck · Millerton

Hancock · Cooks Falls · Rockland · Emmonsville · Broadheads Bridge · Kingston · Roundout · Coleman

Stockport · Livingston Manor · Claryville · Bullrun · ULSTER · Stissing

Lordville · Cooley · Samsonville · Marbletown · Port Ewen · McIntire

Long Eddy · Eureka · Mombaccus · Esopus · Stattsburg · Amenia

Parksville · Neversink · St. Josen · Rosendale · Saltpoint · Hibernia · Wassaic

Fremont Center · Liberty · Hasbrouck · Springtown · Hydepark · Millbrook

Jeffersonville · Wood-bourne · Minne-waska · Kerhonkson · Newpal[tz] · P.Jc. · Oak Summit · DUTCHESS · Kent

Calicoon · Strongtown · Luzon · Fallsburg · Ellenville · Highland · Poughkeepsie

Thompsons · Montrose · Elford · Herrick Center · Cochecton · Mountaindale · Forest · Modena · Briggs · Wings Sta.

Dimock · Hop Bottom · SULLIVAN · Spring Glen · Arthursburg P.O.

Bethel · Monticello · Red Hill · Glen Gardiner · Marlboro · Fishkill Plains

Cochecton Center · Summitville · Pine Bush · Wallkill · Wappingers · Pawling

Forest City · Narrowsburg · Beaverbrook · St. Josephs · Mamakating · Cedar Cliff · Stormville · New Milford

Lynn · Tusten · Hartwood · Brown-ville · Montgomery · Walden · Fishkill · Falls · Reynoldsville · Patterson

Glenspey · Winterton · Newburgh · Matteawan · Towners

Pondeddy · W. Brookville · Middle-town · Maybrook · Cornwall · Fishkill Landing · Storm King · Dykemans

Hugenot · ORANGE · Washington-ville · Goshen · PUTNAM · Coldspring

H 76 J 75 30′ K 41 30 75 71 74 30′

ucts, valued at $11,772,874, including common and paving brick, $7,310,007; stone, $6,993,705, including limestone, $2,898,520, and sandstone, $1,978,117; salt, 9,642,178 barrels, valued at $2,335,150; cement, 3,238,884 barrels, valued at $3,067,088, of which 2,290,995 barrels, valued at $2,433,918, was Portland; petroleum, 1,212,300 barrels, valued at $2,127,748; sand and gravel, 5,254,896 short tons, valued at $1,767,521; gypsum, valued at $800,225; natural gas, valued at $766,157; mineral waters, 7,176,815 gallons sold, valued at $686,574; lime, 137,111 short tons, valued at $652,205; and fibrous talc, 67,800 short tons, valued at $626,000.

Manufactures.—The river systems with their extensive water power, the proximity of the Pennsylvania coal fields, and the facilities for transportation make New York one of the most prominent manufacturing States. Niagara Falls gives enormous power, which is turned into electricity and used in the manufacture of aluminum, carborundum, and machinery. Schenectady is famous for its locomotives and electrical apparatus, Balston Spa for its paper mills, Elmira for its car shops, Oswego for flour mills, Kingston for hydraulic cement, Haverstraw for bricks, Rochester for optical goods, Syracuse for salt, and Brooklyn, New York city, Buffalo, Utica, Albany, Troy, Binghamton, Yonkers, and Long Island City for general manufactures. According to the Federal census of 1905 there were 37,194 factory-system manufacturing plants, employing $2,031,459,515 capital and 856,947 wage-earners; paying $430,014,851 for wages and $1,348,603,286 for materials; and yielding products valued at $2,488,345,579. While New York has held first rank among the States in many respects since early in the 19th century, in none has its predominance been so marked as in its manufactures.

Banking.—On Sept. 1, 1910, there were reported 449 National banks in operation in the State, having a combined paid-in capital of $169,817,100. The savings banks numbered 142, had 2,886,910 depositors and $1,628,916,868 in total resources, and held an aggregate of $1,526,935,581 in deposits, or an average of $528.92 to each depositor. In comparison with other States, New York had the largest capital invested in State banks, $34,148,000, and the largest volume of aggregate resources, $617,416,371. The New York Clearing House Association had a membership of 50 banks, with aggregate capital of $132,350,000. Its exchanges represent approximately 60 per cent. of the clearings of all associations in the country, and in 1910 reached $102,553,959,100, within $1,200,140,901 of the maximum amount during its existence. There were 252 building and loan associations in the State, with a total of 127,973 members and $49,631,104 in assets.

New York

Commerce.—New York is the most important commercial State in the Union, the greater part of the European commerce being carried on through the port of New York. It has also a large internal and interstate trade promoted by its exceptional railroad, river, lake, canal, and coast-wise facilities. In the fiscal year ending June 30, 1910, the total commerce in merchandise aggregated in value $1,721,042,065, and that of gold and silver in ore, bullion, and coin, $5,616,432. The following table shows the foreign merchandise trade by customs districts and ports of delivery:

Ports.	Imports.	Exports.
Albany	$1,520,477	.....
Buffalo Creek	11,122,903	$34,788,677
Cape Vincent	363,478	151,380
Champlain	9,602,829	17,608,720
Dunkirk	15,975	.....
Genesee	1,975,191	1,360,959
Niagara	5,430,477	20,320,186
Oswegatchie	20,420,047	4,623,572
Oswego	991,945	2,516,202
Syracuse	251,733	.....
New York	935,990,958	651,986,356
Total	$987,686,013	$733,356,052

Education.—The head of the State's educational system is the University of the State of New York, which is a chartering, examining, appointing, and supervising, but not a teaching, body; is composed of regents elected by the Legislature on joint ballot; and, besides universities, colleges, and academies, issues charters to libraries and museums. The age limit for free attendance at the public schools is 5-21; for compulsory attendance, 8-16. The population of school age exceeds 2,000,000, nearly evenly divided between males and females; the enrollment in the public schools is over 1,400,000; the average daily attendance, over 1,100,000; and the estimated enrollment in private and parochial schools exceeds 350,000. There are over 43,000 teachers, of whom about 38,000 are women, and all receive an average monthly salary of $88.56. Buildings used for public school purposes exceed 12,000 in number, and the value of all school property is estimated at $175,000,000. The ordinary annual revenue from all sources is over $56,000,000, and the ordinary expenditure, including about $31,500,000 for salaries of superintendents and teachers, is about $55,000,000. The permanent school funds aggregate in value $8,996,863.

The following table shows the principal universities, colleges, and technological schools for men and for both sexes:

UNIVERSITIES, COLLEGES, ETC.

Location	Name	Control	Opened
Alfred	Alfred University.	Non.sect.	1836
Annandale	St. Stephen's Col.	P. E.	1860
Brooklyn	Adelphi College	Non-sect.	1896
"	Polytechnic Inst.	"	1854
"	St. Francis Col.	R. C.	1859
"	St. John's College	"	1870

UNIVERSITIES, COLLEGES, ETC.

Location	Name	Control	Opened
Buffalo.....	Canisius College..	R. C.	1870
Canton.....	St. Lawrence Univ.	Univ.	1858
Clinton.....	Hamilton College.	Non-sect.	1812
Geneva.....	Hobart College ..	"	1822
Hamilton...	Colgate Univ. ...	"	1819
Ithaca.....	Cornell Univ. ...	"	1868
New York..	Coll. St. Francis Xavier	R. C.	1847
" ..	Coll. of City of New York	City.	1849
" ..	Columbia Univ. ..	Non-sect.	1754
" ..	Fordham Univ. ..	R. C.	1841
" ..	Manhattan College	"	1863
" ..	New York Univ..	Non-sect.	1832
Niagara....	Niagara Univ. ...	R. C.	1856
Potsdam...	Clarkson School of Technology	Non-sect.	1896
Rochester..	Rochester Univ. ..	Bapt.	1850
St. Bonaventure.....	St. Bonaventure's College	R. C.	1859
Schenectady	Union University.	Non-sect.	1795
Syracuse...	Syracuse Univ. ..	M. E.	1871
Troy.....	Rensselaer Polytechnic Inst. ..	Non-sect.	1824
West Point.	U. S. Milit'y Acad.	National.	1802

Teachers College, in New York city, founded in 1888 and affiliated with Columbia University in 1898, is a school of pedagogy only.

The principal colleges for women exclusively are shown below:

COLLEGES FOR WOMEN

Location	Name	Control	Opened
Aurora.....	Wells College ...	Non-sect.	1868
Elmira.....	Elmira College ..	Presb.	1855
NewRochelle	Coll. of St. Angela	R. C.	1904
New York..	Barnard College ..	Non-sect.	1889
Poughkeep'e	Vassar College ..	"	1865

Churches.—According to a special Census report on "Religious Bodies" (2 vols., 1910) there were in the State 9,639 religious organizations, having 9,193 church edifices and 623 halls used for religious purposes, 4,638 parsonages, 3,591,974 communicants or members, and 8,795 Sunday-schools, with 123,319 officers and teachers, and 1,247,051 scholars. The value of the church property of 8,344 organizations was reported at $255,166,284, and that of parsonages of 4,638 organizations, $22,283,225. The following table shows the strongest denominations numerically:

STATISTICS OF RELIGIOUS BODIES

Denominations.	Organizations.	Churches and halls.	Communicants.	Sunday-school scholars.
Roman Catholic	1,208	1,290	*2,285,768	312,195
Methodist	2,617	2,645	313,689	276,257
Presbyterian ..	937	1,080	199,923	163,708
Prot. Episcopal	843	1,010	193,890	97,557
Baptist	1,093	1,116	176,981	136,979
Lutheran	453	472	124,644	71,097
Reformed	325	399	69,828	64,222
Congregational't	302	342	57,351	47,882
Jewish	720	342	†35,342	15,277

*All members of families. †Heads of families.

New York

Railroads.—The first railroad in the State was opened to traffic in 1831. It extended from Albany to Schenectady, a distance of 17 miles. Subsequent development is shown by specified years below:

MILEAGE OF STEAM RAILROADS

Year.	Miles.	Year.	Miles.
1831	17	1880	5,957
1845	719	1890	7,660.71
1855	2,444	1900	8,121.03
1860	2,682	1910	8,461.72
1870	3,928	1911	8,467.71

The railroads operating in the State in 1911 were the Boston & Albany; Boston & Maine; Buffalo, Rochester & Pittsburg; Central of New Jersey; Delaware & Hudson; Delaware, Lackawanna & Western; Erie; Lake Shore & Michigan Southern; Lehigh Valley; Long Island; Michigan Central; New York Central & Hudson River; New York, Chicago & St. Louis; New York, New Haven & Hartford; New York, Ontario & Western; New York, Susquehanna & Western; Pennsylvania; and the Rutland.

Canals.—New York was formerly supplied with about 20 canals, but in late years many of these have been abandoned. In 1911 the Erie, Oswego, and Champlain canals were being enlarged at an estimated cost of $101,000,000, and the Cayuga and Seneca canal was about to be enlarged at an estimated cost of $7,000,000. The following table shows the principal canals now in operation:

CANALS IN OPERATION

Name.	Length miles.	Opened.	Cost.
Black River	35	1849	$3,581,954
Cayuga and Seneca	25	1839	2,232,632
Champlain	81	1822	4,044,000
Delaware and Hud.	86	1828	6,339,210
Erie	387	1826	52,540,800
Harlem (Ship) ..	7	1895	2,700,000
Oswego	38	1828	5,239,526
	659	.....	$76,678,122

Finances.—The revenues of the State in 1910 yielded the largest amount of any year in its history, the total being $37,460,200, or $2,931,685 more than in the previous record year. The principal sources were: Excise, $9,589,779; corporation taxes, $9,123,738; inheritance taxes, $8,212,735; stock transfers, $4,635,443; and mortgage taxes, $1,931,848. In 1893 the State debt had been reduced to $660—practically extinguished. In 1895 the first proposition for issuing bonds for canal enlargement and improvement was sanctioned by popular vote, the amount being $9,000,000; in 1903 a further issue of $101,000,000 was authorized; and in 1909 a third one for $7,000,000. All of these bonds are issued as required by the work. The total bonded debt of the State at the end of 1910 was $57,230,660, and the sinking fund held

New York

$24,158,490. The equalized assessed valuations in 1910 were: Real estate, $9,266,628,-482; personal property, $555,192,070—total, $9,821,820,552. No State tax had been levied since 1905.

State Government.—The governor is elected for a term of two years, and receives a salary of $10,000 per annum. Legislative sessions are held annually, commencing on the first Wednesday in January, and the length of the session is unlimited. The Legislature has 51 members in the Senate and 150 in the House, each of whom receives $1,500 per annum, and mileage. There are 37 Representatives in Congress. In 1911 the State government was Democratic.

Population.—The following table shows the growth of the population by each National decennial census:

POPULATION, 1790-1910

Year.	Total.	Year.	Total.
1790	340,120	1860	3,880,735
1800	589,051	1870	4,382,759
1810	959,049	1880	5,082,871
1820	1,372,812	1890	6,003,174
1830	1,918,608	1900	7,268,894
1840	2,428,921	1910	9,113,614
1850	3,097,394		

History.—The first explorations of New York were made by Champlain and Henry Hudson in 1609; Champlain coming down from Canada, as far as the lake which bears his name, and Hudson, discovering New York Bay, and sailing up the Hudson river. The region surrounding the Hudson was claimed by the Dutch who called the place New Netherlands, sending out numerous colonists, who explored the country along the Hudson and Long Island Sound, and founded trading posts at Fort Orange (now Albany), and at New Amsterdam, on Manhattan Island, the latter the present city of New York. The Dutch settlements were invaded by the English from Connecticut, and by the Swedes in Delaware. The English claimed New Netherlands as part of Virginia, priorly discovered by Cabot, and Charles II., in 1664, granted a charter of all the lands lying between the Hudson and the Delaware to his brother, the Duke of York. In August of the same year the whole country passed into the possession of the English, who gave the name of New York to New Amsterdam, and that of Albany to Fort Orange. When the Duke of York ascended the English throne as James II., the government became an appendage to the crown, and was administered by viceroys bearing the title of governor. In 1684 Governor Dongan concluded an offensive and defensive treaty with the Indians; and from that time forward the English became their allies and fast friends. The peace of Ryswick, in 1697, terminating the war between England and France, Count Frontenac, the French governor of Canada at the time, directed his force against the Five Nations. This proceeding was frustrated by the English governor of the province, who supported the Indians. The great conflict between England and France to decide the sovereignty of America broke out in 1754. In 1756, the French destroyed Oswego; and, in the following year, Fort William Henry capitulated to the French, when the English garrison was massacred by the Indian allies of the victors. In 1758 General Abercrombie was defeated at Ticonderoga, and Colonel Bradstreet took Fort Frontenac. In 1759 Niagara surrendered to General Prideaux and Sir William Johnson, and Ticonderoga and Crown Point were abandoned, leaving no French troops within the limits of the colony. In 1775 the Revolutionary War broke out, and in February, 1776, an American force took possession of New York city, which they held till the defeat at Long Island in August. In 1786 New York city was evacuated by the British. The first constitution of the State was adopted in 1777, and was successively revised in 1801, 1821, 1846, 1877. In 1788 New York adopted the Federal Constitution. The national government was first located in New York city, which was the State capital till 1797. During the War of 1812 important events took place on the N. boundary, along Lake Ontario, the Niagara river, and on Lake Champlain. Slavery was abolished in 1817. Steamboat navigation was begun on the Hudson in 1807, and in 1825 the Erie Canal was completed from the Lakes to the Hudson. New York took an active part in the Civil War, supplying large numbers of troops to the army. On March 29, 1911, the State Capitol at Albany, that cost $27,-000,000, was damaged by fire to an estimated extent of over $5,000,000, and many priceless records and documents were destroyed.

New York, the commercial, financial, and industrial metropolis of the United States; the first city in the country in population and general importance; and the first in the world in commerce and the second in population. It is in the S. part of the State of the same name, at the junction of the Hudson, or North, and the East rivers, and at the head of the most commodious and magnificent bay in the world, and in lat. 40° 42′ N. and long. 74° 0′ 3″ W. from Greenwich. Until the creation of the Greater New York in 1898, it was confined to the island of Manhattan, lying between the rivers named and the Harlem at the N., which connects them, and the group of small islands in the East river. Manhattan Island alone is 13½ miles long, with a width varying to a maximum of 2¼ miles (at 14th street).

According to Van der Donck, who published a "History of the New Netherlands" (Amsterdam, 1656), Hudson's river was

New York

the English name of the great river coming from the North; but the Dutch "called it *Mauritius*, after Prince Maurice, who then presided over the government of Holland." The original Indian name of the island was *Manhattan;* the Dutch called the city *Nieuw Amsterdam;* and the English changed it to the name it still retains. The same writer gives the following quaint description of the bay of New York: "The bay on which Staaten Island is situated is the most celebrated, because the East and North rivers flow into it * * * together with a number of kills, gats, and creeks, some of which resemble small rivers, and are navigable, as Raritan Kill, Kill Van Kull, Nieuvesink, etc. This bay is so formed as to render it safe from all boisterous winds, and a thousand ships of burthen may harbor in it within the land. The entrance into the bay is extensive, and is accomplished with but little danger to those who have once gone, or have been taught the passage."

Topography.—As at present constituted, New York city has an extreme length of 35 miles; an area, including the islands in the East river, of 326.89 square miles; and an aggregate water frontage, excluding those islands, of 341.22 lineal miles. It is divided into five boroughs: Manhattan, consisting of Manhattan Island, Governor's Island, Bedloes Island, Ellis Island, Blackwell's Island, Randall's Island, Ward's Island and Oyster Island; Bronx, consisting of all that portion of the city lying N. or E. of the Harlem river, between the Hudson and the East rivers and Long Island Sound, including City, Traver's, Hart's, and Riker's islands; Brooklyn, consisting of the former city of Brooklyn, and all of Kings county; Queens, including the present county of that name; and Richmond, consisting of Staten Island.

The main body of the city, situated on Manhattan Island, is bounded by Spuyten Duyvil creek, and the Harlem river, separating it from the mainland of the State, the East river, New York Bay, and the Hudson river. The island was originally very rough, with a rocky ridge running from the S. extremity, N. and branching into several spurs. These unite at a distance of several miles, culminating in Washington Heights, 230 feet above the water, and in a bold promontory 130 feet high in the extreme N. In the S. the surface consisted in many places of alluvial sand deposits and swamps. The original surface is disappearing by the constant grading and filling in, by the improvement of old and construction of new streets.

Street Plan.—At the S. end of Manhattan Island is the Battery, a park of 21 acres having a fine water front. Running N. from the Battery is Broadway, one of the principal business streets. At 10th street Broadway turns N. W., and finally merges into 11th avenue. The streets in the S. part of the city are narrow, crooked and irregularly laid out, but beginning with 13th street, they become regular, crossing each other at right angles; the cross streets are numbered, as are also most of the avenues running N. and S.

Bridges.—The Harlem river is spanned by a dozen bridges, the most noteworthy of which are the Willis, Madison, and Lenox avenues, the Broadway, University Heights, Washington, King's, and High, the latter carrying the first Croton aqueduct, and several railroad bridges.

Four great bridges now span the East river, affording rapid interborough transit. The oldest, variously known as the East river and the Brooklyn bridge, connects Manhattan and Brooklyn, from Park Row in the former to Sands and Washington streets in the latter. It was built by the Roeblings; was begun Jan. 3, 1870; opened to traffic May 24, 1883; and up to 1911 had cost about $22,400,000. The roadway, accommodating surface and electric railroads, carriages and wagons, and pedestrians, is suspended from four cables.

The Williamsburg bridge, connecting Clinton street, Manhattan, and Havemeyer street, Brooklyn, was begun Nov. 7, 1896; opened for foot and wagon traffic Dec. 19, 1903, and for various railway lines in 1904, 1905, and 1908; and cost for construction, including the station in Manhattan, $14,000,000. It is also a four-cable suspension structure.

The Manhattan bridge is a double-deck structure, extending from the Bowery and Canal street, Manhattan, to Nassau, near Bridge street, Brooklyn; begun Aug. 29, 1901; roadway opened for traffic Dec. 31, 1909, and the east footway to pedestrians, July 18, 1910; cost, $14,000,000 for structure and $12,000,000 for land.

The Queensboro bridge is technically known as a continuous cantilever; extends from Second avenue and 60th street, Manhattan, to Crescent street, Queens, with supporting towers on Blackwell's Island; begun in June, 1901; opened for pedestrians and vehicles March 30, 1909, and for surface railway Sept. 19 following; cost, $12,662,000 for structure and $4,594,000 for land.

Rapid Transit.—When the Brooklyn bridge was opened to traffic it was generally believed that the great structure would prove adequate for all demands for many years to come; but this illusion was soon dispelled. Inter-borough traffic, particularly represented by people working in Manhattan, demanded greater and quicker facilities. Additional bridges were authorized, and when it was seen that even these would prove insufficient to accommodate the rapidly-growing population and the vast army

New York

of commuters, the subway and the tunnel began to have their day.

Many years ago an attempt was made to construct an underground railway system beneath Broadway. A short stretch was made from the corner of Warren street, but the engineering experience of the day could not cope with existing conditions. Underground blasting of the ridge of hard rock that extends more or less diagonally across a large part of the island was regarded as liable to wreck the buildings along the route, and because of this and the lack of capital, the projectors were forced to abandon the scheme.

The subways and tunnels of New York constitute two entirely distinct systems; but their common purpose and their direct or nearby connections have caused them to be considered almost as a single method of rapid transit. Strictly speaking, the subways are underground constructions for railway service, and the tunnels are under-river lines; but the latter in places partake of both characteristics.

Subways.—The subways proper in operation in 1911 comprised a four-track trunk line extending from the City Hall Park through Lafayette street, Fourth avenue, 42d street, and Broadway to 96th street. Extending from the City Hall S. under Broadway to the Battery is a double-track extension, which connects with a subway in Brooklyn by means of one of the tunnels under the East river. From the 96th street terminal of the main line, one branch extends to Van Cortlandt Park at 242d street, having three tracks part of the way, two tracks another part, and an elevated structure a third part; and a second branch (Lenox avenue), terminating at the Bronx Park, has two tracks part of the way and an elevated structure the rest. The foregoing lines have a total length of 25.7 miles, with 81.9 miles of track; and cost about $50,000,000 for construction and $25,000,000 for equipment. The main portion N. of the City Hall was built in 1900-1904. Another subway, a part of the Hudson & Manhattan Railroad system, connects with the tunnels under the Hudson river at Morton street, and extends up Sixth avenue to 33d street.

At the time of writing there had been begun a Fourth avenue subway system, to extend from the Brooklyn end of the Manhattan bridge to 43d street at Fourth avenue; estimated cost, $16,000,000; and a Brooklyn loop subway system, to connect the four East river bridges, both in Manhattan and Brooklyn, making use of the Williamsburg bridge across the river. Bids had also been submitted to the Public Service Commission for a new tri-borough system, embracing the following routes: the Broadway-Lexington avenue subway, Jerome avenue branch, Southern Boulevard and Westchester avenue branch, Canal street subway, Broadway-Lafayette avenue subway, Fourth avenue subway, Fort Hamilton branch, and Coney Island branch. The plans called for two, three, and four-track construction, aggregating 44.2 miles, and the estimated cost for construction alone was $120,000,000.

Tunnels.—The relations of the subways and tunnels of New York city are so intimate that it is difficult to segregate them as distinct systems. As in the case of the first East river bridge, the subway-tunnel constructions soon fell far behind the popular need for local, interborough, and interstate accommodations, and this condition led the Public Service Commission in 1910 to sanction the great tri-borough undertaking above mentioned.

At the time of writing there were four distinct systems of tunnels proper, viz.: the Pennsylvania Railroad, the Hudson & Manhattan Railroad, the Belmont, and the Rapid Transit. The tunnels of the Pennsylvania Railroad consist of two tubes under the Hudson river, connecting Weehawken, N. J., with the great railroad station in New York at Seventh avenue, between 31st and 33d streets, completed in 1910. From this station a double line of tunnels extends under the city to First avenue, at an average depth of 60 feet below the street surface, which, with the tunnels beneath the river, was completed in 1910. A second extension of this system, with four tubes, runs from First avenue, beneath the East river, and to Long Island City.

The Hudson & Manhattan Railroad system has two sets of tunnels under the Hudson river from Jersey City, N. J., one, the North, extending to Morton street; the other, the South, to the Church street Terminal Buildings. These are double-tube lines, completed in 1908 and 1909, and have auxiliary tubes on the New Jersey side connecting the stations of the Pennsylvania and Erie railroads in Jersey City and the Lackawanna railroad in Hoboken with the main line. From Morton street, New York, what might be called with equal propriety a tunnel or a subway extends to Christopher street, thence to Sixth avenue, and then north to 33d street (opened to this point in 1910).

The Belmont tunnel extends under the East river from 42d street, New York, to Long Island City, and was completed in 1908, and the Rapid Transit tunnel extends from the Battery, New York, under the East river to Joralemon street, Brooklyn, connecting the New York and Brooklyn subways, opened in 1908. In 1911 a subway or tunnel extension was begun from Sixth avenue and 33d street through 42d street to the Grand Central station.

Parks.—The public parks of New York city are very numerous and well kept. The larger parks are: Central Park, 840 acres,

New York

in Manhattan; Bronx Park, 662 acres, and Van Cortlandt Park, 1,132 acres, in the Bronx, and Prospect Park, in BROOKLYN (*q. v.*). Central Park contains about 30 buildings, including the Metropolitan Museum of Art, the American Museum of Natural History, and the old United States Arsenal; two extensive reservoirs, numerous lakes, and children's playgrounds. The Bronx Park contains a botanical garden, and a large reservation, used as a zoölogical garden. Van Cortlandt Park is an extensive stretch of rural country, containing a large skating pond, baseball fields, golf links, and a militia parade ground. The numerous other parks, scattered about the city, include City Hall Park, containing the City Hall and Court House; Riverside Park, extending several miles along the Hudson river and containing the tomb of General Grant, and Morningside Park, situated on a high ridge E. of Riverside and containing the buildings of Columbia University, the new cathedral of St. John the Divine, and St. Luke's Hospital. Parkways are designed to connect Van Cortlandt Park with Bronx Park, Pelham Bay Park and Crotona Park. In Brooklyn, Ocean Parkway extends from Prospect Park to Coney Island. The Speedway, a public road for fast driving, 100 feet wide, extends for a distance of two miles along the foot of the bluff on the W. bank of the Harlem river.

Monuments, Statues, etc.—The city is rapidly making a large showing of monuments, statues, busts, and other works of art in its parks, squares, and plazas. In the boroughs of Manhattan and Brooklyn there are over 60 such memorials to distinguished personages, and a score or more of commemorative works. In Manhattan the most conspicuous and noteworthy example of the former group is the mausoleum, containing the remains of General Grant and his wife, on Riverside Drive and 123d street, and in Brooklyn, the statues of J. S. T. Stranahan in Prospect Park and Henry Ward Beecher in the Borough Hall Park. Among the notable impersonal statuary in Manhattan are Bartholdi's great copper statue of "Liberty Enlightening the World," on Liberty Island; Egyptian Obelisk, in Central Park; Martyrs' Monument, in Trinity Churchyard; Washington Marble Arch, Washington square; Water Gate, foot of W. 110th street, where Henry Hudson landed; Soldiers' and Sailors' Monument, Morningside Drive; and the Indian Hunter, the Pilgrim, Commerce, and the Seventh Regiment memorial, all in Central Park. Brooklyn has a magnificent Soldiers' and Sailors' Arch, and memorials to Maryland Revolutionary soldiers, the Prison Ship Martyrs, and the dead of the "Slocum" steamboat horror.

Notable Buildings.—Among the public buildings is the City Hall, 216 by 105 feet, and three stories high, a marble edifice in the Italian style, completed in 1812 at a cost of $500,000. In the rear of the City Hall is the Court House. The City Prison (Centre street) and Hall of Records (Chambers street) are noted for their fine architecture. New York is noted for the number and height of its office buildings. In 1911 there were 50 such structures ranging from 14 to 50 stories in height, or from 179 to 700 feet above the sidewalk, and 16 more were nearing completion. The tallest building was that of the Metropolitan Life Insurance Company, 700¼ feet to top of lantern on its majestic tower. Other conspicuous ones were the Singer, 612 feet; Municipal, 560; "New York Times," 419; Heidelberg, 410; "Evening Post," 385; Park Row, 382; Pulitzer ("World"), 375½; Manhattan Life, 348; St. Paul, 308; and the American Surety and American Tract Society, each 306.

Hotels.—The city is widely noted for the number, size, architectural beauty, and interior magnificence of its hotels, and for its great and sumptuous apartment houses. Of the former there are over 125 that really deserve the name. Probably the best known in Manhattan are the old Astor House, on Broadway, opposite the post-office; the Astor, on Broadway and 44th-45th street; the Belmont, on Park Avenue and 42d street; the Grand Union, on Fourth avenue and 42d street; the Knickerbocker, on Broadway and 42d street; the Martha Washington, for women only, on Fourth avenue and 29th street; the Plaza, on Fifth avenue and 59th street; the St. Regis, on Fifth avenue and 55th street; and the Waldorf-Astoria, on Fifth avenue and 33d-34th street. Brooklyn, Richmond and Queens have over 50 between them, the latter containing several large seaside ones, open only during the summer season.

Museums, etc.—The principal museums of the city are the American Museum of Natural History, on Central Park West and 77th street, containing extensive collections of animal life in all divisions—archæology, anthropology, geology, botany, paleontology, etc.; the Metropolitan Museum of Art, on Central Park and 83d street, housing the largest collection of paintings, sculpture, architectural models, and archæology in the country; the Aquarium in old Castle Garden, at the Battery, containing a greater number of species of fish and specimens than any other aquarium in the world; the Zoological Park, in Bronx Park, which has the largest collection of animals in the country; the Botanical Gardens, also in Bronx Park, with an immense Horticultural Museum; and the Brooklyn Institute of Arts and Sciences, on Prospect Park and the Eastern Parkway, possessing noteworthy

New York

collections of historical, archæological, and art specimens.

Government.—The charter in force in 1911 took effect Jan. 1, 1902. Under this charter the city is governed by a mayor elected for 4 years; a controller, also elected for 4 years; and a board of aldermen, consisting of 73 members, elected for 2 years, and a president elected at large for 4 years. The president of each borough is elected for 4 years. There are in the entire city 46 local school boards, and 25 boards of local improvement. The city is lighted by gas and electricity at a cost of $4,500,000 per annum; has a water supply system that has cost $170,500,000, and is undergoing enlargement; and contains upward of 3,500 miles of streets, of which about 2,500 miles are paved, over 2,500 miles of water mains, and 2,000 miles of sewers. The annual cost of cleaning the streets and removing ashes and garbage is over $7,500,000; of maintaining the fire department, $8,250,000; police department, $15,000,000; public schools, $30,000,000; and the entire municipal government (appropriation for 1911) $174,079,000.

Finances.—At the time the act of the Legislature creating the Greater City of New York became effective (Jan. 1, 1898), the public debt statement of the several boroughs showed the following condition:

Boroughs.	Funded debt.	Sinking fund.	Net debt.
Manhattan—Bronx	$226,144,311.28	$85,654,317.52	$140,489,993.76
Brooklyn	81,626,175.53	6,734,055.69	74,892,119.84
Queens	13,709,935.62	330,000.00	13,379,935.62
Richmond	3,486,736.67	.....	3,486,736.67
Total	$324,967,159.10	$92,718,373.21	$232,248,785.89

These figures do not include $2,007,600 revenue bonds of the former city of New York nor $4,060,000 similar bonds or certificates of indebtedness of the former city of Brooklyn, both then outstanding, but redeemable from the tax levies for 1897 and 1898, respectively. Between the date of the consolidation and Oct. 10, 1910, the Greater City of New York issued a total of $808,806,095.94 new bonds, and redeemed issues aggregating $215,716,014.60, exclusive of revenue or general fund bonds. Including special revenue and general fund bonds, the debt statement on Oct. 10, 1910, showed: Funded debt, $948,506,985; temporary loans, $133,434,798; total debt, $1,081,941.783; sinking funds, $249,557,655; net debt, $832,384,127. The net water debt, included in the foregoing, was $95,417,155.

Assessed Valuations.—The following table presents a unique view of the growth of the city in a period of more than a century. It should be borne in mind that in 1903 the assessment on real estate was made on the basis of practically actual values. These values, therefore, for 1903 and subsequent years are greatly in excess of those for previous years, resulting in a largely reduced tax rate.

Year	Real estate.	Personal.	Total.
1805	.....	.....	$25,645,867
1810	.....	.....	25,486,370
1820	.....	.....	69,530,753
1830	$87,603,580	$37,684,938	125,288,518
1840	187,221,714	65,011,801	252,233,515
1850	207,142,576	78,919,240	286,061,816
1860	398,533,619	178,697,637	577,230,656
1870	742,103,075	305,285,374	1,047,388,449
1880	1,049,340,336	197,532,075	1,246,872,411
1890	1,398,290,007	298,688,383	1,696,978,390
1900	3,168,547,700	485,574,493	3,654,122,193
1910	7,044,192,674	372,644,825	7,416,837,499

Churches.—The Reformed Church is the oldest in the city, and dates from 1628. The Protestant Episcopal is next in age, and Trinity is the oldest and wealthiest parish, maintaining several chapels: St. Paul's, St. John's, Trinity Chapel, St. Chrysostom's, St. Augustine's, St. Agnes, etc. The first Presbyterian Church was founded in 1719 in Wall street, and is now at Fifth avenue and 11th street. The Fifth Avenue Presbyterian, and the Roman Catholic Cathedral at Fifth avenue and 50th street are among the more prominent churches in the city. The Protestant Episcopal Church has been erecting for several years a magnificent cathedral, St. John the Divine, on Morningside and Amsterdam avenues.

According to a special report by the Bureau of the Census on "Religious Bodies" (2 vols., 1910), there were in the city 2,002 religious organizations, having 1,536 church edifices and 283 other places of worship, 1,838,482 communicants or members, church property valued at $153,925,740, and 1,687 Sunday-schools, with 35,834 officers and teachers, and 490,589 scholars. The following table summarizes the reports of denominations having upward of 10,000 communicants:

Denominations.	Organizations.	Church edifices.	Communicants.	Value of Church Property.
Roman Catholic	278	290	*1,413,775	$55,811,715
Protestant Episc.	188	241	92,534	25,830,300
Methodist Episc.	161	165	49,970	9,864,706
Presb. (U. S. A.)	109	137	48,914	15,326,883
Baptist	112	115	43,601	9,477,710
Ev. Luth. Gen. C.	59	59	30,869	3,286,100
Jewish	615	†121	‡30,414	8,726,000
Ref. in America	73	91	24,005	7,542,500
Congregational	47	57	21,096	4,262,500
Ev. Luth. Syn. Con.	39	35	13,930	1,759,650
Greek Orthodox	3	3	12,578	65,000

*All members of families. †Also 152 halls.
‡Heads of families only.

Hospitals, Asylums, and Homes.—The charitable and benevolent activities of the city are carried on by a large number of organizations, representing all types of the cosmopolitan population. There are over 150 hospitals, many of wide reputation, and more than 200 asylums and houses, caring for all manner of unfortunates. The Rockefeller Institute for Medical Research, founded by John D. Rockefeller with an endowment of $8,250,000, is the only institution of its kind in the country, and, although one of the youngest, has also accomplished incalculable good in seeking the causes and cures of diseases.

Education.—The Department of Education is conducted by a board of 46 members appointed by the mayor. This board has the care and control of all property of the city used for school purposes, and supervises the various executive officers of the department. The Board of Education appoints a City Superintendent for a term of six years. He is the chief executive officer of the board, conducting the business of the department in accordance with its regulations. The Greater New York has an estimated population of school age of about 1,500,000, of whom 750,000 are enrolled in public day schools and 100,000 in private and parochial schools. There are 500 elementary schools, 20 high schools, 3 training schools for teachers, 2 vocational schools, 3 truant schools and 1 nautical school. Supervising officers number over 900; teachers, 16,070 (men 1,775, women 14,295); appropriation to Department of Education for 1910, $28,578,432, of which $23,130,014 was for salaries of teachers, supervisors, etc.

For higher education there are the College of the City of New York, the College of St. Francis Xavier, Columbia University, Manhattan College, New York University, St. John's College, at Fordham, Normal College of the City of New York, Teachers' College, Brooklyn Polytechnic Institute, Adelphi College, St. Francis College, St. John's College in Brooklyn, Packer Collegiate Institute, and Barnard College. The medical schools are the College of Physicians and Surgeons of Columbia University, Bellevue Hospital Medical College, New York University Medical School, Cornell University Medical School, and the Post Graduate Medical School. There are also the New York Dental College, New York College of Pharmacy, American Veterinary College, and the New York College of Veterinary Surgeons. The art schools include the Art Students' League, the Academy of Design, and the art schools of the Metropolitan Museum of Art, Cooper Union, and Gotham Art Institute. The National Conservatory of Music, New York College of Music, the Grand Conservatory of Music, and the Metropolitan College of Music are the principal schools of music.

New York

Libraries.—The libraries of the city are very extensive and include over 2,000,000 volumes. The Astor Library in Lafayette place, the Lenox Library in Fifth avenue, and the Tilden Library, were consolidated in 1901, under the title of New York Public Library, Astor, Lenox and Tilden Foundations. This library stands upon the site of the old reservoir at Fifth avenue and 42d street, and was completed in 1911, at a cost of about $8,000,000. Among the other libraries of importance are the Mercantile, Society, Apprentices', Cooper Union, Free Circulating, Columbia University, New York City, New York Historical Society, and the Brooklyn libraries. There are law libraries in the postoffice building, at the Bar Association, at the Equitable Life Insurance Company, and the New York Law Institute Library. In 1901 Mr. Andrew Carnegie presented the city wth $5,200,000 for the purpose of erecting libraries. This gift was used for the erection of 65 branch library buildings in various parts of the city.

Manufactures.—New York city holds a peerless position not only in the total value of its manufactured products but in many of the individual industries. Possessing numerous advantages, natural and otherwise, that have had a greater or less influence on the establishment and maintenance of manufacturing industries, the city has become the chief center of manufactures for the United States. New York possesses one of the finest harbors in the world, and as a port of entry is unsurpassed by any in the country. Imported materials used in manufactures are thus obtainable at the greatest advantage, and the products finished for export may be shipped at the lowest possible rates. The abundance of labor, in consequence of the large immigrant population, has also constituted an important factor in the development of local manufactures.

The value of manufactured products for this city in 1905, according to a "Bulletin" of the Bureau of the Census, surpassed the total value of products for every State in the Union except New York and Pennsylvania. Of the 37,194 factory-system establishments reported in the State, 20,839, or 56 per cent., were located in New York city. These 20,839 establishments represented 291 different industries, or 85.8 per cent. of the total of 339 classifications used in the compilation of the report. The city also reported $1,042,946,487, or 51.3 per cent. of the total capital investment in the State; 464,716, or 54.2 per cent. of the total number of wage-earners; $248,128,259, or 57.7 per cent. of the total wages; and $1,526,523,006, or 61.3 per cent. of the total value of products. It is further interesting to note that the value of the products of the city formed 10.3 per cent. of the total value of

products of the entire United States; that all of the 23 leading industries of the city were also leading industries of the State; and that in 11 of these 23 industries over 75 per cent. of the value of products in State was reported by establishments in the city.

The remarkable development of the city's manufacturing interests is more vividly set forth in the following official table:

Year.	Plants.	Capital.	Wage earners.	Wages.	Materials.	Product value.
1850	3,387	$34,232,822	83,620	.....	.....	.....
1870	7,626	129,952,262	129,577	$63,824,040	$178,696,939	$332,951,520
1880	11,339	181,206,356	227,352	97,030,021	288,441,691	472,926,437
1890	25,403	640,946,076	354,291	230,102,167	366,422,722	777,222,721
1900	39,776	921,876,081	462,763	245,021,881	709,109,412	1,371,358,468
1905	20,839	1,042,946,487	464,716	248,128,259	818,029,267	1,526,523,006

It should be noted that in 1905 the census inquiries were confined to purely factory-system plants, excluding small and individual industries; hence the difference in number of plants, etc., in 1900 and 1905.

As in the State, the manufacture of clothing formed the chief industry in the city, having 3,847 plants and 110,796 wage-earners, paying $55,497,239 for wages, and having an output valued at $305,523,795. The aggregate value of the output of all industries in but two other cities in the United States exceeded the value of the clothing output alone in New York City. Other leading industries in the order of output values were the combined printing and publishing industry, $116,877,594; the manufacture of tobacco, cigars and cigarettes, $47,549,630; slaughtering (excluding meat-packing), $45,564,825; bread and other bakery products, $44,000,459; malt liquors, $43,168,232; foundry and machine shop products, $36,459,552; and millinery and lace goods, $32,342,603—all others being below $30,000,000.

Banks.—The United States Comptroller of the Currency reported for the year ending Sept. 1, 1910, 44 National banks in the boroughs of Manhattan, the Bronx and Brooklyn, having a combined capital of $121,702,000; circulation, $47,058,420; surplus and undivided profits, $253,303,785; individual deposits, $716,184,684; and resources, $1,695,851,866. In all boroughs there were 49 National banks; 57 State banks; 57 savings banks; 49 loan and trust companies, and 42 safe deposit companies. Special reports to the National Monetary Commission from 198 National, State, savings, and private banks, and loan and trust companies showed an aggregate capital of $200,227,000; surplus, $322,616,560; and resources, $4,748,013,822.

Clearing House.—The New York Clearing House Association was organized in 1854, with a membership of 50 banks, having a combined capital of $47,044,900, and the total clearings that year aggregated $5,750,455,987. Since then the number of banks in the association has fluctuated from 48 to 67, and in 1910 it stood at its original figure, but the combined capital was then $132,350,000, and the clearings of the year amounted to $102,553,959,069. In the 57 years of the existence of the association, the aggregate clearings reached the enormous total of $2,132,059,754,829. The record year was 1906, when the clearings were $103,754,100,091. The general business development of the city is shown by the amount of clearings in specified years in the period of 1854-1910, viz.:

Year.	Clearings.	Year.	Clearings.
1854	$5,750,455,987	1890	$37,660,686,572
1860	7,231,143,057	1900	51,964,588,564
1870	27,804,539,406	1910	102,553,959,069
1880	37,182,128,621		

The proportion of the exchanges at the New York Clearing House to the aggregate transactions at all clearing houses in the United States is shown below, no clearings other than at New York city being reported prior to 1887:

Clearing Houses.	1880.	1890.	1900.	1910.
New York City.....	$37,182,128,621	$37,660,686,572	$51,964,588,564	$102,553,959,100
All others	.....	21,184,593,572	32,617,861,517	66,471,213,500
Total.....	$37,182,128,621	$58,845,279,505	$84,582,450,081	$169,025,172,600

Commerce.—More than one-half of the total foreign trade of the United States is carried on at the port of New York. This is graphically shown in the following table summarizing the trade in merchandise and in gold and silver coin and bullion of the entire country and of this port during the fiscal year ending June 30, 1910:

Port	Merchandise		Gold and Silver		Total Trade
	Imports	Exports	Imports	Exports	
New York	$935,990,958	$651,986,356	$1,115,196	$3,823,544	$1,592,916,054
All others	621,829,630	1,092,998,364	6,768,892	2,057,667	1,723,653,953
Totals.....	$1,557,819,988	$1,744,984,720	$7,884,088	$5,881,211	$3,316,570,007

This city is the principal gateway through which immigrants pass into the United States. During the fiscal year ending June 30, 1910, of a total of 1,041,570 immigrant arrivals at the various ports of the

New York

country, 786,094 came through the customs district of New York.

Population.—During the period of 1890-1900 the population of New York city showed a gain of 929,788, or 37.1 per cent., and during 1900-1910 the gain was 1,329,681, or 38.7 per cent. To properly comprehend this feature of the city's growth, consideration should be given to the status of the various components of the Greater City of New York prior to the act of consolidation, which became effective on Jan. 1, 1898. The old city of New York comprised the entire island of Manhattan and a portion of the territory of Westchester county, north of the Harlem river, now constituting the borough of the Bronx; the present borough of Brooklyn had become co-extensive with Kings county; the borough of Richmond with Richmond county, or Staten Island; and the borough of Queens had absorbed Long Island City and a number of villages, comprising a large part of Queens county, the remaining part having been taken to form the county of Nassau.

Premising that the total population of the city in 1697 was 4,302, and in 1756 13,040, the foregoing statement will make clearer the following analytical table showing the growth of the city by its present components at the census periods in 1790-1910:

Year.	Manhattan.	Bronx.	Brooklyn.	Richmond.	Queens.	Total.
1790	33,131	1,781	4,495	3,835	6,159	49,401
1800	60,515	1,755	5,740	4,564	6,642	79,216
1810	96,373	2,267	8,303	5,347	7,444	119,734
1820	123,706	2,782	11,187	6,135	8,246	152,056
1830	202,589	3,023	20,535	7,082	9,149	242,278
1840	312,710	5,346	47,613	10,965	14,480	391,114
1850	515,547	8,032	138,882	15,061	18,593	696,115
1860	813,669	23,593	279,122	25,492	32,903	1,174,779
1870	942,292	37,393	419,921	33,029	45,468	1,478,103
1880	1,164,673	51,980	599,495	38,991	56,559	1,911,698
1890	1,441,216	88,908	838,547	51,693	87,050	2,507,414
1900	1,850,093	200,507	1,166,582	67,021	152,999	3,437,202
1910	2,331,542	430,980	1,634,351	85,969	284,041	4,766,883

History.—In 1609 the island of Manhattan was first visited by Hendrik Hudson, who ascended the river which bears his name. In 1613 Adrian Block, a merchant, arrived and built four houses. In 1623 a Dutch colony was established, and in 1626 Peter Minuit, the governor, bought Manhattan Island from the Indians for $24 in trinkets. This colony was known as New Amsterdam, and passed into the possession of the English in 1664, and was named New York. In 1673 the town surrendered to a Dutch squadron, but was given back a year later by treaty. Sir Edmund Andros, the first English governor, was overthrown in 1689, and Leisler, the leader of the progressive party, usurped the government until 1691, when he was hanged for treason. There were uprisings of slaves in 1712 and 1741, but these were suppressed by cruelty. In 1765 the Stamp Act Congress met in New York city and voted a Declaration of Rights. In 1774 a cargo of tea was sent back to England and another thrown overboard, and on April 3, 1775, the colonial assembly adjourned. The city was held by the Continental militia till Aug. 26, 1776, when forced to withdraw by the British, who held the city till Nov. 25, 1783.

Washington was inaugurated the first time in New York city, April 30, 1789. In 1805 the first free school was opened; in 1807 the first steamboat voyage to Albany was made, and in 1825 the Erie canal was opened. The city was visited by a cholera epidemic in 1832, and again in 1834, 1849, and 1854; by a disastrous fire in 1835; and a financial panic in 1837, the bread riots occurring in that year. In 1853 the Crystal Palace Industrial Exhibition took place, and in 1863 occurred the draft riot caused by the enforcement of the military draft. The city supplied the Union army with 116,382 troops for the Civil War. The Brooklyn bridge was opened in 1883; and the Bartholdi statue unveiled in 1886. The celebration of the centennial of Washington's inauguration took place in 1889; and the Columbian celebration in 1892 and 1893. In 1901 the charter of 1897 was amended.

In 1909 an international commemoration of the discovery of the Hudson river and of the first trip on it of Robert Fulton's steamboat "Clermont"; began at New York city Sept. 25, and ended at Troy, N. Y., Oct. 9. The most notable features were the river parade of 41 of the world's greatest warships; the participation of reproductions of Hudson's "Half-Moon" and Fulton's "Clermont"; the great parade in New York of historic floats; the river parade to Troy; and the illumination of the warships, the Palisades, and the cities and towns along the river.

On Aug. 9, 1910, the city and country were suddenly plunged into intense excitement by the attempted assassination of Mayor William J. Gaynor, on board a steamship at Hoboken, N. J., as he was about starting on a brief ocean trip. His assailant was a former city employé out of work, who fired a bullet into his head. The missile was split into two parts, but did not do serious damage and was not removed, and after spending two months in a hospital the Mayor had recovered sufficiently to resume his official duties.

New York Public Library

New York Public Library, established by consolidation of "The Trustees of the Astor Library," "The Trustees of the Lenox Library," and "The Tilden Trust," May 23, 1895, 21 trustees being chosen from the trustees of these corporations. The agreement of consolidation provided for the establishment and maintenance of a free public library and reading room in the city of New York, with such branches as might be deemed advisable for the continued promotion of the objects and purposes of these several corporations. The Astor Library was founded in 1849, by John Jacob Astor, and his endowment was increased, and land and buildings added, by the beneficence of various members of the Astor family. The Lenox Library was founded by James Lenox, who gave land on Fifth avenue, between 70th and 71st streets, large funds and valuable collections of Bibles, manuscripts, and Americana. It received subsequently large endowments from his sister, Miss Henrietta Lenox, from Mrs. R. L. Stuart, and others. The Tilden Trust, incorporated in 1887, was created by the will of Samuel J. Tilden, made in 1884, which gave his entire residuary estate to trustees to establish and maintain a free library and reading room. A long contest in the courts resulted, before the termination of the suit, in an agreement of compromise by which the Tilden Trust became possessed of over $2,000,000.

The trustees soon after the consolidation in 1885 determined to pursue a liberal policy and to create a great library system not only for the use of scholars, but for the people. The best permanent site for the future great library was considered to be in Bryant Park, on Fifth avenue, between 40th and 42d streets, on the site of the reservoir, which had become obsolete and was practically unused. On March 25, 1896, the trustees made a formal address to the mayor asking aid from the city in securing the site of the reservoir, and in May, 1896, the Legislature passed a law authorizing the removal of the reservoir and the lease of the land to the library. On May 19, 1897, another act was passed providing for the construction by the city of a library building on the reservoir site, and for its lease to the library, which act was amended in 1900, removing the limit of cost. On Nov. 10 the architects were selected for the new building, and on Dec. 1 the plans were approved by the city. The style of architecture is Renaissance and the material used is white marble. The building fronts on Fifth avenue, looking E. The greatest projection of the main façade of the building is 75 feet back of the Fifth avenue building line. It is intended to make a terrace out of this 75 feet of foreground, serving as a grand approach to the main entrance. The terrace will be 455 feet long. There is a hallway in the center of the building 80 feet long and 40 feet wide. The staircases which lead to the second and third floors are of stone, 12 feet wide. The arches forming the vestibule are 35 feet high and 15 feet wide. The entrance to the stairs and the elevators is found on the 40th street side. The rooms for the circulation of books and the children's room are on the basement floor, 42d street side; on this floor are also the rooms for newspapers, the binding and printing departments; the first floor contains the offices of the business superintendent, superintendent of circulation, patents, and periodicals, reading-rooms, and exhibition rooms; on the second floor is the Trustees' room, the office of the Director, lecture and assembly rooms, cataloguing and accession departments, and various special reading-rooms; the third floor contains the large general reading-rooms, the public catalogue, special reading-rooms for manuscripts, Americana, etc., the Stuart books and pictures, the print room, etc. There is about 140 feet of ground between the west elevation of the building and the present park. The design of the building is monumental in character, with classical proportions. After delays, owing to the inability of the city to appropriate funds for the work, the removal of the reservoir was begun on June 6, 1899. The entire building was under roof at the end of Nov., 1906, and the building was completed in March, 1911. On March 12, 1901, Andrew Carnegie offered to give $5,200,000 to the city for the construction and equipment of free circulating libraries upon condition that the city should provide the land and agree to maintain the libraries when built. This communication was submitted to the Mayor on March 15, and on April 26 an act was passed authorizing acceptance of the gift by the city upon the terms imposed by Mr. Carnegie. An agreement with the city was executed on July 17, the Library acting as agent for Mr. Carnegie, under which 42 buildings are to be erected in Manhattan, the Bronx, and Richmond (later increased to 50), on sites to be selected and purchased by the city with the approval of the Library, the buildings to be leased to the Library and to be under its control. The city agrees to provide adequate yearly maintenance, 10 per cent. of the cost of each building being agreed upon as a minimum.

On Nov. 7, 1901, an agreement was made with three firms of architects in New York to prepare plans and specifications for these branch libraries. On June 6, 1902, an issue of bonds for $250,000 was authorized for purchase of sites. The first Carnegie building, known as the Yorkville branch, was opened Dec. 13, 1902, at 222 E. 79th street; the second, providing a new home for the

Chatham Square branch, was opened Nov. 2, 1903, at 31 East Broadway. By the end of 1909 32 branches had been opened under this contract. The Trustees of the Library are: John W. Alexander, William W. Appleton, John Bigelow, John L. Cadwalader, Andrew Carnegie, Cleveland H. Dodge, John Murphy Farley, Samuel Greenbaum, John Henry Hammond, H. Van Ren Kennedy, Lewis Cass Ledyard, J. Pierpont Morgan, Morgan J. O'Brien, Stephen H. Olin, Alexander E. Orr, George L. Rives, Chas. Howland Russell, Edward W. Sheldon, George W. Smith, Frederick Sturges, Henry W. Taft.

Mayor of city of New York, *ex-officio;* Comptroller of the city of New York, *ex-officio;* President of the Board of Aldermen, *ex-officio;* Director and Head Librarian, John Shaw Billings.

New York University, a coeducational non-sectarian institution in New York city; opened in 1831; has grounds and buildings valued at over $3,700,000; aggregate endowment, over $1,200,000; scientific apparatus, etc., $200,000; volumes in the library, 95,000; average number of faculty, 250; average student attendance, 4,400; ordinary income, about $500,000; graduates, over 21,000.

New Zealand, a former British colony, since 1907 a Dominion, consisting of a group of islands in the South Pacific Ocean, two, called North and South (or Middle) Island, and a third of comparatively insignificant size, Stewart Island; length of the group N. to S., about 1,000 miles; area, 104,471 square miles. Pop. (June 30, 1909) 1,029,417, exclusive of aborigines. Capital, Wellington, in North Island; other chief cities: Dunedin, Auckland, Christchurch.

North Island, the N. one of the group, and separated from South Island by Cook's Strait, which, where narrowest, is about 23 miles wide, is very irregular in shape, and much broken by deep bays and projecting headlands. Its area is estimated at 44,468 square miles. The main body of the island, as well as its peninsulas, has for the most part an exceedingly rugged and mountainous surface; and besides being traversed from S. to N. by chains of mountains reaching a height of 6,000 feet, presents a number of lofty isolated volcanic peaks, among which the most conspicuous are Tongariro (6,500 feet) occasionally active, and Ruapehu (9,195 feet), and Mount Egmont (8,300 feet), extinct volcanoes. The coast line of North Island contains many excellent natural harbors, especially those of Wellington on Cook's Strait, and of Auckland on the isthmus of the N. projection. The chief indentations are Hauraki Gulf and Bay of Plenty in the N. E.; Hawke's Bay in the E.; South Taranaki Bight in the S. W. The streams are extremely numerous, but are mostly mere torrents, which bring down immense deposits of shingle. The largest of the rivers are the Waikato (200 miles) and the Wanganui (about 120). Most of the streams have their sources in lakes embosomed among mountains covered with magnificent forests. The largest of all the lakes is Taupo, situated near the center of the island, about 36 miles long by 25 miles broad. To the N. E. occur a number of lakes, familiarly known as the "Hot Lakes," there being here hot springs and other volcanic phenomena.

South Island is of a much more compact and regular form; area, about 58,525 square miles. With exception of the N. coast, the S. W. coast, and a remarkable spur on the E. coast called Banks' Peninsula, the coast line is very continuous. On the N. coast, from Cape Farewell to Cape Campbell, are numerous good harbors; in the S. W. are a series of narrow fiords. South Island is traversed from N. to S. by a lofty central mountain chain, which has an average height of about 8,000 feet; while Mount Cook, near the W. coast, the culminating point of New Zealand, is 13,200 feet high. Among these mountains are glaciers of great size, stretching down on the S. W. almost to the sea. Along the E.

NEW ZEALAND: A GROUP OF HOT SPRINGS.

New Zealand

coast several extensive plains exist. The largest river is the Clutha, which has a course of 150 miles, and enters the sea near the S. E. angle of the island. The largest lakes are Wakatipu and Te Anau, covering 114 and 132 square miles respectively.

Stewart Island is separated from South Island by Foveaux Strait, about 15 miles wide. It has an area of 665 square miles. A great number of smaller islands belong to the New Zealand group. The Chatham Islands and Kermadec Islands are outlying dependencies.

Minerals and Natural Productions.— New Zealand is rich in minerals. Coal is abundant; iron, tin, silver, and copper are also found in various regions. Gold, discovered in 1861, is worked both in North and South Islands. The output in 1899 was valued at $6,052,948. The climate is very varied, though remarkably healthful. In temperature it resembles France and North Italy, but the humidity is considerably greater. Rapid changes are a notable feature of the weather. Among vegetable productions the most characteristic are the ferns (130 different species), which form almost the only vegetation over immense districts. Some of them are more than 30 feet high, and remarkable for the elegance of their forms. The flax plant furnishes an article of export. A number of the forest trees furnish valuable timber. Among others is the kauri or damar pine. Flowering plants are remarkably scarce, and there are no indigenous fruits. The colony produces every English grain, grass, fruit, and vegetable. In animals New Zealand is singularly deficient, only a sort of dog (now extinct), a rat, and two species of bats being indigenous. Rabbits have been introduced and have multiplied so as to become a perfect pest; pigs now run wild, as well as cats. Pheasants, partridges, quails, and red and fallow deer have also been successfully introduced. All the common European quadrupeds appear to be easily acclimatized. Pigeons and parrots are the most common native birds. Among others are the apteryx (a wingless bird), the huia or parson-bird, and the owl-parrot. The gigantic moa is now extinct. The chief reptiles are a few lizards. The coast teems with fish, and seals are still numerous in some parts. The original natives of New Zealand, a people of Polynesian origin, are called Maoris. Their numbers have been so reduced by internecine feuds that they do not now exceed 40,000, all of whom, with the exception of a few hundreds, are located in the North Island. By missionary efforts a great part of them have been converted to Christianity. They have acquired in many instances considerable property in stock, cultivated lands, etc., and in the neighborhood of the settlements they are adopting European dress and habits.

Government and Education.— By the constitution the crown appoints the governor; but the legislative power is vested in the General Assembly, or Parliament of two houses — a Legislative Council consisting of 45 members appointed for terms of seven years; and a House of Representatives, which is made up of 80 members, including 4 Maoris, elected by the people for three years. The governor is aided and advised by a ministry comprising the chief officers of state, who are members of the General Assembly. By the act passed by the assembly in 1875, which abolished the provincial system, the powers previously exercised by superintendents and provincial officers were delegated to county councils or vested in the governor. The civil and criminal laws are the same as those of England. For colonial defense a number of volunteers have been enrolled (about 8,500); the chief ports are also being put in a state of defense. There is no State-aided Church, but most Christian sects are well provided for. The Church of England is most numerously represented. Elementary education is free, secular, and compulsory. Secondary education is provided for in numerous high schools, grammar schools, colleges, etc. At the head of the higher education is the University of New Zealand, an examining body empowered to grant honors, degrees, and scholarships. Affiliated to it are several colleges throughout the colony. There is also a separate university at Dunedin. There are training colleges for teachers, theological colleges, etc.

Industry and Commerce.— Stock-rearing and agriculture are the most important industries, though mining is also an important occupation. There are about 30,000,000 sheep in the colony, and by far the most important export is wool ($50,000,000 annually); frozen meat and grain are also largely exported. Gold is the most valuable export next to wool; others are tallow, timber, kauri-gum. In 1898 the total imports amounted to about $40,000,000; exports, $42,072,020. There are upward of 2,220 miles of railway in New Zealand open for traffic.

History.— New Zealand was discovered by Tasman in 1642, but little was known of it till the visits of Cook in 1769 and 1774. The first permanent settlement was made by missionaries in 1815. In 1833, a resident was appointed, with limited powers, and subordinate to the government of New South Wales. In 1840 New Zealand was erected into a colony; in 1841 it was formally separated from New South Wales and placed under its own independent governor; and in 1852 it received a constitution and responsible government. In 1865 the

seat of government was removed from Auckland to Wellington. In 1873 the public works policy was inaugurated, and large loans were raised for immigration, harbors, railways, roads, etc. In 1876 the provinces were abolished; the colony was divided into 63 counties, and all government centralized at Wellington.

New Zealand Spinach (*Tretragonia expansa*), a succulent trailing plant inhabiting New Zealand, Tasmania, Australia, South America, and Japan. It has been introduced into Europe and North America as a substitute for spinach.

Ney, Michel, Duke of Elchingen and Prince of Moskva, peer and Marshal of France; born in Saarlouis, France, Jan. 10, 1769. His early years were devoted to the study of the law, but disliking the confinement, he entered the army as a private hussar in 1787. He was distinguished in the first years of the Revolutionary War, when serving with the army of the Rhine; and in 1796 he rose to the rank of Brigadier-General. On his marriage with Mlle. Anguié, the friend of Hortense de Beauharnais, Napoleon presented him with a magnificent Egyptian saber, and named him his envoy and minister-plenipotentiary to the Helvetian republic; but in 1803 he was recalled to take command of the army intended to make a descent upon England. In the following year, when Napoleon received the title of emperor, he resolved on restoring titles and decorations. Ney was then created a marshal, and also received other distinctions, while he was with one accord denominated by the army "the bravest of the brave." After a succession of victories, during which Ney never relaxed in his exertions, he obtained the additional title of Prince of Moskva, and in June, 1814, he was invested with the dignity of a peer of France. He retired to his seat in the country, from which he was recalled in March, 1815, by information that Napoleon had quitted Elba. He thought the return of Napoleon would prove injurious to France, and maintained that the mischief ought to be prevented. Therefore, on taking leave of Louis XVIII., he made many protestations of his zeal and fidelity to the king, and expressed his determination to stay the progress of the invader. Arriving at Besançon, Ney found the whole country hastening to meet the returning emperor at Lyons; the Dukes d'Artois and d'Angoulême acknowledged the fruitlessness of resistance. The troops he commanded shared the delirium; and Ney himself yielded his opinion, and went over with his army to his former friend and master. He again fought under his banner at the battle of Waterloo, where he had five horses killed under him, and his cloak perforated with bullets. After the conclusion of that eventful day, and the second abdication of Napoleon, Ney was advised to quit France, for which money and every facility of escape were offered him. He refused them all and retired to the residence of a near relative; but he was soon arrested, and brought to trial; and his colleagues and companions in arms having declared themselves incompetent to form a court-martial whereby to judge him, the affair was carried to the House of Peers, by whom he was condemned. Every avenue to the royal presence was purposely closed against his unhappy wife, who anxiously sought his pardon; and Ney suffered with firmness, declaring witn his last breath that he never had acted treacherously to his country. He was shot Dec. 7, 1815, in the garden of the Luxembourg, Paris.

Nez Percés, a tribe of American Indians, chiefly settled in Idaho, on the Lapwai river. The Nez Percés proper have always been loyal to the whites, and are making good progress in civilization; but in 1877 the treaty reductions of their reservation led to a sanguinary outbreak on the part of the "non-treaty" Nez Percés, who murdered settlers, fought the soldiers, and then fled across Idaho, Montana, and Dakota. They were overtaken and beaten, and the survivors (some 350) transferred to Indian Territory; but in 1885 some were restored to Idaho, and the rest joined the Colville Indians, in Washington. There is no evidence that they ever had a custom which would justify their name, "pierced nose." See CHOPUMUSH.

Ngami, Lake, a South African lake, at the N. extremity of the Kalahari Desert; at an altitude of 2,810 feet. Its extent and depth vary with the fall of rain in the country to the N. of it; its average size is 50 miles long and from 10 to 20 broad. The chief tributary, the Okavango or Cubango, called in its lower course the Tioge, brings down from the N. W. vast volumes of water. At another season of the year the Suga or Zouga brings in a supply from the E. It is not yet decisively settled whether in times of flood the lake sends off the surplus water to the Zambesi.

Ngan=Hwei, or **Anhwei,** an interior province of China; bounded N. E. by Kiangsu, S. E. by Chekiang, S. by Kiangsee, W. and N. W. by Houpe and Honan; drained by the Hoai-ho and Yang-tze-Kiang rivers and their tributaries; area, 54,810 square miles; pop. 23,670,314. The surface is mostly level, but broken to the S. and W. by ranges of hills of no great elevation. It contains a number of lakes, of which Chan-Hu or Nest Lake is the most important. There are mines of gold, silver, copper, and other metals. The best green tea in China is grown in the S. E. portions of this prov-

NIAGARA FALLS

Viewed from the American Side

ince. Inks, varnish, and lanterns are manufactured.

Niagara Falls. The Niagara river, which flows from Lake Erie N. into Lake Ontario, is about 36 miles in length; its descent from the level of one lake to that of the other is about 334 feet. At the foot of Grand Island, which reaches within 1½ miles of the Falls, the river is contracted to a width of 2½ miles, and grows narrower as it proceeds. By this, and by the descent in the channel, which is about 60 feet in the mile, are produced the swift currents known as the rapids, in which the river, notwithstanding its great depth, is perpetually white with foam. At the Falls, which are 22 miles from Lake Erie, the river is divided by an island called Goat Island; but, in consequence of a bend in the channel, by far the largest portion of the water is sent down by the Canadian side. On this side, therefore, is the grander cataract, which has been named the Horseshoe Fall, and which is about 600 yards in width and 154 feet high. The water is so deep that it retains its green color for some distance below the brow of the precipice; and it rushes over with such force that it is thrown about 50 feet from the foot of the cliff. The separation caused by Goat Island leaves a large wall of rock between the Canadian and American falls, the latter being again divided by an islet at a short distance from Goat Island. This fall is from 8 to 10 feet higher than the Horseshoe, but only about 220 yards wide. The Falls can be seen from below on both sides, and every facility is given for viewing them from all the best points. The river is crossed by a suspension bridge, and by a ferry about 200 or 300 yards below the Falls, where it is 1,200 yards wide. A stratum of rock runs across the direct course of the river, 3 or 4 miles below, which, after forming a vast circular basin, with an almost impassable whirlpool, is forced away at right angles to its old channel.

The total energy of the Falls is calculated at 16,000,000 horse power, and the work of utilizing this power is the beginning of "perhaps the most stupendous engineering feat ever undertaken." On April 15, 1895, the first large dynamo was run at full speed, 250 revolutions per minute, and proved quite satisfactory. On July 1 the first electric power transmitted for commercial purposes, 4,000 horse power, was sent to an aluminium factory a mile distant. Various other developments were afterward reported in rapid succession, especially in the direction of electric railroading. On Jan. 17, 1896, the Niagara Falls Power Company accepted a grant for the transmission of electric power for lighting and power purposes to Buffalo. On April 18, 1898 it was reported that the fourth 5,000-horse power Westinghouse generator had been tested by the power company. This machine, the first of a new set of dynamos to be installed and operated, brought up the capacity of the station to 20,000 electrical horse power, and additional dynamos of the same design are to be installed till the total capacity reaches 50,000 horse power. In July it was stated that the aluminium conductors erected as an experiment by the power company to carry current to the works of the National Electrolytic Company, near by, were in use. The conductors consist for the first part of bars 25 feet long, 6 inches wide, and ½ inch thick, and then of cables built up of No. 10 aluminium wire and insulated with rubber. The total weight of aluminium used is 22,000 pounds, and it was added that the same work in copper would require 48,000 pounds of metal.

Niagara, Fort, an old fort of Ontario, Canada, built by the French in 1727. It is still garrisoned.

Niagara Falls, a city in Niagara co., N. Y.; on the Niagara river, and on the Michigan Central, the Erie, the Lehigh Valley, the Grand Trunk, the New York Central and Hudson River and other railroads; 20 miles N. of Buffalo. Here are De Veaux College (P. E.), Niagara University (R. C.), a business college, several hospitals, electric lights, electric street railroads, several National and State banks, and a number of daily and weekly newspapers. It contains flour and paper mills, a bicycle factory, planing mills, carbide and carborundum works, and a remarkable engineering plant operated by means of a hydraulic canal, and an immense tunnel costing about $4,000,000, for the purpose of utilizing the power of the falls for manufacturing. There is an assessed property valuation of $15,500,000. The city has a continual flow of visitors who are attracted hither by the Niagara Falls and Whirlpool Rapids, about two miles below the falls. Niagara Falls was chartered in 1892, and comprises the former villages of Niagara Falls and Suspension Bridge. Pop. (1910) 30,445.

Niagara International Park, a reservation on both sides of Niagara river and falls, set apart for public purposes by the joint action of the Legislature of New York State (1901) and the Dominion of Canada.

Niagara University, an educational institution in Niagara Falls, N. Y., founded in 1856 under the auspices of the Roman Catholic Church; received its present name in 1883; has grounds and buildings valued at over $800,000; scientific apparatus, etc., $60,000; volumes in the library, 50,000; average number of faculty, 30; average student attendance, 300.

Niam-niam, an African people dwelling between lat. 4° and 6° N. and lon. 25° and 30° E., along the watershed that parts the feeders of the Bahr al-Ghazal from those of the Welle-Makua and other N. tributaries of the Kongo. They are a branch of the A-Sandeh tribes, who all belong to the stock of the negroid Nubas. The men devote themselves to hunting and war; the women cultivate the fields of eleusine, manioc, sweet potato, gourds, yam, banana, etc. These with game are the chief food, though a portion of the people are notorious cannibals. They have no cattle. Considerable manual and artistic skill is shown in the forging of iron, making of pottery and baskets, and the carving of wood. They are passionately fond of music, and play a kind of mandolin. Polygamy prevails. The weapons are spears, knives, a species of iron boomerang, and shields. It is to these people that the legends of "tailed men" are referable.

Nias, an island belonging to Holland; W. of Sumatra; has an area of about 2,100 square miles. The surface is mountainous, the highest peak rising 1,970 feet. In 1857, when the Dutch took complete possession of the island, the population was reckoned at 17,000. They grow rice, cocoanuts, bananas, tobacco, sugar-canes, etc., and annually about 110,000 pounds of pepper. The Niassers are of the Malay race, but fairer than the type. They are gentle, sober, peaceful, and remarkably ingenious in handicraft.

Nibelung, a mythical King of Norway, whose subjects are called Nibelungs and territory the Nibelungenland. There were two contemporary kings in this realm, against whom Siegfried, Prince of the Netherlands, fought. He slew the 12 giants who formed their paladins with 700 of their chiefs, and made their country tributary. The word Nibelungen is from *nebel* (darkness), and means the children of mist or darkness.

Nibelungenlied, a German epic, the name of which signifies "Song of the Nibelungs," composed by some anonymous poet near the close of the 12th century. It has been claimed that the poem, in the form in which it has come down to us, was not written by one person, but is a conglomeration of old hero-songs. The acutest critics, however, agree that the work has a unity which could not be attained by a mere compiler, but must owe its existence to the skill of a single mind. The Nibelungs, in German legend, were a race of N. drawfs, so styled from their king, Nibelung. Later, the name was applied to the followers of Siegfried, the principal hero of the first part of the "Lied," who, with his followers, conquered from the Nibelungs in Norway a "hoard" or treasure collected by them. The poem is divided into cantos, called adventures, the number of which varies in the different manuscripts. Two great parts can be distinguished in the poem. Of the first part the principal hero is Siegfried, King of Niderland, the region about Xanten on the lower Rhine. Siegfried assists Gunther, King of the Burgundians, in obtaining the hand of Brunhilde, the powerful queen of Iceland, and is rewarded by getting for a wife Kriemhilde, the sister of Gunther. The envy and jealousy of Brunhilde cause a quarrel between her and Kriemhilde, as a result of which Siegfried is murdered by Hagen, his deadly enemy, and the faithful vassal of Gunther. The scene of this first part is laid on the Rhine, with Worms as the center. The second part begins 13 years after, when Kriemhilde, in order to get revenge for the murder of her husband, marries Attila (Etzel, in the poem), King of the Huns. She has, however, to wait for her revenge 13 years more, when she induces Hagen and Gunther and his two brothers to visit Attila's court on the lower Danube. They march thither, accompanied by 11,000 knights and men-at-arms. Here, after a long and dreadful struggle, all the Burgundians are killed, and also Kriemhilde. The scene of the chief events of the second part is on the lower Danube.

Beyond question, the subject-matter of the poem is based on German hero-legends which originated in the times of the migration of the tribes. That the "Nibelungenlied" was once a very popular epic is proved by the number of manuscripts still extant. Yet for several centuries it was entirely forgotten, till Bodmer, in 1757, called attention to the epic by editing parts of it. His efforts did not arouse much interest, though the poem was studied and interpreted in several universities. It was resuscitated by the rise of national feeling during the wars of Napoleon I. In 1815 Zenue published an edition of the epic for young men to carry with them to the battlefields. Since then the "Lied" has constantly increased in popularity, and the greatest German philologists of the 19th century have devoted themselves to its elucidation. It is now universally considered the greatest national epic of the Germans, who regard it as one of the most precious gems of their literature. It has little of the grace of courtly poetry. Its characters are without subtlety or refinement. We are throughout in the presence of vast elemental forces. These forces, however, are rendered with extraordinary vividness of imagination, and with a profound feeling for what is sublime and awful in human destiny. No competent critic now disputes the fact that the "Nibelungenlied" takes rank next after the Homeric poems among the great epics of the world. Wagner, in his "Ring of the

Nibelungs," has taken little but names from the old epic. The source of his material is the old Norse version of the legend in the "Volsunga Saga" and the "Edda."

Niblack, Albert Parker, an American naval officer; born in Vincennes, Ind., July 25, 1859; was graduated at the United States Naval Academy, in 1880; on duty at the Pacific Station, 1880–1882; engaged in exploration in Alaska, 1884–1888; served in the Squadron of Evolution and the Atlantic Squadron, 1889–1894; and for several years acted as lecturer in the Naval War College. He was naval attaché at Berlin, Rome, and Vienna; served in the Cuban blockade, on the flagship "Olympia" in the battle of Manila Bay, and subsequently on the "Brooklyn." He was author of "Coast Indians of Alaska and Northern British Columbia."

Nicæa. See NICE.

Nicander, Karl August (nē-kän'der), a Swedish poet; born in Strengnäs, Sweden, March 20, 1799. His "Death of Tasso" (1826) is very well known; other noted works by him are: "The Runic Sword," a tragedy in verse (1821); "King Enzio" (1825); and "Recollections of the South" (1828). He died Feb. 9, 1839.

Nicaragua, a republic of Central America; reaching from the Caribbean Sea to the Pacific, between Costa Rica on the S. and Honduras on the N., the E. (Caribbean) coast measuring 290 miles and the W. coast 185 miles; area, 49,200 square miles; pop. (1906) 800,000, including 40,000 uncivilized Indians.

Topography.— The Central American Cordilleras form the backbone of the country; they run N. W. and S. E. at a distance of 12 to 30 miles from the Pacific, and attain elevations of 4,000 and 5,000 feet above sea-level. On the W. the surface sinks rapidly to a longitudinal depression (110 feet), the S. two-thirds of which are filled by the large lakes of Nicaragua (115 miles long, 45 broad, and 140 feet deep in most parts) and Managua (35 miles long, 20 broad, 30 feet deep), the latter lying N. of the former and 25 feet higher. This depression is studded with a chain of volcanic cones, standing on islands in the lakes (Ometepec and Madera, 4,190 feet), and clustering thickly between the N. end of Lake Managua and the Gulf of Fonseca at the N. W. extremity of the country, as Coseguina (3,835 feet, which was the scene of a tremendous outbreak, lasting over four days, in 1835), Viejo (6,267), Telica (4,200), Momotombo (6,890), Mombacho (4,600), and several others. Though most of these are quiescent, some of them burst forth in eruption from time to time; Ometepec poured out its lavas during seven days in 1883. Another low range separates this depression from the Pacific. The districts W. of the central backbone are the chief seats of the population. There stand the towns Managua (the capital), Leon, Granada, Chinandega, Rivas. On the W. coast there are three harbors — the Gulf of Fonseca in the N. Salinas Bay in the S., and the port of Corinto toward the N. The only port on the E. side is Greytown, at the mouth of the San Juan river. E. of the Cordilleras the surface falls away gradually; the spurs that break off from the main ridge sink into the low alluvial plains that face the Caribbean Sea. Thick forests clothe extensive areas on this side. Several rivers carry off the surplus water E., a few being of good length, such as the Coco or Wanks (350 miles long), which serves as the conventional N. boundary; the San Juan (125 miles), which drains Lake Nicaragua and separates the state of Nicaragua from Costa Rica on the S.; the Bluefields and the Rio Grande (230 miles). The low coast-belt, called the Mosquito Territory, is lined with salt lagoons — Pearl lagoon having an area of 200 square miles, and Bluefields lagoon half as much.

Mineralogy.— The mountain-spurs E. of the main chain are rich in minerals; gold is mined in the neighborhood of Libertad on to Matagalpa, in the heart of the country, and silver near the sources of the Coco in the N.; coal, copper, tin, iron, lead, zinc, antimony, quicksilver, marble, etc., exist, but are not worked.

Climate.— As a rule the climate varies between 70° and 90° F., and there is a dry season lasting from about December to May.

Soil.— The natural products of the soil are tropical. The forest trees include mahogany, rosewood, logwood, fustic, sandalwood, india-rubber, and numerous others that yield fancy woods, medicinal plants, gums and dyewoods Large herds of cattle are bred and reared on the extensive plains of the center and E. The rich soil of the cultivated W. region yields maize (the staple food of the people), coffee, cocoa, sugar, cotton, rice, tobacco, indigo, and a great variety of tropical fruits.

Commerce.— The exports — chiefly coffee, india-rubber, bananas, hides, metals, gums, woods — average $1,520,000; the imports, mostly manufactured goods, $2,145,000.

Religion.— The state religion is the Roman Catholic, but all creeds are tolerated.

Education.— The educational standard is low, in spite of two universities (so-called), at Leon and Granada, with about 350 students in all.

Government.—The country is governed by a president (elected for four years), a legislative assembly of 11 members, and a senate of 10; both these bodies are elected

by the people, the former for four, the latter for six years.

Railroads.— There are 100 miles of railway, connecting the chief towns with Corinto.

Finance.— The public revenue is derived chiefly from monopolies on spirits, tobacco, and gunpowder, and from import dues. The national debt amounts to $3,037,535.

History.— Nicaragua, like the republic N. of it, was a center of Aztec civilization; the Aztecs were preceded by another race, likewise civilized, who have left stone sculptures and monumental remains. The Aztec influence survives in archæological ruins and relics and in the Indian dialects. Columbus sailed along the Mosquito coast in 1502. Twenty years later the country was overrun by the Spaniards under Gil Gonzalez D'Avila, and in 1524 the city of Granada was founded. This town soon developed as the head of a stream of commerce that flowed up and down the San Juan river. In 1610 was founded Leon, the democratic rival of the aristocratic Granada. During the Spanish supremacy (after 1550) Nicaragua was a province of Guatemala. In 1821 it asserted its independence, and two years later joined the federation of the Central American states, a connection that lasted 16 years. The history of the country after the severance from Spain till 1865, is a record of war and dissension, war with Costa Rica, with Guatemala, and with Great Britain (1848), which had asserted a protectorate over the Mosquito Coast since 1655. This region was given up to Nicaragua in 1860. Between 1855 and 1860 the artistocratic and the democratic party were fighting, the latter being assisted by the adventurer William Walker (see WALKER, WILLIAM). Since then Nicaragua has made laudable efforts to develop her resources and to advance along the path of civilization, and she now compares most favorably with her sister republics in Central America.

A bill providing for the construction of a canal across Nicaragua connecting the Atlantic and Pacific oceans was adopted in the United States Senate, Jan. 21, 1899. It provided that the canal should be completed in six years; should be capable of accommodating the largest ocean steamers; and should cost not over $115,000,000. The bill also guaranteed the neutrality of the canal. Politically, the most important provision of the bill was the authority it gave to the President to open negotiations with Great Britain for the abrogation of the Clayton-Bulwer treaty. Under this last provision a convention was signed in Washington, Feb. 5, 1900, by Secretary Hay, representing the United States, and Lord Pauncefote, representing Great Britain, in which that provision of the Clayton-Bulwer treaty providing for a joint control of any canal across the isthmus was annulled. This convention was ratified by the United States Senate, Dec. 20, 1900, but it failed to meet the approval of the British government owing to amendments made by the United States Senate. On Nov. 18, 1901, a second convention was signed in Washington by Secretary Hay and Lord Pauncefote; was submitted to the United States Senate for ratification Dec. 4, and was ratified by a vote of 72 to 6 on the 16th following.

Nicaragua, Lake of, an extensive sheet of water in the republic of the same name; length, 90 miles N. W. to S. E.; greatest breadth, 40 miles; mean breadth, 30 miles; 110 feet above the Pacific, from which it is separated by a strip of land 12 miles wide. The San Juan de Nicaragua river flows from its S. E. extremity into the Caribbean Sea, and at its N. W. extremity it is connected with the smaller Lake of Managua or Leon by the Penaloya river. Steamers ply on it, as it forms a link in the traffic route across the isthmus of Central America.

Nicaragua Wood, the wood of a South American tree; it is used in dyeing and is called peach wood; it is not sound enough for turning. The trees yielding this wood have not been ascertained with any certainty. The "Treasury of Botany" considers it derived from *Cæsalpinia echinata.*

Nicator. See DEMETRIUS II.

Niccolini, Giovanni Battista (-lē'nē), an Italian dramatist; born near Pisa, Italy, Oct. 31, 1782. He studied at the University of Pisa; published his first poem in 1804; became in 1807 librarian and Professor of History in the Academy of Fine Arts in Florence, and in 1810 produced "Pollissena," his first tragedy. Other tragedies followed, partly on classical, partly on modern subjects, which procured for their author a wide fame. He died in Florence, Italy, Sept. 20, 1861.

Nice. See NIKE.

Nice, or Nicæa, in ancient geography, a city of Bithynia, in Asia Minor, on the E. shore of Lake Ascania. This city, called Ancore, or Helicore, is said to have been colonized by Bottiæans, and destroyed by the Mysians. Antigonus rebuilt it 316, B. C., and named it Antigonea; but Lysimachus, having conquered this part of Asia, changed its name to Nicæa, in honor of his wife Nicæa, daughter of Antipater. It became a city of great importance, and the kings of Bithynia often resided here. The celebrated Council of Nicæa, the first general council, was convened, A. D. 325, at Nicæa in Asia Minor by the Emperor Constantine, in order to settle differences that had arisen in respect to the doctrines of Arius. This council was attended by upward of 250 bishops, of whom a great majority came from the

East, besides presbyters, deacons, and others from all parts of the Christian world. The chief question was the Arian heresy; and the council decreed the excommunication of Arius (see ARIAN). The 2d council of Nice, recognized œcumenic council of the Roman Catholics, assembled under the authority of Pope Adrian I. by the desire of Empress Irene, and sat from Sept. 24 to Oct. 23. The bishops declared the veneration of images and the cross to be agreeable to sacred Scripture and reason, and to the teachings of the Church.

Nice (Italian Nizza), chief town of the department of Alpes Maritimes, France, on the coast, 140 miles E. by N. of Marseilles and 110 S. W. of Genoa. On the N. of the city the hills rise in terraces and shield it from the cold winds. On the S. it faces the sea, which tempers the heat in summer. Owing to the advantages of its situation, Nice has for many long years been celebrated as a winter resort for invalids; the number of visitors is estimated from 15,000 to 40,000. The mean temperature of winter is 49° F., of summer 72°. Frost occurs but seldom. The city consists of three parts — the New Town on the W., the Old Town, and the Port, on the E. The first of these is the part frequented by foreigners, particularly English (whence its name of "English town"). Beautiful promenades stretch along the seashore, and are overlooked by villas and hotels. Numerous bridges across the little river Paglione (Paillon) connect the New Town with the Old or Upper Town. This part, with narrow streets, clusters at the foot of a rocky height, the Castle Hill; on the other (E.) side of this hill is the harbor, which was enlarged to twice its original size in 1889, and deepened to 25 feet. The castle Hill is an isolated mass of limestone 318 feet high, formerly crowned by a strong castle, now in ruins, and is laid out in public gardens. The chief public buildings are the cathedral, the Gothic church of Notre Dame, the natural history museum, art gallery, library, observatory, casino, etc. The people manufacture artistic pottery, perfumery, and Italian pastes, grow flowers and fruits, the last of which they preserve, and produce inlay work in olive wood. Most of these things are exported, chiefly by way of Genoa and Marseilles. The exports from the port of Nice range in annual value from $473,280 to $284,910, the greater portion being for olive oil. The imports varying from $2,853,435 to $9,047,950, consist of wine, oil, and cereals, with smaller quantities of coal, charcoal, timber, bran, and flour. The ancient Ligurian town of Nicæa, founded by a colony of Phocæans from Massalia (Marseilles), became subject to Rome in the 2d century B. C. It was in the hands of the Saracens during the greater part of the 10th century. Then, after existing as an independent city, it acknowledged the supremacy of the Counts of Provence and the House of Savoy (1388). In 1543 it was taken and pillaged by the Turks under Barbarossa. From 1600 onward it was repeatedly taken by the French; and they kept possession of it from 1792 to 1814. In 1860 it was ceded to France by Sardinia (Savoy). Masséna was born near the city, and Garibaldi in it. Pop. (1906) 134,232.

FIRST COUNCIL OF NICÆA.

Nicene Creed, properly the CONSTANTINOPOLITAN-NICENE CREED, the summary of articles of belief formulated by the first council of Nice, and the "Filioque" clause, to which the Greeks objected, having been added at the First Council of Constantinople, A. D., 381, under Pope Damasus I. The creed is recited daily in the Roman mass — all present genuflecting at the words "*Et homo factus est*" — and in the Communion office of the Anglican Church.

Nicephorus, called THE CONFESSOR, a Byzantine historian; born in Constantinople in 758. He was appointed patriarch of Constantinople in 806, but on account of his defense of image-worship was persecuted and finally deposed by the iconoclast Leo V., the Armenian. Retiring to a monastery he wrote a "Breviarium," a brief history of Constantinople (602 to 770), distinguished for accuracy and erudition; a "Chronology" from the beginning of the world; and controversial writings. He died in 828.

Niche, or **Nice,** a cavity or hollow place in the thickness of a wall, in which to place a figure, a statue, a vase, or an ornament. Niches are made to partake of all the segments under a semicircle. They are sometimes at an equal distance from the front, and parallel or square on the back with the front line, in which case they are called square recesses or square niches. Occasionally small pediments were formed over them, supported on consoles, or small columns or pilasters placed at the sides of the niches. Anciently they were used in ecclesiastical buildings for statues and shallow square recesses. Semicircular niches for the reception of statues were of frequent occurrence in the walls; and there was generally a large niche, with a vault above it, facing the entrance of the temple, and forming the termination of the building, which contained the image of a god.

Nichol, John, a Scotch writer; born in Montrose, Forfarshire, Scotland, Sept. 8, 1833. He was a Professor of English Literature at the University of Glasgow (1861–1889), who did much to make American books popular in England. His numerous publications include: "Leaves" (1854), verse; "Tables of European History, 200–1876 A. D." (1876; 4th ed. 1888); "Byron" in "English Men of Letters" series; "American Literature, 1620–1880" (1882). He was an ardent advocate of the Northern cause during the Civil War, and visited the United States at the close of the conflict. He died in London, England, Oct. 11, 1894.

Nichol, John Pringle, a Scotch astronomer; born in Brechin, Scotland, Jan. 14,

OBSERVATORY OF NICE.

1804. Licensed for the Scotch Church, he turned his attention to astronomy, and acquired so much reputation that in 1836 he was appointed Professor of Astronomy in Glasgow University. He wrote: "The Architecture of the Heavens" (1838); "Contemplations on the Solar System" (1838); "The Stellar Universe" (1848); and the "Planetary System" (1851). He likewise edited a "Cyclopædia of Physical Sciences," published in 1857. He died near Rothesay, Scotland, Sept. 19, 1859.

Nicholas, one of the seven deacons mentioned in the Acts. He was a proselyte of Antioch; but afterward founded a sect called by his name, which permitted concubinage and the offering of meats to idols. By some, however, this Nicholas is said to have been a person other than Nicholas the deacon.

Nicholas, the name of five Popes, as follows:

NICHOLAS I., Pope, elected in succession to Benedict III., in 858. He excommunicated Photius, patriarch of Constantinople, whose schism led to the separation of the Roman and Byzantine Churches. He died in Rome, 867.

NICHOLAS II., Pope; born in Burgundy. He became Archbishop of Florence, and succeeded Stephen IX. in 1058. He was opposed by a rival, who styled himself Benedict X.; but being disavowed by the council of Satri, the latter was obliged to forego his claim to the papal chair. This Pope assembled a council at Rome, and caused a decree to be passed which was very important in the subsequent elections to the tiara. He was succeeded by Alexander II. He died in 1061.

NICHOLAS III., Pope; born of a noble Italian family. He was elected in succession to John XXI., in 1277. He obtained from the emperor, Rudolph of Hapsburg, large grants of Italian territory; among the rest, the exarchate of Ravenna. He dispatched a number of missions to heathen countries, and deprived Charles d'Anjou, King of Naples, of the dignity of a senator of Rome. His successor was Martin IV. He died in 1280.

NICHOLAS IV., Pope; born in Ascoli, Italy. He was elected to the papal chair on the death of Honorius IV., in 1288. He excommunicated James of Aragon and his followers in the island of Sicily, and advanced the claims of Charles II. of Anjou to that kingdom. He likewise endeavored to excite a new crusade, but without success. This disappointment hastened his death, which took place in 1292.

NICHOLAS V., Cardinal-Bishop of Bologna, became Pope after Eugenius IV., in 1447. He restored peace to the Roman and Western Churches, and caused the sovereigns and states of Italy to forget their feuds. He collected books and manuscripts, and ordered translations to be made of the Greek classics. The Vatican library was also founded by him, and he embellished Rome with numerous fine edifices. He was an enlightened and distinguished Pope. He died in 1455.

Nicholas I. (Nikolai Pavlovich), Emperor of Russia, third son of the Emperor Paul I.; born near St. Petersburg, Russia, June 25, 1796 (old style). He ascended the throne in 1825. He made war with Persia in 1827–1828; joined in the treaty of London, which secured the independence of Greece; and made one of the allied powers who destroyed the Turkish fleet at Navarino in 1827. This affair led to war between Russia and Turkey, in which the latter was defeated, paid indemnity, and signed the treaty of peace at Adrianople in 1829. He suppressed the Polish insurrection which broke out in the following year with relentless severity. In 1848 Nicholas assisted Austria with an army corps in putting down the rising in Hungary. Early in 1852 began the Russian effort to take over the holy places and assume the protectorate of the Christians in Palestine. This led to the Crimean War, before the close of which Nicholas died from lung disease in St. Petersburg, Feb. 18, 1855 (old style).

Nicholas II., Emperor of Russia, son of Alexander III.; born in St. Petersburg, Russia, May 18, 1868. His mother was the Princess Dagmar, a daughter of the King of Denmark, and sister to the Princess of Wales, the Duchess of Cumberland, and the King of Greece. The course of his studies was, by his father's wish, directed chiefly to modern history and languages, constitutional history, political and social economy, and the law and administration of his own country. During the famine of 1891 he was, at his own request, made president of the Committee of Succor, and worked hard in the organization of relief. As czarevitch he held several military commands in his own country — in the famous Préobrajensky regiment among others — and in England he had conferred on him in 1893 the Order of the Garter. He succeeded to the throne Nov. 1, 1894. He married the Princess Alix of Hesse-Darmstadt Nov. 26, 1894. His coronation took place with impressive and elaborate ceremonial at Moscow in May, 1896, and in August of the same year he commenced a tour which included visits to the Emperor of Austria and Germany, to the King of Denmark, to Queen Victoria, and to the President of France. The visit to Paris was taken advantage of to accentuate the friendly understanding or alliance, as it may now be called, between France and Russia. This alliance was definitely announced on the occasion of the visit of President Faure to St. Petersburg in 1887.

By the peace proposals that he made to the powers in 1898 he gave a fresh impulse to the cause of arbitration (*q. v.*).

Nicholas I., King of Montenegro (proclaimed a kingdom in 1910); born Oct. 7 (Sept. 25), 1841. After an educational course at Trieste and Paris, he succeeded his uncle, who had been assassinated in August, 1860. He married in the same year, Princess Milona, the daughter of the vice-president of the Council of State. In 1890 the 30th anniversary of his accession was celebrated, and during 1896 the bicentenary of the foundation of his dynasty. Queen Victoria gave him the Grand Cross of the Royal Victorian Order in March, 1897. His daughter, Princess Helen, married the Prince of Naples, the heir to the throne of Italy; and another daughter, Princess Anne, Prince Francis Joseph of Battenburg.

Nicholas, St., Bishop of Myra, in Lycia. He is believed to have lived under Diocletian and Constantine, and to have suffered persecution under the former; but little is known of his life. His feast day in the Roman calendar is Dec. 6; he is the patron saint of poor maidens, sailors, travelers, merchants, and children (Santa Klaus), and is one of the most popular saints in the Greek Church.

Nicholls, Charlotte. See BRONTÉ.

Nichols, Edward Tatnall, an American naval officer; born in Augusta, Ga., March 1, 1823. He entered the naval service Dec. 14, 1836, was promoted to the rank of past-midshipman July 1, 1842, and commissioned as lieutenant March 13, 1850. During the Civil War he commanded the steamer "Winona," of the West Gulf blockading squadron, assisted at the bombardment of Forts Jackson and St. Philip, received the surrender of Fort St. Philip, April 28, 1862, participated in the attack on and passage of the Vicksburg batteries, June 28, 1862, and engaged the Confederate ram "Arkansas." He was commissioned as commander July 16, 1862, and after the close of the war was assigned to special duty at New York. He received a captain's commission July 25, 1866, and was made chief of staff of the Asiatic squadron in 1870. He was promoted commodore May 24, 1872, commandant of the Boston navy yard in the same year, and rear-admiral commanding the South Atlantic station Feb. 25, 1878. He died in Pomfret, Conn., Oct. 12, 1886.

Nichols, George Ward, an American writer on art and music; born in Mt. Desert, Me., June 21, 1837. He was on the staff of General Sherman in the Civil War. He was for some years president of the Cincinnati College of Music. Among his works are: "The Story of the Great March" (1865); "Sanctuary" (1866), a story of the Civil War; "Art Education Applied to Industry" (1877) "Pottery" (1878). He died in Cincinnati, Ohio, Sept. 15, 1885.

Nichols, Henry E., an American naval officer; born in New York; entered the United States Naval Academy, Oct. 1, 1861; and was promoted captain March 3, 1899. In 1897 he was given command of the "Bennington," and joined Admiral Dewey's fleet at Manila in July, 1898. On Jan. 26, 1899, he received command of the monitor "Monadnock", with which he did unusually effective work off Paranaque, Philippine Islands. During a severe bombardment, June 10, 1899, Captain Nichols was overcome by the heat and refusing to be relieved died while his vessel was shelling the insurgents.

Nichols, John, an English writer; born in Islington, near London, England, Feb. 2, 1745. He was one of the publishers of the "Gentlemen's Magazine," and wrote "History and Antiquities of Leicestershire" (1795-1811), and "Literary Anecdotes of the Eighteenth Century" (1812-1815). He died Nov. 26, 1826.

Nicholson, Henry Alleyne, an English scientist, born in Penrith, New South Wales, Sept. 11, 1844; was educated at the University of Göttingen and Edinburgh, lecturer on natural history in Edinburgh Medical School (1869); Professor of Natural History and Botany in the University of Toronto (1871); of Biology and Natural History in the College of Physical Science, Durham University (1874); of Natural History in the University of St. Andrews (1875); lecturer on geology to the British Museum (1877); and Professor of Natural History at the University of Aberdeen (1882). His works are numerous, comprising "A Manual of Zoölogy" (1870); "Text Book of Geology" (1872): "The Nature of Life" (1875); "Synopsis of the Classification of the Animal Kingdom" (1882), etc. He died in Aberdeen, Scotland, Jan. 19, 1899.

Nicholson, James, an American naval officer; born in Chestertown, Md., in 1737. At an early age he went to sea. This occupation he followed till 1763, when he married in New York, and resided there some years. In 1776, he obtained the command of a ship-of-war called the "Defence," fitted out by the government of Maryland, and soon retook some vessels which the British had captured. In June, 1780, when in command of the frigate "Trumbull," of 32 guns, he fought a severe action with the "Wyatt," in which the "Trumbull" was completely disabled, but her antagonist, equally hurt, withdrew, without attempting to capture her. In 1801 he was appointed commissioner of loans for the State of New York. He died in New York city, Sept. 2, 1804.

Nicholson, James William Augustus, an American naval officer; born in Dedham, Mass., March 10, 1821; entered the navy in 1838 and was promoted commander in 1862. During the Civil War he was distinguished for gallant conduct and had charge of the monitor "Manhattan," which was with Farragut's fleet at the battle of Mobile Bay in 1864. He was promoted rear-admiral in 1881, and died in New York city, Oct. 28, 1887.

Nicholson, John, an English military officer; born in Dublin, Ireland, Dec. 11, 1822. In 1838 he joined the East India Company's service, and in 1840 his regiment was ordered to Ghazni, Afghanistan, where, two years later, it was compelled to surrender to the enemy. After being imprisoned he regained his liberty. On the breaking out of the Sikh war in 1845 he served in the campaign on the Sutlej, and was present at the battle of Ferozeshah. He was now appointed assistant to the resident at the conquered capital, Lahore. During the Sikh rebellion of 1848 he greatly distinguished himself, the preservation of the important fortress of Attock being due to his daring and promptitude, while soon after, at the Margulla Pass, he succeded in intercepting and defeating a large body of the insurgents. At the battles of Chillianwalla and Gujrat successively he earned the special approval of Lord Gough, to whom he was immediately attached. The Punjab having finally become a British province, Captain Nicholson was appointed a deputy commissioner under the Lahore Board. His success in bringing the savage tribes under thorough subjection to law and order was marvellous. In the mutiny in 1857 he perhaps did more than any other man to hold firm the British grasp of the Punjab. At Trimmoo Ghaut, July 12 and 14, he nearly annihilated a force of rebels, and at Najafgarh on the 24th he dispersed another body of mutineers. As Brigadier-General, on Sept. 14 he led the first column of attack at the siege of Delhi, and after the troops had forced their way into the city he still exposed himself in the most fearless manner, and fell, shot through the body, Sept. 23, 1857.

Nicias, an Athenian general, who took a prominent part in the Peloponnesian war. On the death of Cleon, whom he had steadily opposed, he negotiated the treaty called the peace of Nicias (421 B. C.), by which the Athenians and Spartans agreed to a truce of 50 years. In 415, the peace being almost a dead letter, Nicias was joined with Alcibiades and Lamachus in command of the expedition to Sicily, of which, however, he wholly disapproved. After temporary success the tide was turned by the arrival of Spartan auxiliary forces at Syracuse, to meet which Athenian reinforcements were sent under Demosthenes and Eurymedon; but after more than two years' efforts, the Athenians had to raise the seige and retire. An eclipse of the moon took place at the time fixed for their secret departure, and Nicias, a superstitious man, deferred the retreat; the Athenians were completely overthrown, and Nicias with his colleague put to death in 413.

Nicias, a celebrated Grecian painter; contemporary with Apelles. His greatest picture was that which illustrated the passage in Homer's "Odyssey," where Ulysses invokes the shades of the departed. Ptolemy I., King of Egypt, offered Nicias 60 talents (about $75,000) for the picture; but the painter preferred to present it to his native city of Athens. One of his pictures was taken to Rome by Augustus, in whose temple it was afterward fixed. He is likewise stated to have painted some of the statues of Praxiteles. Lived about the 3d century B. C.

Nick, in Scandinavian mythology, a water-wraith or kelpie. There are nicks in sea, lake, river, and waterfall. Both Catholic and Protestant clergy have labored to stir up an aversion to these beings. They are sometimes represented as half child, half horse, the hoofs being reversed, and sometimes as old men sitting on rocks wringing the water from their hair. In Denmark, when one is drowned, they say *Nikken tog ham bort* (Nick took him away).

Nickel, in chemistry, symbol, Ni; at. wt., 58.7. A tetrad-metallic element, discovered by Cronstedt in 1751, in combination with arsenic, in the copper-colored mineral arsenide of nickel; called by the miners kupfernickel. Its preparation is effected in various ways, the methods involving first the separation of the arsenic, copper, etc., with hydric-sulphide, and that of cobalt by chloride of lime or nitrite of potash. The solution of pure nickel is precipitated by potash, and the dry oxide mixed with oil or charcoal and exposed in a crucible to the heat of a blast furnace, whereby the metal is obtained as a fused mass. Nickel is silver-white, malleable and ductile, and as infusible as iron. Sp. gr., 8.28–8.66. It is magnetic at ordinary temperatures and dissolves in dilute sulphuric, nitric, and hydrochloric acids. Nickel forms several alloys, the most important being known as German-silver. It forms two oxides: nickel protoxide, NiO, formed by exposing nitrate of nickel to continued ignition; it is a grayish-green non-magnetic powder, which does not absorb oxygen from the air; nickel sesquioxide, Ni_2O_3, formed by exposing nitrate of nickel to a moderate heat; it is a black powder, which dissolves in acids with evolution of oxygen and formation of nickel salts. These are mostly emerald-green in the hydrated state, turning

yellow when heated. Also, in the United States, a popular name for a small coin, consisting of nickel, value five cents. Nickel-arsenate = *Annabergite,* and *Xanthiosite;* nickel-arsenide = *Chloanthite, Nickeline,* and *Rammelsbergite;* nickel-bismuth = *Grünauite;* nickel-carbonate and nickel-hydrate = *Texasite;* nickel-glance = *Gersdorffite;* nickel-green = *Annabergite;* nickel-gymnite = *Genthite;* nickel-ocher, nickel-bloom = *Annabergite;* nickel-oxide = *Bunsenite;* nickel-pyrites = *Millerite;* nickel-silicate = *Alipite, Genthite, Noumeite,* and *Pimelite;* nickel-sulphate = *Morenosite;* nickel-sulphide = *Millerite;* nickel-stibine = *Ulmannite;* nickel-vitriol = *Morenosite.*

Nickel Glance, a grayish-white, massive, and granular ore of nickel, on the average consisting of 35.5 nickel, 45.2 arsenic, and 19.3 sulphur, part of the nickel being sometimes replaced by iron or cobalt.

Nickel Plating, the art of coating copper, brass, or other metal with nickel. To a dilute solution of pure zinc chloride a solution of nickel sulphate is added, until the liquid is distinctly green, and the whole raised to the boiling-point. The article to be plated, after being thoroughly cleaned, is placed in the liquid, and the boiling continued for 30 minutes, when the nickel will be found deposited in a brilliant white layer. After being washed and dried it takes a fine yellowish-toned polish. A moderate battery power and nickel anodes are sometimes employed. Nickel electrotypes stand wear and tear much better than the ordinary copper ones.

Nickel Steel. Iron has a strong affinity for nickel, and alloys with it in all proportions very readily. It seems, however, from tests given by H. K. Landis, of the American Institute of Mining Engineers, in the "Scientific American," Jan. 9, 1897, that the maximum results are obtained with 8 or 16 per cent. of nickel. The following is the average composition of nickel steel as made in the United States:

Carbon	0.24-0.28	per	cent.
Sulphur	0.02-0.03	"	"
Manganese	0.60-0.70	"	"
Phosphorus	0.01-0.03	"	"
Nickel	3.00-5.00	"	"

It will be seen that the above corresponds to what is called a "mild steel," and yet the increase in strength due to nickel alone is probably 60 per cent. of its strength without the addition of nickel, while the cost of the steel is but 1 to 1.5 cents per pound more, disregarding the small loss in manufacture.

Physical Properties.— Resistance to corrosion is its principal peculiarity. Numerous tests have been made, especially in sea water, which is very destructive to iron or steel, the results of which have demonstrated the fact that nickel steel when used alone would outlast the best of ordinary steels. This was proved by tests with propellers, torpedo netting, metal sheathing for vessel bottoms, etc. There seems some doubt, however, as to its applicability to boilers, where its high elastic limit would permit much lighter construction. Some experiments indicate that nickel steel corrodes rapidly in pure water and in the presence of various boiler compounds, while on the other hand an English authority cites an experiment indicating a corrosion of but one-half to three-quarters that of ordinary steels. When the boiler is made entirely of nickel steel, thus preventing electrolytic action, there is no doubt but that it is the best material yet applied to that purpose. The fracture faces are more fibrous than in ordinary steel, though there is no appreciable difference in color or luster of the polished metal.

Mechanical Properties.— Nickel steel is a noble metal, for while it has a remarkable resistance to applied stresses, yet it is almost as easily worked as soft steel, is not brittle while hot or cold, is not much affected by tempering or annealing as compared with carbon steel, and is remarkably homogeneous. We might first ask what effect nickel has on the properties of iron. This was shown in the results of experiments on nickel-iron alloys made at the Laboratory of Industrial Mechanics at Berlin and reported by that celebrated metallurgist Dr. Wedding. These alloys contained no carbon and but small percentages of several impurities — not over 0.2 per cent. total. The results were, therefore, practically for pure nickel-iron alloys, and they showed that the maximum tension results were obtained with an 8 per cent. nickel alloy, while the compressive and shearing strength had its greatest development with the 16 per cent. alloy. The effect of nickel on iron was therefore to raise its tensile strength from 52,500 to 80,200 pounds per square inch; its elastic compressive strength from 29,440 to 186,748, and its shearing resistance from 42,242 to 102,410 pounds per square inch. This effect is not obliterated by the presence of carbon, as is seen in the deductions arrived at by Cholat and Harmet:

1. Ferro-nickel alloys: 2.5 per cent. nickel, 0.1 per cent. to 1.0 per cent. carbon. The elastic limit and ultimate strength are raised and contraction decreased as the proportion of carbon increased. Tempering develops these properties uniformly.

2. Ferro-nickel alloys: 15 per cent. nickel, 0.1 to 1.0 per cent. carbon. In the annealed specimens, strength and elasticity increased rapidly with the carbon content up to 3 per cent. carbon, where the tensile strength was 213,400 pounds per square inch. Tempering in oil raised the elastic limit of this

last steel to 166,400 and its breaking strength to 277,400 pounds per square inch. The minimum contraction corresponded very nearly to the highest elastic limit. Prolonged annealing slightly improved on the annealed specimen.

3. Ferro-nickel alloys: 25 per cent. nickel, 0.1 per cent. to 1.0 per cent. carbon. An interesting variation is here noted, for contraction and elongation rise with the carbon content, the tensile strength remains high, and the metal is not brittle. It seems that the high percentage of nickel held the carbon in a condition which could not be modified by tempering.

This latter property is very useful, as internal strains incident on manufacture can be relieved by annealing without sensibly reducing the resisting qualities of the steel; in fact, such annealing tends greatly to toughen the material and increases its ability to resist shock or vibration to a remarkable degree. Where a low carbon (0.20 per cent. C) steel will withstand 300,000 double stresses on an alternate stress machine, a high carbon (0.50 per cent. C) will break at probably 400,000 and nickel steel at from 1,500,000 to 2,000,000 such double stresses, each stress being two-thirds of its ultimate strength, or very near its elastic limit. It is very common for tempered nickel steel to have a tensile strength of 200,000 pounds per square inch without being brittle. If we compare this with the 60,000 pounds for low carbon steel, we see that there is still plenty of room at the top, for most of the steel used today is low in carbon. Commander Eaton, U. S. N., says that the United States government first bought nickel to use in steel in 1890, that the first nickel steel plate was tested in 1893, in July, from which date all armor for United States vessels was made of nickel steel. As the armor plate industry has probably achieved the best results in nickel steel, the following tests made on plates exhibited at the Chicago Exposition by the Bethlehem Iron Company are presented. The analysis of this steel corresponds very closely to the average composition already given, except that the nickel content is 3.25 per cent.

MECHANICAL TESTS OF NICKEL STEEL ARMOR PLATES.

Elastic Limit. Pounds per square inch.	Ultimate Strength. Pounds per square inch.	Elongation. Per cent.	Contraction. Per cent
86,000	117,200	11.50	45.0
72,000	142,000	14.25	45.0
96,800	120,000	13.75	62.0
78,800	110,000	16.25	58.5
64,000	117,600	17.00	45.9
65,000	118,900	16.66	42.2
74,000	142,800	13,00	28.2
74,000	143,200	12.32	27.6
51,000	91,600	22.75	53.2
51,000	91,200	21.62	53.4
53,000	85,200	21.30	49.5
48,000	86,000	21.25	47.4
.....	276,000	2.75	4.0
.....	246,600	4.25	6.0

When these results are compared with those of high carbon steel having a strength of 90,000 pounds per square inch, we can understand why simple steel plates break while nickel steel resists the ballistic tests. Low percentages of nickel do not interfere in the least with the ordinary processes of Harveyizing, tempering, forging or reforging, machining, or rolling, and give to the plates all the qualities of high carbon steel without its brittleness.

Outside of the application of this metal by the United States navy to armor, angles, rods, thin plates, engine shafting, hull plates, an experimental gun, the barrels of small arms, torpedo netting, etc., may be mentioned its application to bicycle frames and handle bars, steam boilers, and difficult steel castings. In fact, wherever a tough metal of high resistance and low corrodibility is wanted, this alloy is applicable. Its excellent mechanical qualities permit the weight of the parts to be reduced, leading to its application to motor carriages, and suspension bridges, while its high resilience allows it to be used to advantage in car links, axles, crank pins, bridge pins, bicycle spokes, etc. We may look forward with a considerable degree of certainty to the extended use of this material in a wide variety of mechanical construction in the near future.

Nicker, in Teutonic mythology, a malignant kind of water-sprite. He often presents himself on the shore in the shape of a horse, and has thus close affinities with the Scotch *kelpie;* while indeed the Old Norse *nikr* (Old High German *nichus*) is thought by some to mean the hippopotamus only. In our own demonology we find both a male nix and a female nixie. The modern Dutch *nikker* is merely an ordinary evil spirit or devil, recalling our own familiar Old Nick.

Nicobar Islands, a group of islands in the Indian Ocean, forming with the Andamans, to the S. of which group they lie, an extension of the great island chain of which Java and Sumatra are the principal links; area 634 square miles; pop., aboriginal, 6,915. Twenty in number, 12 of which are inhabited, they consist of two divisions —the N., low and planted with cocoanut trees, and the S. mountainous (2,000 feet) and covered with timber. Malaria prevails nearly all the year round; the temperature seldom moves outside the limits 80°–85° F. The people belong to two races, an inland tribe, little civilized, who show Mongolian affinities and are regarded as indigenous, and the coast people, about 6,000 in number, who are of mixed Malay blood, but idle and lazy. They collect and export trepang and edible birds'-nests. The archipelago was occupied by Denmark, 1756–1856. In 1869 it was annexed by Great Britain, to put a

stop to the piracy of the people. A penal colony for India exists at Nankauri on the island Kamorta.

Nicodemus, a member of the Jewish Sanhedrim, at first a Pharisee, and afterward a disciple of Jesus. He was early convinced that Christ came from God, but was not ready at once to rank himself among His followers. In John iii: 1–20, he first appears as a timid inquirer after the truth, learning the great doctrines of regeneration and atonement. In John vii: 45–52, we see him cautiously defending the Saviour before the Senhedrim. At last, in the trying scene of the crucifixion, he avowed himself a believer, and came with Joseph of Arimathea to pay the last duties to the body of Christ, which they took down from the cross, embalmed, and laid in the sepulcher (John xix: 39).

Nicol, Erskine, a British painter; born in Leith, Scotland, July 3, 1825. He received his education in art at the Trustees' Academy, Edinburgh; resided some time in Ireland, where he received his peculiar bent at a delineator of Irish life and manners; settled in London (1862), and contributed regularly to the Royal Academy, of which he was elected an associate in 1866. Among his well-known pictures of Irish subjects are "Notice to Quit," "Renewal of the Lease Refused," "Brotherhood," "Among the Old Masters," and "Interviewing the Member." He died March 8, 1904.

Nicolai, Christoph Friedrich, a German author and publisher; born in Berlin, Prussia, March 18, 1733. With Moses Mendelssohn he edited the "Library of Belles Lettres" (1757–1758), and contributed with Lessing to "Letters on the Most Recent Literature" (1759–1765). By this he was led to conceive the plan of the "Universal German Library" (106 vols. 1765–1792), a periodical which he edited for many years, and which contributed to the progress of literature and improvement of taste in Germany. He wrote topographical works, satires, anecdotes of Frederick the Great, and an autobiography, in which he describes strange apparitions or obvious hallucinations by which he was visited. He died Jan. 8, 1811.

Nicolai, Otto, a German composer; born in Königsberg, Prussia, June 9, 1810. His early life was a struggle with poverty and difficulties. He studied in Berlin and in Rome, and in 1847 became papellmeister at Berlin. His best-known work is the opera "The Merry Wives of Windsor" (1848). He died in Berlin, May 11, 1849.

Nicolaiev, or **Nikolaiev,** one of the principal naval stations of Russia, on the Black Sea, in the province of Kherson, and 36 miles N. W. of the town of Kherson, at the confluence of the Ingul and Bug. It occupies a large space, is fortified and well built, with wide streets and a finely planted boulevard. It was founded in 1791, and since its connection with the Russian railway system its trade and importance have vastly increased. Pop. (1908) 92,012.

Nicolaitans, an immoral sect mentioned in Rev. ii: 6, 15, and sometimes, but apparently on very feeble grounds, connected with Nicolas the proselyte of Antioch, mentioned in Acts vi: 5.

Nicolardot, Louis (nik-ō-lär-dō), a French author; born in Dijon, France, Nov. 28, 1822. The most characteristic of his works are: "Journal of Louis XVI." (1873); "The Impeccable Théophile Gautier" (1883); and "La Fontine and the Human Comedy" (1885). He died in Paris, Nov. 21, 1888.

Nicolas, Sir Nicholas Harris, an English antiquary; born March 10, 1799. He entered the navy, and had reached the rank of lieutenant by 1815, but at the close of the war left the service to study law, and was called to the bar at the Inner Temple in 1825. He devoted himself chiefly to genealogical and historical studies, and his great work, "History of the Orders of Knighthood of the British Empire" (1841–1842), remains a solid monument of learning. He devoted the energies of his later years to works on the naval history of England: "Dispatches and Letters of Admiral Lord Viscount Nelson" (1844–1846), and the unfinished "History of the British Navy" (1847), as well as the papers of Sir Hudson Lowe. Harris wrote biographical notices of many of the poets in Pickering's Aldine edition, as well as many useful historical handbooks, as a "Synopsis of the Peerage of England" (1825), "Testamenta Vetusta" (1826), the "Chronology of History (1835). Other works are "Proceedings and Ordinances of the Privy Council of England" (1833–1837); a "Life of William Davison," Queen Elizabeth's secretary (1823); "Memoirs of Ritson" (1833); and a host of books and papers — and all of value — on heraldic, genealogical, antiquarian, and historical questions. He died near Boulogne, France, Aug. 3, 1848.

Nicolas de la Brie. See MARTIN IV.

Nicolay, John George, an American author; born in Essingen, Bavaria, Feb. 26, 1832; was brought to the United States in 1838 by his parents, and educated in the public schools. When 16 years old he became a printer in the office of the "Free Press," Pittsfield, Ill., where he rose to the post of publisher and editor. As proprietor of this paper he was recognized as a dominant political force in the State. During the famous campaign between Mr. Lincoln and Mr. Douglas, he took sides with the former, and when Mr. Lincoln was nominated

for the presidency he appointed Mr. Nicolay his private secretary. Shortly before President Lincoln's assassination, he appointed Mr. Nicolay United States Consul at Paris, which post he held till 1869. In 1872 he was made marshal of the Supreme Court of the United States, and occupied that post for 15 years. As an author, Mr. Nicolay is best known from "Abraham Lincoln, a History" (1890), on which he collaborated with JOHN HAY (*q. v.*). He also contributed numerous magazine articles and sketches on President Lincoln. He died in Washington, D. C., Sept. 26, 1901.

Nicole, François Léon Etienne (nē-kōl′), a Haitian poet; born near Grande Rivère, in 1731. He was a mulatto. Educated in a Jesuit college, he went to Paris in 1750, where Voltaire introduced him to literary circles. Louis XV. granted him a pension in recognition of his talents. He published: "The Romance of the Slave" (1766); "Tropical Flowers" (1770); and "New Poems" (1772). He died in Cap Français, in 1773.

Nicole, Pierre, a French writer, one of the so-called Port-royalists; born in Chartres, France, Oct. 19, 1625. From the provinces he proceeded to Paris, where he studied theology; afterward he entered Port Royal, where he was engaged in teaching and associated himself with Arnauld in the preparation of his work on logic. Besides this he translated Pascal's "Letters" into Latin, and wrote "Essay on Morality" and "The Imaginary and the Visionary," the latter provoking a severe attack from Racine. He died in Paris, France, Nov. 16, 1695.

Nicoll, William Robertson, a Scotch clergyman and editor; born in Lumsden, Aberdeenshire, Scotland, Oct. 10, 1851. He took an M. A. at Aberdeen University; was minister of the Free Church at Kelso for eight years; on account of ill-health he resigned, in 1887 started the "British Weekly," one of the most successful religious papers in England, and later became English editor of the "Bookman." Among his publications are: "Calls to Christ" (1881); "John Bunyan" (1884) in the "Evangelical Succession" series; "Ten-Minute Sermons" (1895); "The Key of the Grave"; "Sunday Afternoon Verses" (1897); etc.

Nicolls, Sir Richard, the first English governor of New York; born in Ampthill, England, in 1624. At 18 years of age he joined the royal army and was made captain of a troop of horse. On the triumph of Cromwell he fled to Holland, but at the restoration of Charles II., was appointed gentleman of the bed chamber to the Duke of York. In 1664 he was given charge of the fleet sent to reduce New Netherland. Owing to lack of preparation the Dutch could offer no resistance, and the English gained easy possession of the city, which Sir Richard renamed New York. In 1665 he established the offices of mayor, alderman, and sheriff. His rule was popular and successful. He returned to England in 1668, and lost his life serving under the Duke of York against De Ruyter, May 28, 1672.

Nicomedes I., King of Bithynia, succeeded his father Zipœtas, 278 B. C. In the following year he sought the assistance of the Gauls against his brother Zibætas, who disputed the throne with him. His barbarian auxiliaries subsequently turned against him, and overran the whole of Asia Minor. He died about 250 B. C.

Nicomedes II., succeeded Prusias II., in 149 B. C. During his long reign, he remained the ally of the Romans, and assisted the latter against Aristonicus, King of Pergamus, 131 B. C. The last years of his reign were spent in contending against Mithridates VI., King of Pontus. He died in 91 B. C.

Nicomedes III., son and successor of the preceding. He was deposed in the first year of his reign, by Mithridates VI., but was afterward restored to it by the Romans. In 88 B. C. he engaged with the Romans in attacking Mithridates, whose general defeated him in Paphlagonia; whereupon he fled to Italy, where he remained till the conclusion of the war 84 B. C. Dying without issue, he left his crown to the Romans, 74 B. C.

Nicomedia, the capital of ancient Bithynia, at the N. E. angle of an inlet of the Propontis. It was built in 264 A. D. by Nicomedes I., and soon became one of the most magnificent and flourishing cities in the world; some of the later Roman emperors, such as Diocletian and Constantine the Great, selected it for their temporary residence. It suffered greatly from earthquakes. Hannibal committed suicide in a castle close by, and Constantine died near the city, which was the birthplace of the historian Arrian. The small town of Ismid now occupies its site.

Nicopolis, a city of ancient Greece, in Epirus, on the Ambracian Gulf built by Augustus, 31 B. C., to commemorate his victory over Antony at Actium. Nicopolis became subsequently the capital of Epirus, but in the Middle Ages it sank into obscurity and disappeared. It was probably the place where St. Paul passed the last winter of his life. There were five or six other towns of this name in antiquity.

Nicopolis, a town of Bulgaria, on the Danube; 56 miles W. of Rustchuk. The Berlin Congress of 1878 provided for the demolition of the fortifications. Here the Hungarians were defeated by the Sultan Bajazet in 1396; and the place has been

more than once taken by the Russians (1810, 1827, 1877).

Nicosia, or **Levkosia,** the capital of Cyprus, near the middle of the N. half of the island; surrounded with old Venetian walls, the residence of the British High Commissioner, and the see of a Greek archbishop; it has numerous mosques and churches, and some manufactures of silk, leather, and cotton; pop. (1901) 14,752. Also a city of Sicily, 40 miles N. W. of Catania; pop. (1901) 15,811.

Nicot, Jean (nē-kō), a French diplomatist; born in Nîmes, France, in 1530. He was French ambassador at Lisbon. He introduced into France the tobacco-plant, having obtained its seeds from a Dutchman, who obtained them from Florida; it was called after him Nicotiana (see TOBACCO). He also compiled one of the first French dictionaries (1606). He died in Paris, France, May 5, 1600.

Nicotiana (named after Jean Nicot, of Nîmes), tobacco; the typical genus of the solanaceous tribe Nicotianeæ. Calyx, five-cleft, permanent; corolla, funnel or salver-shaped, the limb five-lobed; stamens, five, as long as the tube of the corolla; stigma, capitate; capsule, two-celled, with many minute seeds. Viscous-leaved herbs, natives of tropical America and Asia. See TOBACCO.

Nicotianeæ in botany a tribe of Solanaceæ, sub-order *Atropaceæ;* made by Myers an order.

Nicotine, in chemistry, $C_{10}H_{14}N_2$; an acrid poisonous alkaloid found in tobacco leaves to the extent of from 1 to 5 per cent. It may be prepared by passing a current of steam through a mixture of lime and powdered tobacco, neutralizing the liquid which comes over with sulphuric acid, adding ammonia to liberate the nicotine, and dissolving the latter in ether. The ethereal solution yields almost pure nicotine. It is a colorless transparent oil, which boils at 250°, and does not freeze at —10°. Sp. gr., 1.027 at 15°. It has a strongly alkaline reaction, and turns the plane of polarization to the left. Soluble in water, alcohol, ether, and the fat oils, and its characteristic reaction is the formation of a kermes-brown precipitate with tincture of iodine. Nicotine forms numerous salts. The sulphate $(C_{10}H_{14}N_2)_2H_2SO_4$, is uncrystallizable, but the chloride, $C_{10}H_{14}N_2HCl$, may be obtained in crystals by passing hydrochloric acid gas into nicotine under vacuo.

Nictitating Membrane, or **Third Eyelid,** a thin membrane by which the process of winking is performed in certain animals, and which covers and protects the eyes from dust or from too much light. It is chiefly found in birds and fishes, and is represented in a rudimentary condition in man, and higher mammals generally, by the "semi-lunar folds," situated at the inner or nasal angle of the eye

Nidaros. See TRONDHJEM.

Nidum. See NEATH.

Niebuhr, Barthold Georg (nē'bör), a German historian and philologist, son of Carstens Niebuhr; born in Copenhagen, Aug. 27, 1776. At the age of 18 he was sent to the University of Kiel, where he studied two years. After holding situations in a government office at Copenhagen, he was invited to Berlin in 1805, and entered the service of the King of Prussia, whose confidence he long enjoyed, and who charged him with important diplomatic negotiations, and made him privy-councillor. On the establishment of the University of Berlin, Niebuhr was chosen lecturer on Roman history; and the lectures then delivered formed the basis of the great work by which his name is immortalized, "Roman History" (1811–1827). He served in the campaigns of 1813–1814, and was sent ambassador to the court of Rome in 1816. He succeeded in negotiating a concordat with the holy see in 1821. Quitting Rome in 1823, he was appointed adjunct-professor at the new University of Bonn. He occupied himself with the preparation of a new edition of his great work, and with a republication of the Byzantine historians; but his labors were interrupted and his health and spirits broken by the French revolution of July, 1830. Niebuhr was a great linguist and philologist, as well as historian, and published, besides his history, "Minor Historical and Philological Writings," etc. The "History of Rome" was translated into English by Hare and Thirlwall; and some "Lectures on Roman History," and on "Ancient Ethnography," by Schmitz. He died in Bonn, Prussia, Jan. 2, 1831.

Niebuhr, Carstens, a German traveler; born in Lüdingwort, Hanover, March 17, 1733. At the age of 22 he went to Hamburg, for the purpose of studying geometry, after which he devoted several years to the study of mathematics at Göttingen. Count Bernstorff, the Danish minister, having determined to send a scientific expedition for the purpose of exploring Arabia, Neibuhr accompanied it as geographer, in March, 1761, and after touching at Constantinople, proceeded to Egypt. Here they remained a year, and reached Yemen, their point of destination, in 1762. In September, 1763, he sailed for Bombay, and in December, 1764, set out on his return overland, through Persia and Turkey. He arrived at Copenhagen in November, 1767, and laid the fruits of his researches before the world in his "Description of Arabia," and his "Travels in Arabia," which have been translated into various languages. He was the only one that returned from the mission, and was

liberally rewarded by the Danish monarch. He died in Meldorf, Prussia, April 26, 1815.

Nieder=Deutsch. See LOW GERMAN.

Niederwald, the W. termination of the Taunus range, that abuts on the Rhine opposite Bingen. On a commanding site near its summit was erected, Sept. 28, 1883, the national (German) memorial commemorative of the successful war of 1870–1871. An extensive pedestal, ornamented with allegorical figures, is surmounted by a bronze figure of Germania, 34½ feet in height. The whole was designed by Schilling, a Dresden sculptor. Toothed-railways carry visitors up to the monument from the villages of Rüdesheim and Assmannshausen at the foot, both noted for their wine.

Niehaus, Charles Henry, an American sculptor; born in Cincinnati, O., Jan. 24, 1855; educated in the public schools; studied art at the Royal Academy of Munich, Germany, where he won the first medal ever given to an American. He received a high award at the World's Columbian Exposition, made various celebrated statues, and was engaged on the Congressional Library, Washington; Trinity Church, New York; the appellate court house, New York; etc.; and was the sculptor of two large groups at the Pan-American Exposition in Buffalo in 1901.

Niel, Adolphe (nē-el′), a Marshal of France; born in Muret, France, Oct. 4, 1802. Admitted in 1821 into the Polytechnic School, he became a lieutenant in the Engineers in 1827, and rose slowly to the rank of General of Division, in 1852. He commanded the engineers at the siege of Bomarsund, on the capture of which he was appointed aide-de-camp to the emperor. He contributed largely to the success of the Crimean War, and was created a senator in 1857. At the commencement of the war in Italy, in April, 1859, he was appointed to the command of the 4th corps of the army of the Alps, and after the victory of Solferino, in which the artillery played so important a part, he was appointed a Marshal of France. In 1867 he was nominated minister of war. He died in Paris, Aug. 13, 1869.

Niello, an art much practised in the Middle Ages, to which may be traced the origin of engraving. The lines of a design are cut in a piece of gold or silver; it is then covered with a black composition consisting of copper, silver, lead, and sulphur, and a little borax is sprinkled over it by subjecting it to heat over a fire, the composition becomes liquid and runs into the lines of the design; the whole is then allowed to cool, when the surface of the metal is scraped and burnished, leaving the drawing in black upon the metal. The art is still practised as a mode of ornamenting ware, but its principal use is for door-plates, plates for shop fronts, etc., in which the brass or zinc plates are engraved and the depressions filled with wax. The term is also applied to impressions in a viscid water-ink on paper from metal-plate engravings taken by the early fathers of copperplate printing for testing the state of their work.

Niemcewicz, Julian Ursin (nyem-tsē′-vich), a Polish statesman, poet, and miscellaneous writer; born in Skoki, Lithuania, in 1757. He served a short time in the army, and became acquainted with Kosciusko; was a leading member of the Constitutional Diet of 1788–1792; served the popular cause at the same time by several patriotic dramas; and was aide-de-camp to Kosciusko in the fatal campaign of 1794. After two years' imprisonment at St. Petersburg, he was released by the Emperor Paul, and with his friend Kosciusko came to the United States, where he married, and paid a long visit to General Washington at Mt. Vernon. He returned to Europe in 1802, but soon quitted it again for the United States; once more returning after the treaty of Tilsit and the establishment of the grand-duchy of Warsaw. He was then named secretary of the Senate, and made a member of the Council of Public Instruction. He assisted, after the Congress of Vienna, in drawing up another constitution for Poland; was dismissed from the Council of Education in 1821, and lost his secretaryship after the failure of the insurrection of 1830–1831, which he supported. He spent part of his exile in England, and then settled at Montmorency, near Paris. The most popular of his poetical works are the "Historical Ballads," which were set to music. Niemcewicz published also "Memoirs of his Own Times," a series of "Memoirs on Ancient Poland," an account of his visit to Washington, and several novels. He died in Paris, France, May 21, 1841.

Niemen, a river of Russia, whose lower course (70 of its 500 miles) lies within the province of East Prussia, where it is called the Memel; it rises a few miles S. of the city of Minsk. It is navigable to Grodno; below Tilsit it divides into two branches, which reach the Kurisches Haff each by four mouths.

Niepce, Joseph Nicéphore (nē-eps′), a French inventor; born in Châlon-sur-Saôn, France, March 7, 1765. He served in the army in Italy, and in 1795 became administrator of the district of Nice. Returning to Châlon in 1801, he devoted himself to chemistry, lithography, and to those experiments with sunlight pictures which brought him into connection with Daguerre and made photography possible. He died in Gras, near Châlon, France, July 5, 1833.

Nietzsche, Friedrich Wilhelm (nētsh′-uh), a German writer; born in Röcken,

Saxony, Oct. 15, 1844; was educated at Bonn; Professor of Classical Philology, University of Basle (1869–1880); served in the war of 1870. His writings attracted a good deal of attention owing to their extreme character. He wrote: "The Birth of Tragedy from the Spirit of Music" (4th ed. 1895); "Thus Spake Zarathustra" (4th ed. 1895); "Beyond Good and Evil" (5th ed. 1895); "The Genealogy of Morality" (4th ed. 1895); "The Overturning of all Values," his masterpiece; "Twilight of the Gods"; etc. He died Aug. 25, 1900.

Nievo, Ippolito (nyā′vō), an Italian author; born in Padua, Italy, Nov. 30, 1832. His best-known work is "The Confessions of an Octogenarian." His "Poems" are admired. He died at sea, March 4, 1861.

Nièvre (nē-āvr′), a central department of France, occupying a portion of the watershed between the Loire and the Seine, and bounded on the W. by the Allier and Loire rivers; area, 2,632 square miles; pop. (1906) 313,972. Mountains belonging to the Morvan system, which forms the watershed between Seine and Rhone, divide the department into two great declivities. There are plateaus more or less fertile, vine-clad hills, and valleys rich in pastures; but the principal wealth of the department consists in its forests and minerals — coal, iron, and gypsum. The Nièvre, whence the name of the department, is an inconsiderable affluent of the Loire from the right. The three chief rivers — the Allier, Loire, and Yonne — are navigable, and the Yonne, which belongs to the system of the Seine, is connected with the Loire by a canal. More than a third of the whole surface is covered with forests. Good wine is made; the iron industry is important, and pottery and glass are manufactured. Capital, Nevers.

Niflheim ("the abode of clouds"), in Scandinavian mythology, the kingdom of cold and darkness, separated from Muspelheim, the kingdom of light and heat, by a huge chasm (Ginnungagap). Niflheim was also the abode of Hel, the goddess of death.

Nigella, a genus of *Ranunculaceæ,* tribe *Helleboreæ.* Sepals five, deciduous, sometimes surrounded by an involucre; petals 5 to 10; stamens many; ovaries 5 to 10, each with one cell and one seed. *N. sativa,* black cummin-seed, is extensively cultivated in India. Its seeds yield an oil. They are used as a spice in Indian curries. The natives of India place them among woolen cloths to keep away insects. They are said to be carminative, stomachic, galactagogue, detergent, diuretic, emmenagogue, and anthelmintic. Mixed with sesamum oil they constitute an external application in skin eruptions.

Niger, Jobba, Quorra, Kovaree, or Kwara, a river of Central Africa, rising near the W. coast; length, estimated 2,600 miles; area of basin and that of tributaries 1,023,280 square miles. It rises in the region now known as the States of Samory, inland from Liberia and Sierra Leone, its headwaters being contiguous to those of the Senegal, which flows in an opposite course. Of the various streams which unite to form the Niger, the Tembe, rising in the Loma Mountains, at about 3,000 feet elevation, and in lat. 8° 36′ N., and lon. 10° 33′ W., is looked on as the parent stream. The Niger flows N. E. as far as Timbuktu, 300 miles above which it is joined by the Mayel-Balevel, a large tributary, and splits up into numerous diverging channels. After passing Timbuktu, it flows E. for 200 miles; then turns S. E. through a rock country. Finally, bending more to the S., it is joined by a tributary of first-class size, the Benue, or Mother of Waters, a rival in volume which has come from a source 860 miles to the E. The united stream now "passes through a series of bold picturesque hills by a narrow gorge," and eventually breaks up into one of the most remarkable mangrove-covered deltas of the world. In its course it passes through much fertile valley land, while numerous towns and villages stand on its banks, and a considerable canoe commerce is prosecuted. The exploration of the Niger has been principally accomplished by English travelers, and Great Britain holds the protectorate of its border-lands as far as Timbuktu. Above this city the control is in the hands of the French, who have steamers on the upper stream, and forts on its banks. Slaves were formerly nearly the only article of export from the Niger, but palm oil is now the principal staple, the delta outlets being known as Oil rivers. The Niger is one of the greatest rivers in the world. So strong is its current that driftwood from the vast estuary is frequently carried scores of miles out to sea.

Nigeria, a British protectorate constituted Jan. 1, 1900; comprising Northern Nigeria, which included till then the territories in the occupation of the Royal Niger Company, and Southern Nigeria, formed from a part of the Niger Coast Protectorate and a part of the territories of the Royal Niger Company. The N. boundary of Northern Nigeria is the French Sudan, from Barua on Lake Tchad to a point on the Niger 10 miles N. of Ilo; the W. is the French territory in the hinterland of Dahomey, from the same point on the Niger S. to the point of intersection of the Oxpara river and the 9th parellel of N. lat.; the S. practically follows the 7th parallel of N. lat.; and the E. is that of the Kameruns running N. E. to Lake Tchad. The S. boundary

of Southern Nigeria is the sea from Ogbo on the W. to the mouth of Cross river on the E.; the E. is the Kameruns; the W. is Lagos; and the N. is Northern Nigeria from Owo to Takum. The two divisions of Nigeria are governed separately by high commissioners. Wuruo, Gando, Sokoto, Kano, Bida, Yola, Yakuba, Zaria, and Illorin are the chief towns in Northern Nigeria, and Old Calabar, Asaba, Idda, Bonny, Opobo Brass, Benin, and Akassa in Southern Nigeria. The Niger Coast Protectorate was constituted in 1884, and the Royal Niger Company was chartered in 1886. Northern Nigeria now includes the former Fulah empire.

Night. Among the ancient Greeks Night (Nyx) was personified as a powerful goddess, who by means of sleep exercised power over men and gods. According to Hesiod, she was the daughter of Chaos, wife of Erebus, and mother of Aether and Hemera (Day), of the Fates, Sleep, Death, Dreams, Hunger, Fear, Nemesis, and Strife. By day she dwelt in Tartarus, enveloped in thick clouds. See DAY.

Night Blindness, medical term Hemeralopia, a disease in which the eyes have the faculty of seeing while the sun is above the horizon, but are incapable of seeing by the aid of artificial light.

Night Hawk, a species of goat-sucker (*Chordeiles virginianus*), a bird universally known in the United States, 9½ inches in length and 23 in extent of wing. It is a bird of strong and vigorous flight, and its prey consists of beetles and other large insects. The other American species are the "chuck-will's widow" (*C. carolinensis*) and the "whip-poor-will" (*C. vociferus*), both of which, like the night hawk, arrive in May, and leave the States in September.

Night Heron (*Nycticorax*), one of the genera of *Herodiones*, cosmopolitan in its distribution, and including nine species. One species, *N. griseus*, widely distributed over the whole of Africa and Southern Asia, breeding in the Spanish peninsula and in Italy, and a migrant to places near the Baltic, has since 1872 become an almost annual visitor to various parts of the British Islands in spring and autumn. It is about 23 inches long; nests in colonies on trees or bushes in swamps, or on reeds strongly built together in a pile; and feeds on water insects and their larvæ, worms, snails, small fish, and frogs. Closely allied forms inhabit America, the *N. nævius*, the common American night heron, being found all over the United States, as a permanent resident in the S. portion only; and in the Malayo-Australian region *N. caledonicus*, a distinct species, occurs. See HERON.

Nightingale, a European migratory species of birds, family of warblers or *Sylvicolidæ*. The males of the nightingale reach the S. counties of England sometimes in April, but more commonly not till the beginning of May; the females do not arrive till a week or 10 days after the males. Migrating from the S., they visit the N. countries for the purpose of breeding,

NIGHTINGALE.

and the famed song of the male is his love chant, and ceases when his mate has hatched her brood. "Vigilance, anxiety, and caution now succeed to harmony; and his croak is the hush, the warning of danger and suspicion, to the infant charge and the mother bird." If by accident his mate be killed, the male resumes his song; and will continue to chant very late in summer unless he can attract, as he commonly soon does, another female. The nightingale feeds chiefly on the larvæ of insects. The nest is built near the ground; the eggs are four or five in number, of a uniform dark-brown color; the young are fledged in the month of June, and are ready to accompany the parents in their migration S. in the month of August.

Nightingale, Florence, an English philanthropist; born in Florence, Italy, May 15, 1820. At an early age she manifested a keen interest in suffering humanity, and from philanthropic motives she visited the chief military hospitals in Europe, and studied the chief nursing systems. During the Crimean War (1854) the hospital accommodation was found to be very defective, and Miss Nightingale promptly volunteered to organize a select band of nurses at Scutari. The offer was accepted by the British War Office, and within a week Miss Nightingale was on her way to the East, where she rendered invaluable service to the sick and wounded by her incessant labors in nursing and hospital reform. The strain, both mental and physical, which this work demanded permanently injured her health; yet notwithstanding her confinement to a sick-room, she continued to give her experience in the interest of hospital reform, and for this purpose she was consulted during the

American Civil War and the Franco-German War. She published "Notes on Hospitals"; "Nursing"; "On the Sanitary State of the Army in India"; "Notes on Lying-in Institutions"; "Life or Death in India"; etc. She received the Order of Merit in 1907; died Aug. 13, 1910.

Nightmare, a fiend or specter of the night, popularly supposed to cause the nightmare; an incubus. In pathology, a disease technically called incubus, which comes during sleep, and is characterized by a sense of weight upon the chest, oppressed breathing, inability to move or even to speak, palpitation of the heart, etc., while the mind is troubled by a frightful dream. After a longer or shorter period of helplessness, the patient breaks through the state of lethargy, and awakes with a start. He finds the morbid physical symptoms are gone, but unpleasant memory of the dream remains. The proximate cause of nightmare may be contraction of the diaphragm and the intercostal muscles. The remoter causes are lying on the back, or in a constrained position, indigestible food in the stomach or pressure upon it, from flatulence with acid secretions, or other causes. Speedy relief is obtained if the arms are so moved that the pectoral muscles elevate the ribs, or by an antacid draught.

Nightshade, the English name of certain plants of the natural order *Solanaceæ*, possessing the narcotic properties frequently developed in that order. Among them are some species of solanum, particularly the common nightshade, or black nightshade (*S. nigrum*), an annual or biennial, with erect angular stem, ovate, sinuate-dentate leaves, drooping lateral umbels of white flowers, and globose black berries; a frequent weed in waste places in England and in most parts of the world. Few plants are more widely diffused. It is only slightly narcotic. The leaves in a fresh state are said to be injurious to animals which eat them, but seem to lose almost all narcotic property by boiling, and are used as spinach, particularly in warm climates. The berries, though generally dreaded or suspected, may also, it is said, be eaten, at least in moderate quantity, without danger. They contain, however, the alkaloid solonine, found also in the shoots of the potato.

Nigrin, an ore of titanium, found in black grains or rolled pieces, containing about 14 per cent. of iron. It occurs in Ceylon and Transylvania.

Nihilism, in ordinary language, nothingness; the state or condition of being nothing, nihility. In history, a term used to designate the Russian Socialist movement, which began about 1870, and may be divided into two distinct periods: (1) "The going among the peasants." A number of young men and young women of the upper class voluntarily went to work in the fields and the factories so as personally to carry on a Socialist propaganda and distribute Socialist literature. Their organs were the "Yperiod" (Forward!) of London and the "Workman" of Geneva. This lasted about six years, during which time there were 23 political trials of 417 persons, half of whom were condemned to exile in Siberia or to hard labor in the mines. (2) In 1878 the struggle with the government commenced. At a congress held at Lipezk, shortly after Soloveiff's attempt on the life of Alexander II., the acquisition of political freedom was declared to be the first necessity. It was hoped to gain this by the formation of a legislative body, elected by the people, with guarantees for electoral independence, and liberty to agitate for reforms. This was demanded from Alexander III. shortly after the assassination of his predecessor as the price of cessation from violence. The Nihilist programme is an agrarian socialism based on communal property. The discoveries of the police show that Nihilism is widely spread in Russia, not only among the working, but among the well-to-do, classes, and even in the army, especially in St. Petersburg, and in many of the principal cities and towns.

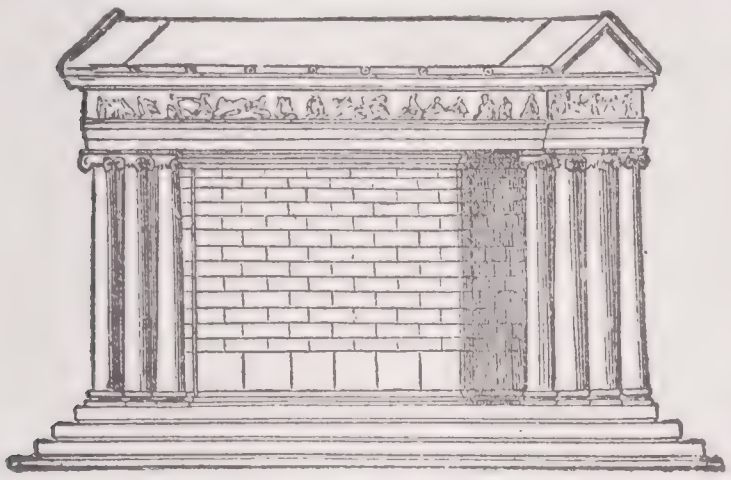
Nihilism in metaphysics is the doctrine that refuses a substantial reality to the phenomenal existence of which man is conscious.

Nihilist, in Church history, a school of theologians who taught that God did not become anything through His Incarnation which He was not before. This opinion is traceable in the writings of Peter Lombard and Abelard, and even to the early school of Antioch, which maintained that God clothed Himself with humanity as with a garment. It was condemned at the Council of Lateran in 1179.

Niigata, a seaport of Japan; on a narrow strip of land at the mouth of the Shinano river; opened to foreign trade in 1859. The harbor does not admit of the entrance of vessels of foreign build, and the roadstead is exposed; the foreign trade has therefore remained only nominal.

Nijni-Novgorod, or **Nizhni-Novgorod,** a famous commercial city of Russia, and capital of the province of the same name; at the confluence of the Oka with the Volga; 274 miles E. of Moscow. There is an upper city, containing the Kreml and many churches, a lower city, and a suburb. The great fair brings buyers and sellers from all climes between Germany and China. For the convenience of those frequenting the fairs, there is an enormous market hall, and 60 blocks of buildings for booths, containing more than 2,500 apartments separated by fireproof walls. There are three annual fairs, two of them of minor account. The third, beginning July 15 and continuing

into September, is still the greatest in the world. During the fair, the normal population is very largely increased. The value of goods sold at one of these fairs often exceeds $90,000,000. At these fairs all foreign



TEMPLE OF NIKE IN ATHENS.

goods are supplied in smaller quantities, those of Russian production showing an increase. Nijni-Novgorod, founded in 1221, was devastated on several occasions by the Tartars; its prosperity dates from 1817, when the great fair was removed to Nijni-Novgorod from Makarief after a great fire. Pop. (1908) 90,053.

Nike, in Greek mythology, the goddess of victory. She was rewarded by Zeus with the permission to live in Olympus, for the readiness with which she came to his assistance in the war with the Titans. There is a temple to her on the Acropolis of Athens still in excellent preservation.

THE GODDESS NIKE.

Nikisch, Arthur, a Hungarian orchestral conductor; born in Azent, Miklos, Lichtenstein, Hungary, in 1855; disclosed extraordinary musical talent at an early age. In his eighth year he played the violin in public, and he was but 11 when he entered the Royal Conservatory of Music in Vienna. Here he devoted himself especially to composition, with so much success that, two years afterward, he sent a string sextet to an open competition, and received the first prize. He remained at the conservatory for eight years, during which time he won other prizes for composition and the first prize and silver medal for violin-playing. Nikisch next applied for a desk among the first violinists at the Royal Opera, and, obtaining the place without difficulty, occupied it four years. In 1878 he went with Neumann to Leipsic, and was installed as assistant conductor in the Old Opera house. He remained there a year, drilling the chorus and soloists and conducting the smaller operas and operettas, and then went to the New Opera house as chief conductor. In 1889 he succeeded Herr Gericke as conductor of the Boston Symphony Orchestra, and in 1893 he resigned and returned to Hungary.

Nikitin, Ivan Savich (nē-kit'in), a Russian poet; born in Varonesh, Russia, Oct. 3, 1824. His "Peasant Hangman" (1858), and "Poems" (1856), "Taras," and other verse, gave him a conspicuous place. He died Oct. 28, 1861.

Nikolaieff. See NICOLAIEV.

Nile, called by the Egyptians Hapi Mu, and by the Hebrews Sihor, the river of N. E. Africa, formed by the union of the Bahr-el-Abiad and the Bahr-el-Azrek. Captains Speke and Grant discovered that the first of these, the true Nile flowed out of the Lake Victoria Nyanza. The second, the Blue Nile, has its source in Abyssinia. The White Nile, from its outfall from the Victoria Nyanza at the Ripon Falls, lat. 0° 20′ N., lon. 33° 30′ E., flows N. W. and W. for about 230 miles, till it enters the Lake Albert Nyanza, within 30 miles of its N. extremity, whence the river again emerges. On issuing from the Victoria Nyanza the Nile rushes down due N. like a mountain torrent, running off at last into long flats and expanding so as to form what is called Lake Ibrahim Pasha. In this part of its course the river is navigable, and continues to be so till it reaches the Karuma Falls. From these falls to the Murchison Falls, (120 feet in height,) near the Albert Nyanza, the river forms a series of rapids. Between the two Nyanzas the Nile is known as the Victoria Nile or Somerset river. From Assuan to the sea the average fall of the Nile is two inches to a mile, and its mean velocity about 3 miles an hour. It waters and fertilizes the whole length of the land of Egypt. The delta of the Nile extends from lat. 30° 10′ N. to 31° 30′ N., and has a base on the Mediterranean of about 150 miles. In it the Nile spreads out into numerous streams, the two principal being those of Rosetta and Damietta. The total length of the Nile from its exit from the lake to the sea, is about 3,000 miles, measured along its course, or 2,200 miles in direct distance.

A great feature peculiar to the great river of Egypt is that from its junction with the Atbara to its mouth, a distance of upward of 1,500 miles, it receives no affluent whatever, and yet it is able to contend with the burning sun, and scarcely less burning sands of Nubia. With the ancient Egyptians the river was held sacred; the god Nilus was one of the lesser divinities. Its annual overflow is one of the greatest marvels in the physical geography of the globe, for it has risen to within a few hours of the same time, and to within a few inches of the same height, year after year, for unknown ages. The question of the source of the Nile is at once the oldest and the most recent of geography. That the sources of a river at whose mouth one of the earliest and most civilized peoples was established should have been so long veiled in obscurity is unparalleled in geographical research. By reference to the map of Africa the latest results of modern research will be seen. Livingstone believed that the true source of the Nile would be found in the Tanganyika Lake, S. of Victoria Nyanza, and lost his life while endeavoring to solve the problem.

The Nile reservoir, for which the great dams at Assouan and Assoiut have been constructed, will enable wide tracts of land to bear two crops a year instead of one, will bring waste districts into tillage, and will greatly increase the area of sugar cultivation. The reservoir will supply 1,000,000,000 cubic meters of water annually. The dam at Assouan is 1¼ miles long. It is pierced by 180 openings, 23 feet side, and 7 feet wide, which have steel sluice gates. The news that the Nile reservoir was to be begun was contained in an announcement on Feb. 20, 1898, to the effect that the khedive in council had approved a contract with John Aird and Company, which settled the much debated question. The contract called for the completion of the two dams in five years from July 1, 1898, and the contractors agreed to accept payments by annual installments of £160,000, beginning on the completion of the dams and extending over 30 years — a total of £4,800,000. Sir Benjamin Baker is the chief engineer of the scheme. Work was begun immediately after the contract had been signed, and in 1901 it was stated that progress had been so rapid there was reason to believe that the undertaking would be completed six months earlier than was originally thought possible. Employment on the Assouan dam was given to 16,000 operatives.

THE FATHER NILE MARBLE IN THE VATICAN.

Niles, John Milton, an American statesman; born in Windsor, Conn., Aug. 20, 1787; he founded the Hartford "Times" in 1817; was twice United States Senator; and in 1840 became Postmaster-General. Besides addresses and speeches he published: "Lives of Perry, Lawrence, Pike, and Harrison" (1820); "History of the Revolution in Mexico and South America" (1839). He died May 31, 1856.

Nilometer, an instrument for measuring the rise of the Nile during its periodical floods. One is on the island of Er-Ródah, and consists of a graduated pillar, upon which the height of the water is read off. The pillar stands in a well which communicates with the river. In the time of Pliny, a height of 12 cubits meant famine, 13 scarcity, 15 safety, and 16 plenty. At present the canals are cut and distribution commences when the river reaches 18 cubits; 19 cubits is tolerable, 20 adequate, 21 excellent, 22 abundant, and 24 ruinous, as invading the houses and stores of the country.

Nilsson, Christine, a Swedish operatic singer; born in Wexiö, Sweden, Aug. 3,

1843; was educated in Sweden and France; made her début at Paris in "La Traviata" in 1864; and in London, where she appeared in 1867, soon took rank as one of the foremost soprano singers. Marguerite is one of her best-known parts. She repeatedly visited the United States. She married (1872) M. Rouzand (who died in 1882), and in 1887 Count de Miranda.

Nimbus, a word applied, especially in sacred art, to a halo or glory surrounding the head in representations of divine or sacred personages. The nimbus is of pagan origin, and was probably derived from the Romans, who ornamented the statues of their divinities and emperors with radiated crowns. The aureola, with which the nimbus is frequently confounded, envelops the whole body, while the nimbus is limited to the head. Nimbi are properly depicted in gold, but sometimes in stained windows they appear of various colors. The nimbus of God the Father is generally represented of a triangular shape, with rays diverging from it in all directions; that of Christ contains a cross, more or less enriched; that of the Virgin Mary a circlet of small stars; those of angels, a circle of small rays, surrounded by another circle of quatrefoils, like roses interspersed with pearls. When the nimbus is depicted of a square form, it indicates that the person was living when delineated, and is affixed as a mark of honor and respect. As an attribute of power, the nimbus is often seen attached to the heads of evil spirits. In many illuminated books of the 9th and following centuries, Satan wears a crown.

In meteorology the word is applied to a rain cloud; sometimes classed as if forming a primary or fundamental variety of cloud; it is really a mixture of the stratus, the cumulus, and the cirrus. It has a uniform gray tint and fringed edges.

Nimeguen (Dutch Nijmegen), a town in Holland; province of Guelderland; on the Waal river; 73 miles E. of Rotterdam. It is built on the slope of the Hoenderberg "Hill of the Huns," on which the Romans formed the permanent camp of Noviomagum; and some of its streets are steep and narrow, but others are broad and handsome. On a neighboring height stood till 1796 a castle, said to have been founded by Cæsar and inhabited by Charlemagne; and toward the brow of this height there still stands a little sixteen-sided Romanesque baptistery of the 12th or 13th century. On another eminence is the modern Belvidere, whose summit commands a wide view. The fortifications have been demolished; but Nimeguen retains its Renaissance town hall (1554), adorned with medallions of German emperors, and the fine Gothic church of St. Stephen (dating from 1272). The manufactures include tobacco, eau de Cologne, metal-work, beer, etc. Regained by the Spaniards (1585–1591), Nimeguen is celebrated in history for its great peace congress, which on Aug. 12, 1678, concluded a treaty between France and Holland, on Dec. 13, between France and Spain, and on Feb. 5, 1679, between Austria and France. Pop. (1909) 54,735.

Nimes, or **Nismes** (nēm), a city of Southern France, capital of the department of Gard, 62 miles N. W. of Marseilles; is an episcopal see; and consists of an old central quarter surrounded by handsome boulevards, beyond which are the modern quarters. Its manufactures are chiefly of silk and cotton goods; it has a considerable commerce; and is the great entrepôt of Southern France for raw silk. Nîmes is chiefly remarkable for its Roman remains, including an ancient temple, with 30 beautiful Corinthian columns, now serving as a museum and known as the Maison Carrée; the amphitheater, a circus capable of seating 20,000 persons; the temple of Diana; the ancient Tour Magne, on a hill outside of the city, supposed to have been a mausoleum; and a Roman gateway. Nîmes (ancient Nemausus) is supposed to have been built by a Greek colony, and was afterward for about 500 years in the possession of the Romans. In the 16th century it became a stronghold of Calvinism, and suffered much during the civil wars, as also by the revocation of the Edict of Nantes, and during the Revolution; but latterly it became a busy manufacturing center. Pop. (1906) 80,184.

Nimrod, grandson of Ham, who is supposed by some to have been the founder of Babylon, where he reigned while Asshur ruled in Assyria. He is also supposed to be the first king, and the first conqueror. In the Scriptures, he is called "a mighty hunter before the Lord."

Nimrud, the name given to the site of an ancient Assyrian city in the angle formed by the Tigris and Zab rivers, and about 18 miles below Mosul. It is one of the group of great cities which clustered round Nineveh, the capital, and it has been supposed, from inscriptions found in the ruins, that it is identical with the Calah mentioned in Genesis x. See NINEVEH.

Nine Pins, a game with nine pins or pieces of wood set on end, at which a bowl is rolled for throwing them down.

Ninety-six, Fort, a defensive work in Abbeville co., S. C.; about 6 miles from the Soluda river; so-called on account of being 96 miles from the frontier fort of Prince George. It was the scene of many severe conflicts during the Revolutionary War.

Nineveh, or **Ninus,** an ancient and famous city; capital of the great Assyrian empire; said in Scripture to have been

founded by Ninus or Nimrud. It was situated on the E. bank of the Tigris, opposite to the present Mosul. According to the accounts of the classic writers the city was of vast extent, 480 stadia, or more than 60 miles in circumference. Its walls were 100 feet high, broad enough for three chariots, and furnished with 1,500 towers, each 200 feet in height. In the Book of Jonah it is described as an "exceedingly great city of three days' journey," and one "wherein are more than six score thousand persons that cannot discern between their right hand and their left hand." After having been for many centuries the seat of empire, it was taken, after a siege of several years, and destroyed by the united armies of the Medes, under Cyaxares, and the Babylonians, under Nabopolassar, about 625 B. C. When Herodotus, not quite 200 years afterward, and Xenophon visited the spot there remained only ruins. The site is thought to be the modern Nimrud.

Ning=po, a treaty-port of China; province of Che-keang; stands in a fertile plain; 16 miles from the mouth of the Takia (Ning-po) river, and about 100 miles S. of Shanghai. It is surrounded by a wall 25 feet high and 16 feet thick, and contains numerous temples, colleges, etc., chief among them the temple of the Queen of Heaven, founded in the 12th century, but the present building, elaborately and richly ornamented, dates from 1680. The people, 250,000 in number, make sedge hats and mats, grow cotton, catch cuttle fish, and carry on an active trade, especially in the export of green tea. The imports are chiefly opium, cotton and woolen goods, tin and iron, medicines (in transit), dried "lungngans," kerosene oil, indigo, sugar, and tobacco, and the exports green tea, cuttle fish, sedge hats and mats, silk goods, and raw cotton. Apart from junks, some 550 vessels, of 382,800 tons, enter the port every year.

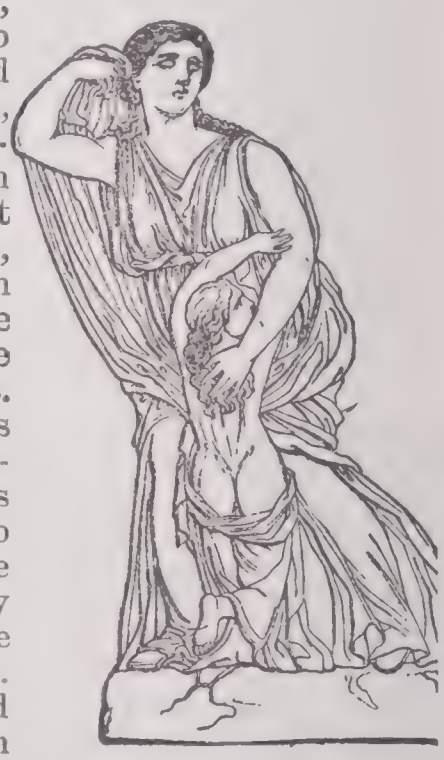
Ninian, St., the first known apostle of Scotland; born of noble parentage, on the shores of the Solway Firth about 360. Of studious and ascetic habits, he was moved by the Holy Spirit to make a pilgrimage to Rome, and there, after some years' stay, was consecrated bishop by the Pope. On his homeward way he visited St. Martin at Tours, and after his arrival in Galloway he founded the "Candida Casa," or Church of Whithorn, dedicating it to St. Martin, the news of whose death had just reached him (397). Later he labored successfully for the evangelization of the Southern Picts, and in 432 (according to the Bollandists) died "perfect in life and full of years," and was buried in his church at Whithorn. His festival falls on Sept. 10. His "Life" by St. Ailred (1109-1166), abbot of Rievaulx in Yorkshire, who visited Galloway, has been edited by Bishop Forbes (vol. v., "Historians of Scotland" series, 1874), who enumerates 66 dedications in Scotland to St. Ninian or "Ringan" — the Lowland Scotch form of his name — including the Episcopal cathedral at Perth.

Ninus. See NINEVEH.

Ninus, King of Assyria, and a celebrated conqueror; about 2068 B. C., succeeded Belus, his father, as king of Babylon and Nineveh. He entered into an alliance with the Arabs, subjugating Egypt and Bactria. He became enamored of Semiramis, the wife of one of his generals, and married her after her husband's death. Semiramis was supposed to have subsequently poisoned Ninus, who reigned during 52 years, and enlarged Nineveh, to which city he gave his name.

Ninus II., or **Ninyas,** son of the preceding and Semiramis, who profited by his youth to assume the regency. According to some, she subsequently voluntarily abdicated, while others state that she was put to death by Ninus. His reign is remarkable for its luxury and extravagance. His successors imitated the example of his voluptuousness; and very little further is known of the Assyrian monarchs till the age of Sardanapalus. His reign is placed between the years 2017–1927 B. C.

Niobe, in Greek mythology, the daughter of Tantalus and wife of Amphion, King of Thebes, to whom she bore six sons and six daughters. Proud of her children, she despised Leto or Latona, who had only two children, Apollo and Artemis; whereupon Latona, enraged at her presumption, moved her children to destroy all the children of Niobe with their arrows. They lay nine days in their blood unburied, when Zeus changed them into stone, and on the tenth day they were buried by the gods themselves. Niobe was changed into stone on Mount Sipylus, in Lydia, from which tears flowed every summer. Such is the Homeric legend, which, however, was afterward much varied and enlarged. Only fragments exist of the tragedies of Æschylus and Sophocles on this theme, which was a favorite subject of ancient art. A noble group representing Niobe and her children was discovered at Rome in 1583, and is now in the Uffizi Palace at Florence. Even the ancient Romans



NIOBE.

were in doubt whether the work proceeded from Scopas or Praxiteles.

Niobe of Nations, Rome, the "lone mother of dead empires."

Niobite, in Church history, a party of Alexandrian Monophysites, founded in the 6th century by Stephen Niobes, who main-

NIOBE.

tained that the qualities belonging to humanity could not continue in the human nature of Christ after its amalgamation with or absorption into the divine nature.

Niobium, in chemistry, a pentad metallic element discovered by Hatchett in 1801, but more fully investigated by Rose, who named it. Symbol, Nb; at. wt., 94. Present in columbite, euxenite, pyrochlore, and in other minerals. The metal may be prepared from the fluoride of niobium by heating it in a covered crucible with sodium, and dissolving out the soluble salts with water. Obtained as a black powder; sp. gr., 6.27. Insoluble in nitric acid, difficultly soluble in hydrochloric acid, but dissolves in hot hydrofluoric acid. It forms two oxides of a chlorous character, uniting with basylous oxides to form salts.

Niort, the capital of the French department of Deux-Sèvres; on the Sèvre Niortaise river; 43 miles N. E. of La Rochelle and 109 S. W. of Tours. An important railway junction, it has an old castle, a city hall (1530), a fine public garden, and the 16th-century church of Notre Dame, with a spire 246 feet high. The dressing of leather and the manufacture of gloves are the leading industries. Niort in the 14th century was held for 18 years by the English. It was the birthplace of Madame de Maintenon. Pop. (1901) 23,897.

Nipa, a genus of endogens, with some affinity to the palms, which they resemble in habit, but placed doubtfully in the order *Pandanaceæ*, tribe Cyclantheæ. Only known species, *N. fruticans*. The trunk is creeping and furcated; the leaves feathery, often 20 feet long; the flowers in a spathe; the fruit in large, round bunches, the size of the human head, and consisting of one-seeded drupes. It grows in the river estuaries and tidal forests of the Sunderbunds, Chittagong, Burma, and the Andaman Islands. The fruit sometimes floats in the mouth of the Ganges in numbers sufficient to obstruct the paddles of a steamboat. The inside of the large fruit is eatable when young, and a liquor used as a beverage is obtainable from the spathe.

Nipigon, a lake in the province of Ontario, Canada; 30 miles N. W. of Lake Superior, with which it is connected by the Nipigon river; is about 70 miles long, but its deeply indented coast line measures 580 miles; greatest depth 540 feet. The lake is studded with hundreds of islands.

Nipissing, a lake in the province of Ontario, Canada; N. E. of Lake Huron, into which (Georgian Bay) it drains through French river (55 miles); about 50 by 28 miles.

Nisami, Abu Mohammed Ben Jusuf Sheikh Nisam-ed-Din, a Persian poet, and the founder of the romantic epic; born about A. D. 1100; was a special favorite of the Seljuk princes, who then ruled in Persia. Besides a "Divan," or collection of lyrics, he wrote five longer poems, which have been extensively circulated in Persia and India. He died in 1180.

Nisan, a month of the Jewish calendar, the first month of the sacred year and seventh of the civil year, answering nearly to our March. It was originally called Abib, but began to be called Nisan after the captivity.

Nisard, Jean Marie Napoléon Désiré (nē-sär'), a French author; born in Châtillon-sur-Seine, France, March 20, 1806; was noted as a critic, and also for his "Studies of Morals and Criticism on the Latin Poets during the Decline of Learning" (1834), and "History of French Literature" (1844–1861). He died in San Remo, Italy, March 15, 1888.

Nisch, the chief town and commercial center of Southern Servia; in a vine-growing district; 152 miles S. E. of Belgrade; is the seat of a Greek bishop; and has a fairly strong citadel (1737). The place played a conspicuous part in the Turkish wars from 1375 to 1878, when it was occupied by Servia. Here, on Sept. 23, 1689, the Austrians defeated the Turks. Pop. (1905) 21,946.

Nishapur, a town of Persia; province of Khorasan; 53 miles W. of Meshed, in a

beautiful and fertile valley; was the birthplace and contains the grave, of Omar Khayyám.

Nisibis, the capital of ancient Mygdonia, the N. E. part of Mesopotamia; was a city of great antiquity, and was of importance both as a place of strength and as an emporium of the trade between the E. and W. It was twice taken by the Romans (under Lucullus and Trajan), and again given up by them to the Armenians; but being a third time taken, in 165 A. D., it remained the chief bulwark of the Roman empire against the Persians, till it was surrendered to them after the death of Julian in 363. The name Nisibin is retained by a small village in the Turkish province of Diarbekir, round which are numerous remains of the ancient city.

Nisi Prius, a law phase originating in a legal fiction, originally occurring in a writ directed to the sheriff of a county, and commanding him to cause the men empaneled as jurors in a civil action to attend at the courts at Westminster, "unless before" that day the justices attended at that place (*i. e.*, in the county in question), to hold the assize, which always happened. Hence the writ, as well as the commission, received the name of *nisi prius*. Judges are said to sit at *nisi prius* in their several circuits, and their courts are called *nisi prius* courts, or courts of *nisi prius*.

Nismes. See NIMES.

Nisroch, in mythology, a god of the Assyrians, in whose temple, and in the very act of idolatry, Sennacherib was slain by his own sons (II Kings xix: 37). According to the etymology, the name would signify "the great eagle"; and the earlier Assyrian sculptures recently exhumed at Nineveh have many representations of an idol in human form, but with the head of an eagle. Among the ancient Arabs, also, the eagle occurs as an idol.

Niter, or **Nitre,** an orthorhombic mineral occurring in crusts, silky fibers, acicular crystals, or diffused through certain soils. Hardness, 2.0; sp. gr., 1.937; luster, vitreous; brittle; color and streak, white; taste, saline. Composition: Nitric acid, 53.4; potash, 46.6 = 100, corresponding to the formula, KO,NO_5.

In pharmacy it is exhibited in small doses as a refrigerant and diuretic, and in large doses as a vascular sedative in fever, especially in that of acute rheumatism. It has been found useful also in dropsy.

Nith, a beautiful Scotch river, rising in Ayrshire, and flowing 71 miles S. S. E. (mainly through Dumfriesshire), till 14 miles below Dumfries, its estuary joins the Solway Firth.

Nithsdale, William Maxwell, Earl of, a Scotch nobleman; born in 1676; succeeded his father as fifth earl in 1683; in 1699 married at Paris Lady Winifred Herbert (1679-1749), youngest daughter of the Marquis of Powis, and thenceforward lived almost constantly at his Kirkcudbrightshire seat, Terregles, much embarrassed in circumstances, and sorely troubled as a Catholic by the neighboring Presbyterian ministers. In 1715 Nithsdale joined the English Jacobites under Forster and Derwentwater, and was taken prisoner at Preston. He was tried for high treason in London, and sentenced to death in spite of abject excuses; but on Feb. 23, 1716 — the night before the day fixed for his execution — not knowing he had just been reprieved, he escaped from the Tower in woman's apparel, through the heroism of his countess, who had ridden up to London in the depth of winter; and after her lord's escape she came back to Terregles, and dug up the family deeds, which she had buried in the garden, and by one of which the estates had been disponed in 1712 to their only son. They then settled at Rome, where the earl died March 20, 1744.

Nitrate, a salt of nitric acid.

Nitrate of Silver, lunar caustic; symbol, $AgNO_3$; prepared by dissolving silver in itric acid. It crystallizes in colorless trimetric crystals, which dissolve in one part of cold water, and melt at 219°.

Nitrate of Sodium, Chile saltpeter; symbol $NaNO_3$. Occurs abundantly as a natural product in Chile, in beds several feet thick and many miles in extent. It crystallizes in obtuse rhombohedrons; soluble in 1½ parts of water at 0°.

Nitric Acid, the most important of the five compounds formed by oxygen with nitrogen; symbol HNO_3. When pure it is a colorless liquid, very strong and disagreeable to the smell, and so acrid that it cannot be safely tasted without being much diluted. It is known in the arts as "aqua fortis," and is commonly obtained by distilling niter (potassium nitrate) or Chile saltpeter (sodium nitrate) with strong sulphuric acid. Nitric acid contains about 76 per cent. of oxygen, a great part of which it readily gives up to other substances, acting thus as a powerful oxidizer. Thus many metals — such as copper, tin, silver, etc.— when brought into contact with this acid are oxidized at the expense of the acid with the production of lower oxides of nitrogen and an oxygenated metallic salt. Nitric acid, when moderately dilute, acts on organic bodies so as to produce a series of most useful substances, notably acetic, oxalic, and picrid acids, isatin or white indigo, When strong acid is used, nitro-compounds oftentimes result, containing the group NO_2 in place of part of the hydrogen of the original substance; thus we get nitrophenol, nitrobenzol, etc. By replacement of the hydrogen in nitric acid a series of salts termed nitrates is obtained. When nitrates are heated with combustible bodies an explo-

sion is generally produced. A mixture of strong hydrochloric and nitric acids is known as "aqua regia," nitromuriatic, or nitrohydrochloric acid. Nitric acid is employed in etching on steel or copper; as a solvent of tin to form with that metal a mordant for some of the finest dyes; in metallurgy and assaying; also in medicine, in a diluted state, as a tonic and as a substitute for mercurial preparations in syphilis and affections of the liver; and also in form of vapor to destroy contagion.

Nitrification, the changing of nitrogenous organic matter or ammonia compounds into nitrates. Possibly the nitrogen of the air under certain circumstances also undergoes this change in soils. Some authorities ascribe the change to a "ferment," "an organized structure," the "micrococcus nitrificans," etc., but it is a power possessed possibly by many micro-organisms. These nitrifying bacteroids perform their work under certain conditions. First, the temperature must be suitable, for at about 5° C. the process is stopped; but with a rise of temperature there is a proportionate increase of work — commencing at about 12° C.— till 37° is reached, which is the "optimum" temperature, and from this onward there is a diminution of action until the "maximum" temperature of 55° C. is reached, when nitrification ceases. These bacteroids are annihilated at a temperature of 90° C., although the same result will follow drying even at a much lower temperature. The second condition is the presence of oxygen; and the third is the presence of a salifiable base, such as lime, potash, soda, etc., without which nitrification cannot proceed. Under these conditions nitrification goes on in every fertile soil, the atmospheric nitrogen, nitrogenous organic matter, or ammonia compounds being converted, in the presence of lime or potash, into the corresponding nitrates of lime or potash; and from these nitric compounds plants derive the most or all of their nitrogen, although some experimentalists maintain that some plants obtain part at least of their nitrogen from ammonia.

Nitride, a compound of nitrogen with phosphorous, boron, silicon, and the metals, *e. g.*, boron nitride, BN.

Nitro-Benzene, an oily body prepared by gradually adding benzene to cold fuming nitric acid, so long as it dissolves, and precipitating with water; symbol $C_6H_5NO_2$. It is a yellowish liquid with a sweet taste, and an odor of oil of bitter almonds; insoluble in water, but soluble in alcohol and ether; sp. gr. 1.2 at 0°. Much used by perfumers under the name of oil of mirbane, and manufactured in large quantities for the preparation of aniline and its derivatives.

Nitro Compounds, compounds in which one or more atoms of hydrogen are replaced by an equivalent quantity of nitryl (NO_2); thus, lactic acid, $C_3H_6O_3$, becomes nitro-lactic acid $C_3H_5(NO_2)O_3$. The nitro compounds are nitro-marin, nitro-tartaric acid, nitro-saccharose, benzoic acid, nitro-carbolic acid, nitro-coumarin, etc.

Nitrogen, a pentad non-metallic element forming four-fifths of the atmosphere and entering into a great variety of combinations; symbol N; at. wt., 14. It may be obtained by burning phosphorus under an inverted bell jar placed over water. The residual gas, when freed from phosphoric pentoxide, P_2O_5, is nitrogen. Very pure nitrogen may be obtained by passing chlorine into a solution of ammonia. It is destitute of color, taste, and odor, and is incapable of sustaining combustion or animal existence, though containing no positively poisonous properties. It is best characterized by its negative properties. Nitrogen acts in the atmosphere chiefly as a diluent to moderate the activity of the oxygen. It has recently been liquefied with the aid of cold and a high pressure. It combines with oxygen, though indirectly, forming well-known compounds.

Nitroglycerin, a violently explosive substance, easily prepared by dissolving glycerin in a mixture of equal measures of the strongest nitric and sulphuric acids, previously cooled, and pouring the solution in a thin stream into a large volume of water, when the nitroglycerin is precipitated as a colorless heavy oil (sp. gr. 1.6). It is advisable to add the glycerin to the mixed acids in very small quantities at a time, and to cool the mixture in a vessel of water after each addition. When the nitroglycerin has subsided, the water may be poured off, and the oil shaken several times with water, so as to wash it thoroughly. The formation of nitroglycerin resembles that of gun-cotton, three equivalents of hydrogen being removed from the glycerin by the oxidizing action of the nitric acid, and three equivalents of nitric peroxide introduced in their place. This oil is far more violent in its explosive effects than gun-cotton, more nearly resembling the fulminates, though not so easily exploded. If a drop of nitroglycerin be placed on an anvil and struck sharply, it explodes with a very loud report, even though not free from water; and if a piece of paper moistened with a drop of it be struck, it is blown into small fragments. On the application of a flame or of a red-hot iron to nitroglycerin, it burns quietly; and when heated over a lamp in the open air it explodes but feebly. In a closed vessel, however, it explodes at about 360° F. with great violence. For blasting rocks the nitroglycerin is poured into a hole in the rock, and exploded by the concussion caused by a particular kind of fuse charged with a little gunpowder. It

has been stated to produce the same effect in blasting as 10 times its weight of gunpowder, and much damage has occurred from the accidental explosion of nitroglycerin in course of transport. When nitroglycerin is kept, especially if it be not thoroughly washed, it decomposes, with evolution of nitrous fumes and formation of crystals of oxalic acid; and it may be readily imagined that, should the accumulation of gaseous products of decomposition burst one of the bottles in a case of nitroglycerin, the concussion would explode the whole quantity. Nitroglycerin is readily soluble in ether and in wood-spirit, and somewhat less soluble in alcohol; it is reprecipitated by water from these last solutions. It solidifies at 40° F. A drop of nitroglycerin is said to cause very violent headache, and in larger doses is decidedly poisonous.

Niu-Chwang. See NEW-CHWANG.

Nivelles (Flemish Nyvel), a town of Belgium; province of Brabant; on the Thines river; 19 miles S. of Brussels. Its fine Romanesque church (1045) contains the relics of Pepin's daughter, St. Gertrude. In 1381 the townsfolk of Ghent were defeated here by Count Louis of Flanders, and 6,000 burned in a monastery.

Niven, William, an American mineralogist; born in Bellskill, Scotland, Oct. 6, 1850; was educated in the common schools of Scotland, and came to the United States in 1879. In 1889 he discovered three new minerals, yttrialite, thorogummite, in Slano co., Tex.; and in 1891 the new mineral aguilarite at Suanajuato, Mexico. In the latter year he also discovered the remains of a prehistoric city or nation, hundreds of square miles in extent, in the state of Guerrero, Mexico.

Nivose, the name adopted in October, 1793, by the French Convention for the fourth month of the republican year. It commenced on Dec. 21, and was the first winter month.

Nix, or **Nixie,** in German popular mythology, the name of water spirits (male and female), haunting rivers, brooks, ponds, and lakes. The male nixie is sometimes represented as old, sometimes as young, but generally as a malicious being. The female nixie appears as a blooming maiden, who often falls in love with some young man, whom she entices or draws into the water.

Nixon, John, an American military officer; born in Philadelphia, Pa., in 1733. He was early prominent in opposition to the taxation demands of England, and in 1774 was made a member of the first Committee of Correspondence. He was warden of the port of Philadelphia; a member of the Committee of Safety and in 1776 was placed in command of the guard of the city. He publicly proclaimed for the first time in Philadelphia, the Declaration of Independence; served with distinction through the Revolutionary War; was a member of the navy board and director of the provision supply; and in 1783 was one of the organizers of the Bank of North America. He died in Philadelphia, Dec. 31, 1808.

Nixon, John, an American military officer; born in Framingham, Mass., March 4, 1725; was at the siege of Louisburg in 1745, also fought at Ticonderoga and the battle of Lake George, and distinguished himself at the battles of Lexington and Bunker Hill, where he commanded a regiment. In 1776, he was promoted Brigadier-General, and in 1777 served under General Gates. He retired from the army in 1780, and died in Middlebury, Vt., March 24, 1815.

Nixon, Lewis, an American shipbuilder; born in Leesburg, Va., April 7, 1861; was graduated at the United States Naval Academy in 1882; sent to the British Royal Naval College, by the Navy Department; and was transferred to the construction corps of the navy in 1884. In 1890 he designed the battleships "Oregon," "Indiana," and "Massachusetts." He resigned from the navy to become superintendent of Cramps' shipyard, Philadelphia, Pa., and in 1895 he founded the Crescent shipyard, in Elizabeth, N. J., where in six years he built over 100 vessels, among them the sub-marine torpedo boat "Holland," the monitor "Florida," and the cruiser "Chattanooga." In 1898 he was appointed president of the East River Bridge Commission of New York.

Nizam (more fully Nizam-almulk), the title assumed by Azof Jah, ruler of Hyderabad in the Deccan, in 1710, and since that time adopted by his successors.

Nizami, or **Nizamee** (nē-sha'mē), a Persian poet; born in 1141; wrote the "Storehouse of Mysteries," a religious poem; "Khusrau and Shirīn," a metrical tale "Lailā and Majnūn," a romantic epic; "Seven Portraits," love stories; and the "Alexander Book." He died in 1202.

Njord, god of the wind and waves.

Noah, the tenth male in descent from Adam, in the line of Seth; was the son of Lamech and the grandson of Methuselah. According to the Scriptural story he received the divine command to build an ark in which he and his family escaped the Deluge (Gen. v: 29-ix: 29).

Noah, Mordecai Manuel, an American journalist; born in Philadelphia, Pa., July 14, 1785. During his journalistic career in New York he was connected with seven newspapers. He made an unsuccessful attempt to found a Jewish colony on Grand

Island, in the Niagara river. His chief works are: "The Siege of Tripoli" and "The Fortress of Sorrente," dramas; "Travels in England, France, and Spain" (1819); "Gleanings from a Gathered Harvest" (1845). He died in New York, May 22, 1851.

Noailles, a French family which dates from the 11th century, and played an important part in history from the reign of Louis XIV. to the Revolution. Antoine (1504-1562) was ambassador in England in 1553-1556, and Admiral of France. Anne Jules (1650–1708), son of the first duke, commanded against the Huguenots and in Spain during the war of the Spanish succession, and was made marshal; while his brother, Louis Antoine (1651-1729), was Archbishop of Paris from 1695 till his death, and was made cardinal in 1700. The third duke, Adrien Maurice (1678–1766), won the marshal's baton in the wars of Louis XV. in Spain, Italy and Germany. The fifth duke, Paul François (1739–1824), attained eminence as a chemist and was elected to the Academy of Sciences in 1777; his brother, Emmanuel Marie Louis (1743–1822), was French ambassador at Amsterdam (1770–1776), London (1776–1783), and Vienna (1783–1792). The sixth duke, Paul (1802–1885), wrote historical works, and was elected to Chateaubriand's chair in the Academy in 1849. His second son Emmanuel Victorien (born 1830), was ambassador at Washington (1872), Rome (1873), and Constantinople (1882-1886), and wrote works on the history and literature of Poland. A grandson of the third duke, Louis Marie (1756–1804), served in the American Revolutionary War under his brother-in-law Lafayette, embraced for a while the French Revolution, and defended San Domingo against the British.

Nobel, Alfred Bernhard, a Swedish chemist and physicist; born in Stockholm, Sweden, Oct. 21, 1833. His father, Emmanuel Nobel, originally an architect, and appointed a professor of geometry at the age of 26, became interested in explosives, and founded extensive engineering and shipbuilding works at St. Petersburg, Russia; in 1859 he left these in charge of his second son, Louis, and, with the rest of his family, returned to Stockholm, where he founded the Nobel firm engaged in the manufacture of explosives. In 1863 Alfred took out a patent for the manufacture of an explosive composed of nitroglycerin and ordinary blasting powder, and in 1864 a second patent. In 1867 he invented dynamite; in 1876 gelatinous nitroglycerin; in 1889 ballistite, which led the way to the invention of smokeless powder. The Nobel firm in 1886-1896 employed constantly 12,000 persons in the manufacture of dynamite alone, and in 25 years the firm never had a strike. Alfred invented also artificial gutta-percha; manufactured cannon, and, with his brother, Louis, developed the petroleum deposits at Baku, in the Caucasus. He subscribed half the sum for fitting out the ill-fated Andrée balloon expedition (see ANDRÉE, S. A.). He lived for a long time in Paris, but had a villa and laboratory at San Remo, Italy, where he died Dec. 10, 1896.

Nobel left his fortune of $9,200,000 to found a prize fund, the annual interest of which was to be divided into five equal parts (each amounting to about $40,000, the sum available), to be distributed every year to the persons who, during the year, had done best in (1) physical science; (2) chemistry; (3) physiology or medicine; (4) idealistic literature; and (5) the advancement of universal peace. The first award of the Nobel prizes was announced Dec. 10, 1901. In the above order of achievement, the recipients were: William Roentgen, the discoverer of the X-rays; J. H. Van't Hoff, of the University of Berlin; Emil Behring, professor at Morburg, Germany, the discoverer of antitoxin for diphtheria; Armand Sully-Prudhomme, the French poet; while the fifth prize was equally divided between Henry Dunant, the Swiss physician, and Frederic Passy, the French founder of the Universal Peace Union. When the announcement was made, Dr. Dunant was reported ill and destitute in a Swiss hospital.

Nobert's Test=plates, finely-ruled glass plates, so named from Nobert, a German optician, used for testing the power of microscopes. The rulings are executed on the under surface of a piece of exceedingly thin glass by means of a diamond point. Some of these ruled plates have the almost incredible number of 225,187 spaces to the inch.

Nobilior, Ser. See FULVIUS.

Nobility, that distinction of rank in civil society which raises a man above the condition of the mass of the people. Society has a tendency to inequality of condition, arising from the natural inequality, physical, moral, and intellectual, of those who compose it, aided by the diversity of external advantages, and of the principles and habits imbibed at an early age. This inequality is apt to increase; the son inheriting the faculties of his father is more favorably situated than his father was for making use of them; and hence in almost every nation in even the very early stages of civilization something like a hereditary nobility is found. Privileges originally acquired by wealth or political power are secured to the family of the possessor of them; and the privileged class come to constitute an order admission into which requires the consent of society or of the order itself.

Nobility

The ancient Romans were divided into *nobiles* and *ignobiles*, a distinction at first corresponding to that of patricians and plebians. A new nobility afterward sprang out of the plebian order, and obtained (336 B. C.) the right to rise to high offices in the state; and in course of time the descendants of those who had filled curule magistracies inherited the *jus imaginum*, or right of having images of their ancestors — a privilege which, like the coat-of-arms in later ages, was considered the criterion of nobility. The man entitled to have his own image was a *novus homo*, while the *ignobilis* could neither have his ancestor's image nor his own.

The origin of the feudal aristocracy of Europe is in part connected with the accidents which influenced the division of conquered lands among the leaders and warriors of the nations that overthrew the Roman empire, and is outlined in the article FEUDALISM (*q. v.*); and the evolution of the dignities of baron, count, earl, marquis, duke, and other ranks will be found under those several heads. In the subinfeudations of the greater nobility, originated a secondary sort of nobility under the name of vavasours, castellans, and lesser barons; and a third order below them comprised vassals, whose tenure, by the military obligations known in England as knight's service, admitted them within the ranks of the aristocracy. In France the allegiance of the lesser nobles to their intermediary lord long continued a reality; in England, on the other hand, William the Conqueror obliged not only his barons who held in chief of the crown, but their vassals also, to take an oath of fealty to himself; and his successors altogether abolished subinfeudation. The military tenant, who held but a portion of a knight's fee, participated in all the privileges of nobility, and an impassable barrier existed between his order and the common people. Over continental Europe in general the nobles, greater and lesser, were in use, after the 10th century, to assume a territorial name from their castles or the principal town or village on their demensne; hence the prefix "de," or its German equivalent "von," still considered over a great part of the Continent as the criterion of nobility or gentility. Britain was, to a great extent, an exception to this rule, many of the most distinguished family names of the aristocracy not having a territorial origin.

Under the feeble successors of Charlemagne the dukes, marquises, and counts of the empire encroached more and more on the royal authority, and by the end of the 9th century the Carlovingian empire had been parcelled into separate and independent principalities, under the dominion of powerful nobles, against whom, in Germany, the crown never recovered its power. In France, however, the royal authority gradually revived under the Capetian race, the great fiefs of the higher nobility being one by one absorbed by the crown. In England, where the subjection of the feudal aristocracy to the crown always was, and continued to be a reality, the resistance of the nobles to the royal encroachments was the means of rearing the great fabric of constitutional liberty. All those who, after the Conquest, held *in capite* from William belonged to the nobility. Such of them as held by barony (the highest form of tenure) are enumerated in Domesday. Their dignity was territorial, not personal, having no existence apart from baronial possession. The *comes* was a baron of superior dignity and greater estates; and these were in England the only names of dignity till the time of Henry III.

After the introduction of HERALDRY (*q. v.*), and its reduction to a system, the possession of a coat-of-arms was a recognized distinction between the noble and the plebeian. On the Continent whoever has a shield of arms is a nobleman; and in every country of continental Europe a grant of arms, or letters of nobility, is conferred on all such a noble's descendants. In England, on the other hand, the words noble and nobility are restricted to the five ranks of the peerage constituting the greater nobility, and to the head of the family, to whom alone the title belongs. Gentility, in its more strict sense, corresponds to the nobility of continental countries. This difference of usage is a frequent source of misapprehension on both sides of the Channel; at some of the minor German courts the untitled member of an English family of ancient and distinguished blood and lineage has sometimes been postponed to a recently-created baron or "Herr von," who has received the title, and the gentility accompanying it, along with his commission in the army. It has been taken for granted that the latter belongs to the "Adel" or nobility, and not the former. Throughout the Middle Ages the lesser nobility of Britain preserved a position above that of most continental countries, being, unlike the corresponding class in Germany, allowed to intermarry with the high nobility, and even with the blood-royal of their country.

The higher nobility, or nobility in the exclusive sense, of England consist of the five temporal ranks of the peerage—duke, marquis, earl, viscount, and baron, who are members of the Upper House of Parliament. Archbishops and bishops are lords temporal, but not peers. The dignity of the peerage

Nobility

is hereditary, but in early times was territorial, the dignity originally being attached to the possession of lands held directly from the crown in return for services to be performed to the sovereign. Later, peers were created by writ of summons to attend the king's council or parliament, but now the creation of a new peer is always made by letters-patent from the crown. In order to the efficient carrying out of the appellate jurisdiction of the House of Lords there are now a limited number of life peers, styled Lords of Appeal in Ordinary. By the Appellate Jurisdiction Act, 1876, as amended 1887, it is enacted that every such lord, unless he is otherwise entitled to sit in the House of Lords, shall by virtue and according to the date of his appointment be entitled during his life to rank as a baron, and shall be entitled to a writ of summons to attend and to sit and vote in the House of Lords. But his dignity is not to descend to his heirs. A peerage is forfeited by attainder for high treason; attainder for felony forfeits a peerage by writ, not by patent; on attainder, peerage cannot be restored by the crown, only by an act of Parliament. Ladies may be peereses in their own right, either by creation or by inheritance. The wives of peers are also styled peeresses. The oldest English peerage is the earldom of Arundel, dating from 1155, and now held by the Dukes of Norfolk; the Irish barony of Kingsale dates from 1181; to the period 1181–1205 belong four baronies now merged in other titles; the Scotch earldom of Sutherland goes back to 1228; and the baronies of Le Despencer, De Ros, and Hastings are all of the year 1264.

By the Act of Union between England and Scotland the Scotch peers elect 16 of their number to represent their body in the House of Lords in each Parliament. The peers of Ireland, in virtue of the Irish Act of Union, elect 28 of their number to sit in the House of Lords for life. The Act of Union with Scotland has been understood to debar the sovereign from creating any new Scotch peerages; all peers created in either England or Scotland between that date and the union with Ireland are peers of Great Britain; and peers created in any of the three kingdoms subsequently to the union with Ireland are peers of the United Kingdom, with this exception that one new peerage of Ireland may be created on the extinction of three existing peerages. When the Irish peers are reduced to 100, then on the extinction of one peerage another may be created. All peers of Great Britain or of the United Kingdom have a seat in the House of Lords. A Scotch peer, though not one of the 16 representative peers, is debarred from sitting in the House of Commons, a disability which does not attach to Irish peers. The peerage has from time to time recruited by new additions, the persons selected being in general peers of Scotland or Ireland; younger members of the families of peers; royal bastards (as recently as 1831); persons distinguished for naval, military, political, or diplomatic services; eminent lawyers promoted to high judicial appointments; persons of large property and ancient family, noble in the more extended sense; and lastly, persons who have by commerce acquired large fortunes and social importance. Many of the Scotch and Irish peers sit in the House of Lords as peers either of England, Great Britain, or of the United Kingdom. The privileges belonging to peers as members of Parliament are explained under PARLIAMENT (*q. v.*); as peers, they also possess the following immunities: they can only be tried by their peers for felony, treason, or misprision of treason, when the whole members of the peerage are summoned. All the privileges belonging to the English peers, except the right of sitting in the House of Lords, were extended to the peers of Scotland by the Treaty of Union. A peer who has different titles in the peerage takes in ordinary parlance his highest title, one of the inferior titles being given by courtesy to his eldest son. Certain courtesy titles belong also to the daughters and younger sons of a peer, but do not extend to their children. British subjects can hold foreign titles of nobility only by consent of the crown. The ancient Scotch barony of Fairfax has since 1800 been confined to citizens of the United States, landholders in Virginia. The sixth baron was a friend of Washington, the tenth (1829–1869) was speaker of the California House of Representatives. The barons of Longueil, a Canadian family, are recognized in Great Britain.

In France a limited body of the higher nobility, styled the peers, were in the enjoyment of privileges not possessed by the rest. The title of duke was subject to strict rule, but many titles of marquis and count, believed to be pure assumptions, were recognized by the courtesy of society. The head of a noble family often assumed at his own hand the title of marquis; and if an estate was purchased which had belonged to a titled family the purchaser was in the habit of transferring to himself the honors possessed by his predecessor — a practice to which Louis XV. put a stop. Immediately before the Revolution 80,000 families claimed nobility, many of them of obscure station, and less than 3,000 of ancient lineage. Nobles and clergy together possessed two-thirds of the land. Practically,

the estimation in which a member of the French nobility was held depended not so much on the degree of his title as on its antiquity, and the distinction of those who had borne it. The higher titles of nobility were not borne by all members of a family; each son assumed a title from one of the family estates — a custom productive of no small confusion. Unlike "roturier" lands, which divided among all the children equally, noble fiefs went to the eldest son. The Revolution overthrew all distinction of ranks. On June 18, 1790, the National Assembly decreed that hereditary nobility was an institution incompatible with a free state, and that titles, arms, and liveries should be abolished. Two years later the records of the nobility were burned. A new nobility was created by the Emperor Napoleon I. in 1808, with titles desecending to the eldest son. The old nobility was again revived at the Restoration. All marquises and viscounts are of pre-revolution titles, none having been created in later times.

Commercial pursuits have more or less in different countries been considered incompatible with nobility. In England this was less the case than in France and Germany, where for long a gentleman could not engage in any trade without losing his rank. A sort of commercial "Bürger-Adel," or half gentleman class, was constituted out of the patrician families of some of the great German cities, particularly Augsburg, Nuremburg, and Frankfort, on whom the emperors bestowed coats-of-arms.

In semi-feudal Italy there was on the whole less antagonism between nobility and trade than N. of the Alps. The aristocracy of Venice had its origin in commerce; and, though untitled, they were among the most distinguished class of nobles in Europe. On the other hand, in Florence, in the 14th century, under a constitution purely mercantile, nobility became a disqualification from holding any office of the state. In order to the enjoyment of civil right, the nobleman had to be struck off the rolls of nobility; and an unpopular plebeian was sometimes ennobled in order to disfranchise him. A little later there grew up, side by side with the old nobility, a race of plebeian nobles — as the Medici — whose pretensions were originally derived from wealth, and who eventually came to be regarded as aristocrats by the democratic party.

The nobility of Spain boasts of a special antiquity and purity of blood, a descent from warriors and conquerors alone. HIDALGO (*q. v.*) is a term which implies gentility or nobility; the hidalgo alone has in strictness a right to the title "Don," which has latterly been used by persons who have no proper claim to it about as extensively as "Esquire" in England. The higher nobility are styled grandees; the class of nobility below them are called Titulados. Red blood is said to flow in the veins of the hidalgo, blue in that of the grandee. The preservation of noble blood, untainted by plebeian intermixture, has often been reckoned a matter of much moment. In Spain most of all this purity of lineage has been jealously guarded. In the German empire no succession was allowed to feus holding immediately of the emperor, unless both parents belonged to the higher nobility. In France the offspring of a gentleman by a plebeian mother was noble in a question of inheritance or exemption from tribute, but could not be received into any order of chivalry. Letters of nobility were sometimes granted to reinstate persons in this position. In Norway titular hereditary nobility was abolished in 1821; in Sweden it still survives. It is in Germany still important for many purposes to possess 8 or 16 quarterings — *i. e.*, to be able to show purity of blood for four or five generations, the father and mother, the two grandmothers, the four great-grandmothers, and also, in case of the 16 quarterings, the eight great-great-grandmothers, having all been entitled to coat-armor. Among the higher grades of the peerage in England a considerable number may be pointed out who do not possess this complete nobility.

In the United States the National Constitution declares (Art. I., Sec. 14) "No title of nobility shall be granted by the United States; and no person holding any office of profit or trust under them shall, without the consent of Congress, accept of any present, emolument, office, or title, of any kind whatever, from any king, prince, or foreign State." Congress sparingly gives its consent for a person in the service of the government to accept a decoration or other mark of honor from another government. Private citizens are under no constitutional restrictions.

Noble, an ancient English gold coin, six shillings and eightpence, first struck in the reign of Edward III., 1344. The noble having increased in value to 10 shillings, a coin of the former value of a noble was issued by Henry VI. and Edward IV., and called ANGEL (*q. v.*). Half-nobles and quarter-nobles were also in circulation at the same period.

Noble, Annette Lucile, an American author; born in Albion, Orleans co., N. Y., July 12, 1844; became a frequent contributor to magazines. Among her works are: "Uncle Jack's Executors" (1880); "Tarryport Schoolhouse" (1882); "After the

Failure" (1887); "Rachel's Farm" (1894).

Noble, Edmund, an English author; born in Glasgow, Scotland, Jan. 8, 1853; educated in Lancashire, and engaged for many years in journalistic work. In 1882 he was proprietor of the Liverpool "City News"; was in Russia as correspondent of the London "Daily News" in 1882–1884; and was a foreign editorial writer of the New York "Herald" in 1887. He wrote "The Russian Revolt" (1885); "Russia and the Russians" (1900); and contributed numerous articles to the magazines.

Noble, John Willock, an American lawyer; born in Lancaster, O., Oct. 26, 1831; was graduated at Yale University in 1851; became city attorney of Keokuk, Ia.; enlisted in the 3d Iowa Cavalry in 1861; was promoted colonel and brevetted Brigadier-General of volunteers; was United States attorney for Missouri, at St. Louis, in 1867–1870; and Secretary of the Interior under President Harrison, in 1889–1893.

Noble, Louis Legrand, an American poet; born in Lisbon, N. Y., Sept. 26, 1813; published: "Ne-Ma-Min: An Indian Story," in three cantos (1852); "The Course of Empire, Voyage of Life, and Other Pictures of Thomas Cole, and Selections from His Letters and Miscellaneous Writings Illustrative of His Life, Character, and Genius" (1853); "The Lady Angeline, A Lay of the Appalachians; The Hours; and Other Poems" (1857). He died in Ionia, Mich., Feb. 6, 1882.

Noble, Lucretia Gray, an American novelist; born in Lowell, Mass. At an early age she removed to Wilbraham, Mass. Besides contributions to magazines, she wrote the popular novel "The Reverend Idol" (1882).

Noctiluca ("night light"), a phosphorescent marine infusorian, extremely abundant round British and other coasts, one of the chief causes of the "phosphorescence" of the waves. It is a spherical animal — large for an infusorian (.02-inch in diameter) — and moves by means of a long stout lash or flagellum, beside which there is a second, very much smaller, lying in the "mouth" region. Its substance is remarkably spongy, and the phosphorescence is said by Allman to have its seat just underneath the rind. See PHOSPHORESCENCE.

Nocturne (nŏk-tern'), in painting, a nightpiece; a painting exhibiting some of the characteristic effects of night light. In music, a composition in which the emotions, particularly those of love and tenderness, are developed. The nocturne has become a favorite style of composition with modern composers of music for the pianoforte.

Noddy (*Anous*), a genus of birds of the family *Laridæ*, differing from terns in having the bill slightly angular, thus exhibiting an approach to gulls, and the tail not forked, but somewhat wedge-shaped. Altogether seven species are enumerated, widely distributed throughout the tropics and in the temperate zones. One species (*A. stolidus*) has been recorded as found off Wexford and in Dublin Bay, but no specimens other than the two obtained there have been taken in the British Isles or on the Continent. It is a familiar bird in the Atlantic and Pacific Oceans, not infrequently alighting on vessels and suffering itself to be taken by the hand; and so at its breeding places also, where, not accustomed to the visits of man, it scarcely gets out of the way, and the female sits undisturbed on the nest. Hence it commonly shares with the booby the reputation of unusual stupidity. It is about 15 or 16 inches long, from the tip of the bill to the end of the tail, the general color being a brownish black. Particular islands seem to be specially selected as the breeding places of noddies, among them the Bahamas, many of the keys of the West Indies, the Laccadives, St. Helena, Ascension, and many islands of Polynesia and Australia. Their nests, which are built on shelves of rocks or patches of sand or on trees, are sometimes very closely placed together. Each nest generally contains only one egg, which

NODDY (ANOUS STOLIDUS).

is about two inches long and of a buff color, sparsely speckled with reddish brown. The eggs are very good to eat, and in some places are collected in large numbers. The other species of noddy are distinguished by their smaller size and slightly different color.

Node, in physics, a point in a vibrating

body, or system of vibrating particles, where there is no movement. When a body is vibrating, the vibratory motion is conveyed from one place to another by the action of the molecular forces of the particles on one another. Now when all the forces acting on a certain particle are at any instant in equilibrium, and the particle consequently remains at rest, there is said to be a node at the particle. If a plate of glass or metal be held in the hand, and a bow be drawn across the edge, particles of fine sand, previously placed on the plate, will arrange themselves in lines, along which it is evident no vibration has taken place. These lines, called nodal lines, generally form geometrical figures. In botany, the joint of a stem, or the part where a leaf or several leaves are inserted.

Nodes, in astronomy, the two points in which the orbit of a planet intersects the plane of the ecliptic, the one through which the planet passes from the S. to the N. side of the ecliptic being called the ascending node, and the other the descending node. As all the bodies of the solar system, whether planets or comets, move in orbits variously inclined to the ecliptic, the orbit of each possesses two nodes, and a straight line drawn joining these two points is called the line of nodes of each body. As the earth moves in the plane of the ecliptic she has no nodes. The places of the nodes are not fixed points on the plane of the ecliptic, but are in a constant state of fluctuation, sometimes advancing (E.), and at other times receding (moving W.). This motion is produced by the mutual attractions of the planets, which tend to draw each of them out of the plane of its orbit; and it depends on the relative positions of the planets with respect to another planet whether that planet's nodes shall advance or recede. On the whole, however, the majority of possible "relative positions," or configurations, as they are called, is in favor of a retrograde motion; and it is found by observation that in an average of many revolutions round the sun a constant retrogradation of the node takes place. The determination of this retrogradation in the case of the planets is a most complicated problem, as the separate action of each on the others has to be taken into account. The revolutions of the planetary nodes are accomplished very slowly, never amounting to as much as a single degree in a century. The nodes of the lunar orbit retrograde with much greater speed under the disturbing influence of the sun. It is owing to the fact that they complete a revolution in nearly 18 Julian years and 11 days that series of eclipses regularly recur in that period. See ECLIPSES.

Nodier, Charles, a French writer; born in Besançon, France, probably April 29, 1780; son of a revolutionist lawyer; lived a shiftless life at Paris, Besançon, Dôle, Laibach, and last again at Paris, where he was appointed in 1823 to the librarianship of the Bibliothèque de l'Arsenal. As a child an ardent Jacobin, he became a royalist at the Restoration, and was elected to the Academy in 1833. He was a devoted student of entomology, philology, and bibliography, but his importance in literature depends mainly upon the influence his personality exerted on the group of Romanticists of 1830. Most of his literary work is already forgotten, save his delightfully fresh and fantastic short stories. He died in Paris, France, Jan. 27, 1844.

CHARLES NODIER.

Nodosaria, in zoölogy, a genus of *Polythalamia* or multilocular foraminifera. The additional segments, each of which is essentially similar to a Lagena, are added to the primordial chamber in a straight line. The ornamentation is various, chiefly thin ribs and delicate points. Range in time from the Permian to the present day.

Noe, Amadée de. See CHAM.

Noel, Thomas, an English poet; born in 1799; published several volumes of verse, among them "Rhymes and Roundelayes" (1841), in which is the poem "The Pauper's Drive," often erroneously attributed to Hood. He died in 1861.

Nogaret, François Felix (nō-gä-rā′), a French author; born in Versailles, France, in 1740; wrote: "The Apology for My Taste" (1771), a work on natural history; "Tales in Verse" (5th ed. 1810); and several plays. He died in 1831.

Nogaret, Stanislas Henry Lucien de, a French colonist; born in Marseilles, France, in 1682; was educated for the bar, but entered the army and served in Canada for several years, and in 1716 was appointed commander of Fort Rosalie, in Louisiana. In 1729 the Natchez Indians burned and sacked the fort, but Nogaret escaped, and, returning a few months later with a large force, rebuilt the stronghold. He contributed much to the welfare of the colony

that grew up around the fort, and founded others in the Choctaw territory. In 1735 he fell heir to the family estate, and returning to France, became a director of the Louisiana Company. He published "A Report of the Colonies Founded in the Valley of the Mississippi," by Chevalier Le Moyne de Bienville; followed by a "History of the Wars with the Natchez Indians" (Paris, 1738). He died in Paris, in 1759.

Nogent-le-Rotrou, a town of France, department of Eure-et-Loir; on the Huisne river; 93 miles S. W. of Paris; is a well-built place, with the ruined château of the great Sully, his violated sepulcher, and a statue of General Saint-Pol, who fell before Sebastopol. The Germans here won two fights, on Nov. 21, 1870, and Jan. 6, 1871.

Noiseless Powder. See GUNPOWDER.

Noisseville, a village of France, 5 miles E. of Metz, where, on Aug. 31–Sept. 1, 1870, Bazaine attacked the German besiegers of Metz with 120,000 men and 600 guns. He had some success on the first day, against the 41,000 men and 138 guns commanded by Manteuffel; but on the second day gave up the attempt to break through the German line, which had been reinforced during the night by 30,000 men and 162 guns.

Nola, an episcopal city of Italy; 16 miles E. N. E. of Naples; is built on the site of one of the oldest cities of Campania, founded by the Ausonians, and taken by the Romans in the Samnite War, 313 B. C. Augustus died here, A. D. 14.

Nollekens, Joseph, an English sculptor; born in London, England, in 1737; son of an Antwerp painter; was placed early under Scheemakers, and in 1759 and 1760 gained premiums from the Society of Arts. Going subsequently to Rome, he had the honor of receiving a gold medal from the Academy of Painting and Sculpture. On his return to England in 1770 he was elected an associate of the Royal Academy (1771) and a Royal Academician (1772). His "Venus with the Sandal" is his principal ideal production; but his professional reputation rests mainly upon his portrait busts. He died in 1823.

Nolle Prosequi (Latin, to be unwilling to prosecute), a term used where a plaintiff or a prosecuting attorney for the public, discontinues a suit, either wholly or as to some count, or as to some defendants.

Nomad, a roaming or wandering shepherd; one who leads a wandering life, and subsists by tending herds of cattle, which graze on herbage of spontaneous growth. In history, nomads or nomades, are tribes of men without fixed habitation. The nomades of ancient times were generally tribes devoted to pastoral pursuits; for the Greeks and Romans knew of no races subsisting wholly by the chase. The principal nomadic tribes of antiquity were those of Southern Russia and the interior of Asia, from whom sprang, in the decline of the Roman empire, many of the tribes which overran Western Europe; and, at a later era, those which conquered empires in Western and Southern Asia. The vast regions of Mongolia are inhabited by nations which still retain their wandering habits.

No Man's Land, a name applied to outlying districts in various countries, especially at one time to what now corresponds mainly to Griqualand East; also to a territory of 80,000 square miles in South Australia; to a strip ceded by Texas to the United States in 1850, for many years without any government, now constituting Beaver co., Okl.; to a small island 3 miles S. W. of Martha's Vineyard, Mass.; and to a strip of land bordering on Pennsylvania, Delaware, and Maryland, still in dispute between those States because of the displacement of the early boundary stones.

Nomarche, in Greece the same as province.

Nom de Plume. See PSEUDONYM.

Nomenclature, a name, title, designation; vocabulary, dictionary, or glossary. In science, the names taken collectively of the objects of study in any branch of science. Sometimes it includes, but far more generally it is distinguished from, terminology. In botany, for example, the names assigned to the several classes, orders, tribes, genera, species, etc., are its nomenclature; the definition of the various words, whether substantives or adjectives, used in describing a plant, belong to terminology. The designation, *Rosa canina* (dog-rose), falls under the department of nomenclature; nectary, diœcious, etc., under that of terminology. In 1842 the subject of scientific nomenclature was investigated and reported on by a committee of the British Association.

In biology, the practice of using two names — one generic the other specific.

In botany: Linnæus laid down 31 rules for the guidance of botanists in nomenclature; some of these have fallen into disuse. Orders generally end in -aceæ, tribes in -eæ, and their subdivisions in -idæ. Botanical assemblages with the last-named ending are called, in this work, families; though family in botany is sometimes made synonymous with order. This brings them into harmony with zoölogical families in -idæ, to which they are apparently equivalent.

In chemistry, its spoken language, which at every period of its history, reflects the stage of its development. The early belief that the heavenly bodies determined the character of terrestrial matter led to the use of such names as sol = gold, luna =

silver, and mercury, the name by which the metal is still known. Later, the physical character of the substance gave rise to the name of the compound, as in milk of lime, sugar of lead. But the present system is, with some minor variations, the work of Lavoisier, Berthollet, and Morveau, and appeared in 1787. The leading principle is that the names of compound bodies should express the simple substances they contain, and their relative proportions. Generally the root-word is employed, together with certain terminations and prefixes to indicate the degree of oxidation and the number of atoms of the elements contained in it — *e. g.*, KNO_3 = potassic nitrate, KNO_2 = potassic nitrite, HNO_3 = nitric acid, HNO_2 = nitrous acid. The following compound shows the manner in which the numeral prefixes are employed: $\begin{matrix} Hg_4 \\ H_4 \end{matrix} \left\{ \begin{matrix} Cl_2 \\ O_2 \\ N_2 \end{matrix} \right.$ = tetra-mercuro-tetra-hydric-dioxi-dichloro-dinitride. The above rule does not apply strictly to organic substances, where regard is had to the history of the groups forming the compound.

In geology, the system adopted has many merits, but in one direction it tends to generate error. When a stratum is called chalk, one naturally expects it to be white and calcareous; it may be neither one nor the other. When another is called greensand, the mind expects it to be characterized by grains of sand of green color; it may be quite different. Such words, used of the spots where the several strata were first identified, are appropriate; but, being founded on local peculiarities, become quite inaccurate when applied to other, and specially to distant regions. Used of the world at large, they are simply chronological, and have no reference to the appearance of particular rocks. See GEOLOGY.

In mineralogy: Linnæus carried his system of two Latin names through the mineral no less than the animal kingdom. Thus, he had his *Schistus tabularis*, *S. atratus*, etc. These are now exchanged for the vernacular terms. Minerals are now generally made to end in -ite, which Dana alters for rocks to -yte. Genera of fossils often end in -ites, as Belemnites, anglicized Belemnite.

In zoölogy: In the days of Swainson and the other adherents of the quinary system, conformity of system in the nomenclature was greatly insisted upon. Every tribe ended in -es, every family in -idæ, and every sub-family in -inæ. Of late, the system has been departed from, and the great aid which it rendered to the memory in consequence sacrificed. With regard to vernacular names, they vary in different parts of the country, and often suggest error. Thus the goat-sucker does not suck goats, and the titmouse is not one of the *Muridæ*, but a bird. They are regarded as unscientific, and used only for popular convenience in scientific works.

Nominalism, the name given to one of two rival schools of philosophy which flourished in the Middle Ages, though the origin of the dispute dates from the days of Plato. It turned on the real nature of genera and species, and the motto of nominalism was "*Universalia post rem.*" Roscellinus, canon of Compiègne, in the latter part of the 11th century, was the first advocate of nominalism, and maintained, in opposition to the advocates of realism, that general ideas have no separate entity. He was charged with holding heretical opinions concerning the Trinity, for which he was cited before the Council of Soissons, and condemned, A. D. 1092. His first great opponent was Anselm, Archbishop of Canterbury, and later Abelard, who had been a pupil of Roscellinus, modified his master's views into what is known as conceptualism.

Nomsz, Jan (nomz), a Dutch playwright; born in Amsterdam, in 1738. His most popular work is "Maria van Lalain," a tragedy; "Zoroaster"; and a poem (1779) of which William I. of Orange is the hero. He died in 1803.

Non Compos Mentis ("not of sound mind") an expression used of a person who is not of sound understanding, and therefore not legally responsible for his acts.

Nonconformists, in English history, those who declined to conform their worship to that by law established. They were of two kinds: First, those who, being religious, worshiped nowhere; second, those who attended the services of some other religious denomination than the Established Church. It was more frequently used of the latter class. The name was first applied to those who declined to conform to the enactment of the Act of Uniformity of Edward VI., passed in 1549. It was revived and applied to the 2,000 clergymen, who had to surrender their livings on account of their inability to conform to the more celebrated Act of Uniformity of Charles II., first enforced on Aug. 24, 1662. Etymologically viewed, a Dissenter and a Conformist somewhat differ. The former word denotes that he feels differently from Churchmen, that his sympathies go in a different direction; the latter word refers, not to his feelings, but to his action with respect to public worship. The laws formerly existing required him to conform to that of the Established Church by attending the services and partaking of the Communion. The two words, dissenter and nonconformist, as generally referring to the

same individual, became interchangeable. See DISSENTER.

Noneffective, in military language, a term applied to that portion of the personnel of any army or navy which is not fit for or capable of active service, or is exempt therefrom, as chaplains, surgeons, nurses, musicians, etc.

Nones, in Roman antiquity, the fifth day, according to the Roman calendar, of the months January, February, April, June, August, September, November, and December, and the seventh of March, May, July, and October. The nones were so called from their falling on the ninth day before the ides, reckoning inclusively, according to the Roman system of computation. In Roman liturgy, the office for the ninth hour.

Nonintrusionist, in Scotch church history, a member of a party who, while patronage was the law of the Scotch Established Church, contended for the principle that no minister should be intruded on a parish contrary to the will of the congregation. It was to meet these views that the General Assembly, in 1834, passed the Veto Act, which brought the Church into conflict with the law courts, and produced the disruption.

Nonjurors, in English church history, a term applied to those of the clergy and laity of the Establishment, who, holding that James II. was sovereign *de jure* after the throne had been declared vacant, refused to take the oath of allegiance to William III. and his successors. Among these were Sancroft, Archbishop of Canterbury, and six bishops — Turner (Ely), Lloyd (Norwich), Frampton (Gloucester), Lake (Chichester), White (Peterborough), and Ken (Bath and Wells). Sancroft sanctioned the consecration of a bishop, and thus a schism arose. The Nonjurors themselves divided on the question of Nonjurors' usages (see below), and each party consecrated bishops. Gordon, the last prelate of the regular body, died in 1799, and so the Nonjurors proper came to an end. Boothe, the last of the irregularly constituted bishops, died in Ireland some 20 years later.

Nonjurors' Usages, certain ceremonies adopted by the Nonjurors in the Communion office, viz.: Mixing water with the wine, prayers for the dead, prayer for the descent of the Holy Ghost on the elements, the prayer of oblation, trine immersion at baptism, the use of chrism at confirmation, and unction of the sick. Hence the Nonjurors were sometimes called Usagers.

Nonnus, or **Nonnos,** a later Greek poet, born in Panopolis, Egypt; lived about the beginning of the 5th century A. D.; was the author of a poem entitled "Dionysiaca, in 48 books, in which the expedition of Bacchus (Dionysus) to India is described; also a paraphrase, in Greek hexameters, of the Gospel of St. John.

Nonsense, Fort, the popular name of a defensive work on the hills overlooking Morristown, N. J., projected by Washington to keep his discouraged and famished army from revolting during the winter of 1779–1780. The soldiers worked on its construction till relief supplies were received. The Washington Association of New Jersey erected a memorial stone on the site of the earthworks in 1888.

Nonsuit, in law, the stoppage of a suit during trial. This is done by the judge when, in his opinion, the plaintiff fails to make out a legal cause of action, or to support his pleadings by any evidence.

"It is usual for a plaintiff, when he or his counsel perceives that he has not given evidence sufficient to maintain his issue, to be voluntarily nonsuited, or withdraw himself: whereupon the crier is ordered to call the plaintiff; and if neither he, nor anybody for him, appears, he is nonsuited, the jurors are discharged, the action is at an end, and the defendant shall recover his costs. The reason of this practice is that a nonsuit is more eligible for the plaintiff, than a verdict against him; for after a nonsuit, which is only a default, he may commence the same suit again for the same cause of action; but after a verdict had, and judgment consequent thereupon, he is forever barred from attacking the defendant upon the same ground of complaint. But in case the plaintiff appears, the jury by their foreman deliver in their verdict."— Blackstone.

Nootka, an island of Canada on the W. coast of Vancouver Island, at the entrance of Nootka Sound, an inlet running about 10 miles inland.

Nootka Dog, a large variety of dog domesticated by the Indians of Nootka Sound, chiefly remarkable for its long wool-like hair, which, when shorn off, holds together like a fleece, and is made into garments.

Nord, a department of France in the extreme N. (whence its name), corresponding with the former province of French Flanders, and bordering on Belgium and the Strait of Dover; area, 2,193 square miles; is composed of two parts, or at least contracts near the middle at Armentières, on the Lys, to a very narrow strip. It is watered by the Scheldt and the Sambre, with their affluents, and by numerous canals. Next to that of the Seine, it is the most densely-peopled department of France, having (1906) 850.1 inhabitants per square mile. In blood the people are Flemish and Walloon in about equal proportions. The soil is fertile, well cultivated, and yields more abundant harvests than any other part of the country; the fisheries are productive, the mineral wealth very great, especially in coal; and for its manufacturing industries Nord is in several respects the foremost of French departments — iron, machinery, porcelain, glass and mirrors,

paper, candles, soap, chemicals, beet-sugar, and cotton, woolen, linen, and silk cloths being all made on a large scale. It is abundantly equipped with railways and navigable streams. The department possesses five fortresses of the first class, and has been the scene of many great campaigns and battles. The chief town, Lille; chief port, Dunkirk. Pop. (1906) 1,895,861.

Nordau, Max Simon, a German author; born in Pest, Hungary, July 29, 1849; followed various avocations, studying and practising medicine, traveling, and writing for the press till 1880, when he went to Paris, and has since devoted himself to literature. He wrote a number of books, of which the best known, perhaps, in the United States is "Degeneration" (1893). He became conspicuous in the Zionist movement. See ZIONISTS.

Nordenfeldt, Phorsten, a Swedish engineer; born in 1844; invented the machine gun that bears his name; also several forms of torpedoes, and a submarine torpedo boat; became chamberlain to the King of Sweden. He was given a reception by the American Society of Swedish Civil Engineers in Brooklyn, N. Y., April 22, 1899.

Nordenskjöld, Baron Nils Adolf Erik, a Swedish Arctic explorer; born in Helsingfors, Finland, Nov. 18, 1832; acquired a taste for mineralogy, geology, chemistry, and similar sciences from his father, the head of the mining department of Finland, and studied them further at the university of his native town and at Berlin. In 1857 he naturalized himself to Sweden, and in the following year was appointed head of the mineralogical department of the Royal Museum at Stockholm. During the next 20 years he frequently visited Spitzbergen; in 1864 he completed the measurement of an arc of the meridian there, and mapped the S. of the island. After two preliminary trips to the mouth of the Yenisei, by which he proved the navigability of the Kara Sea, he successfully accomplished (June, 1878–September, 1879), in the celebrated "Vega," the navigation of the Northeast Passage, from the Atlantic to the Pacific along the N. coast of Asia. On his return he was made a baron of Sweden (1880), and during the next five years published the results of the journey in "Voyage of the Vega Round Asia and Europe" (1881), "Scientific Results of the Vega Expedition" (1883), and "Studies and Investigations" (1885). To Greenland, too, he made two expeditions; members of his party on the second occasion (1883) reached a point 140 miles distant from the E. coast, but without finding the ice-free interior Baron Nordenskjöld believed to exist. Three years later he published a book on the icy interior of Greenland. He died in Stockholm, Sweden, Aug. 12, 1901.

Nordhausen, a town of Prussian Saxony; at the S. base of the Harz Mountains, and the W. end of the fertile Goldene Aue ("golden plain"), on the Zorge river; 48 miles N. N. W. of Erfurt. St. Blasius, one of its seven churches, contains two paintings by Cranach; and there are also a quaint town hall, 70 extensive distilleries of corn brandy or "Nordhaüser schnaps" and manufactures of tobacco, sugar, leather, chemicals, etc. Dating from 874, and in 1253 created a free imperial city, Nordhausen embraced the Reformation in 1522, and in 1803 fell to Prussia. Pop. (1900) 28,497.

Nordhoff, Charles, an American author; born in Westphalia, Prussia, Aug. 31, 1830; was brought to the United States by his parents in 1835; and educated at Woodward College, Cincinnati, O. He served in the United States navy, making a tour around the world; and later was employed in whaling and mackerel fishing. He was in a New York publishing house in 1857–1861; on the New York "Evening Post" in 1861–1871; and on the New York "Herald" since 1874. He is author of "Man-of-War Life"; "The Merchant Vessel"; "Stories of the Island World"; "Cape Cod Stories"; "God and the Future Life"; etc. He died in California, July 14, 1901.

Nordica, Lillian, an American opera singer; born in Farmington, Me., in 1859; family name, Norton. She studied at the Boston Conservatory of Music and afterward in Paris and in Italy. In 1882 she married Mr. Gower, who died a short time afterward. She sang with great success in England, Germany, and on the Continent, and was a favorite in her native country. Being very desirous to sing in Wagner's operas in Bayreuth, she went there and appealed to Mme. Wagner for permission to do so. This granted, she applied herself to the study of German and the rôle of Elsa in "Lohengrin" at the same time, and on her appearance achieved a great triumph. She was especially admired as Marguerite in "Faust," and was also much liked in oratorios. In 1896 she married Zoltain F. Dome, who had appeared for the first time in opera at the Bayreuth Festival, in 1894, in "Parsifal," taking the title rôle.

Nördlingen, a town of Bavaria; on the Eger river; 44 miles N. W. of Augsburg; it has a Gothic church (restored 1880), with a high tower and fine organ, and manufactures carpets. Here took place, Sept. 6, 1643, the great battle in which the Swedes were defeated by the Imperialists with a loss of 12,000 killed and wounded.

Nordmann, Johannes Rumpelmaier (nord'män), an Austrian writer; born near Krems, March 13, 1820; was connected with several prominent periodicals, and wrote: "Poems" (1847); "A Marshal of France" (1857), a tragedy; "Springtime Evenings in Salamanca" (3d ed. 1880); several novels; and a record of travel called "My Sundays" (2d ed. 1880). He died in Vienna, Aug. 20, 1887.

Nordstrand, an island of Prussia, on the W. coast of Schleswig; area, 21 square miles. The greater part of it was swept away in 1634 by a flood, which drowned 15,000 persons.

Nore, a sandbank in the estuary of the Thames; 47 miles from London. Off its E. end is a floating light which revolves 50 feet above high water. The name is commonly applied to the portion of the estuary in the vicinity of the Nore light and sandbank. It was here that the outbreak of the fleet, known as the "mutiny at the Nore," broke out on May 20 and lasted till June 13, 1797. The ringleader, Richard Parker, who had styled himself president of the "Floating Republic," was hanged June 30 from the yardarm of his ship; and a few other men were soon afterward executed or flogged through the fleet. "The King's Own," by Marryat, gives a sketch of the mutiny.

Norfolk, a city and port of entry in Norfolk co., Va.; on the Elizabeth river, and on the Seaboard Air Line, the Atlantic Coast Line, the Chesapeake and Ohio, and several other railroads; 18 miles from Fort Monroe. It is the second largest city in Virginia, and with Portsmouth, on the opposite bank of the river, constitutes the largest naval station in the United States. Here are a United States Naval Hospital, United States custom house, Retreat for the Sick (Prot.), St. Vincent de Paul Hospital, Leach-Wood Seminary, Norfolk Mission College (Pres.), Norfolk Academy, Norfolk College for Young Ladies, Phillips-West School for Girls, a public library and high school. The city has electric street railroads, gas and electric lights, a good sewerage system, waterworks, several National banks, and a number of daily and weekly newspapers. A large export trade is carried on in canned goods, early fruits and vegetables, cotton, coal, oysters, and peanuts; for the latter Norfolk is the largest market in the world. The United States Navy Yard employs thousands of persons and the local industries include lumber, knit goods, iron, wire fence, guano, and fertilizing establishments, etc. Norfolk has an assessed property valuation of about $25,000,000. Pop. (1890) 34,871; (1900) 46,624; (1910) 67,452.

Norfolk Island, an island in the W. Pacific; about half-way between New Zealand and New Caledonia; 400 miles N. N. W. of the former. The coasts are high (mean altitude, 400 feet), and steep, and the surface generally uneven, rising in Mount Pitt to 1,050 feet. The island is 6 miles long, and has an area of 13½ square miles. The soil is fertile and well watered, and the climate healthy. The Norfolk Island pine grows to a height of 200 feet; the Norfolk Island cabbage is a dwarf pine. Norfolk Island was discovered by Cook in 1774. Between 1788 and 1805, and again between 1826 and 1855, it was a penal settlement for convicts sent from New South Wales. In 1856 many of the inhabitants of PITCAIRN ISLAND (*q. v.*) were transferred hither by the British government. The population includes a number of Melanesian boys and girls being educated at Bishop Patterson's mission station of St. Barnabas, Norfolk Island being the headquarters of the diocese Melanesia, which was founded in 1861. The people govern themselves, under the superintendence of the government of New South Wales; they fish, farm, and supply provisions to passing vessels.

Norham Castle, the border fortress of the bishops of Durham; on the Tweed river; 8 miles S. W. of Berwick. Founded in 1121, and deemed impregnable in 1522, it has memories of Kings John, Edward I., and James IV., but is known best through "Marmion." The picturesque ruins comprise a great square keep, 70 feet high.

Noria, a water-raising machine which has traveling pots or buckets, submerged below and discharging at their point of greatest elevation. The term noria, having been applied generally to traveling water-raising buckets, has included the chain pump, sometimes called the Spanish noria. A new feature, however, is found in this, namely, a tube up which the pistons, no longer buckets, ascend. The true Spanish noria has earthen pitchers secured between two ropes which pass over a wheel above and are submerged below.

Norian, Claude Antoine Jules Cairon (nōr-yäk'), a French novelist; born in Limoges, France, in 1827. His novels include: "The Countess of Bruges" (1878), and "The Chevalier de Cerny" (1879). "Paris as It Is" (1884), and many others of equal merit, are in the list of his most important works. He died in Paris, Oct. 1, 1882.

Noricum, a Roman province, between Rhætia on the W. and Pannonia on the E., and corresponding to the present states of Austria proper S. of the Danube, Styria, Carinthia, and part of Salzburg. The Roman emperor Drusus subdued the native

Celtic Norici or Taurisci in 15 B. C. The name survives in the Noric Alps.

Normal, according to an established law, rule, or principle; relating to rudiments or elements; teaching rudiments or first principles; instructing in the art of teaching; as, a normal school.

In geometry, a perpendicular to a curve at some particular point, at which point the normal is also perpendicular to a tangent.

Normal School, a school for the education of teachers. It is not a little surprising, that for the important duty of educating the young, it is only recently that any special training schools have come to be regarded as necessary. They originated in Germany, and were for a long period confined to that country. The first was organized at Stettin, in Prussia, in 1735; the next by Frederick the Great, at Berlin, in 1748; another was opened in Hanover in 1757; and others followed in various parts of Germany. In the 19th century they rapidly increased in numbers, and were greatly improved in their internal organization. The course of instruction generally extends to three or four years, and in most parts of the United States the great majority of the teachers are graduates of the normal school. The first seminary for teachers in France was established in 1810; the first in Holland in 1816; and, in England, in 1830. The first in the United States was opened at Lexington, July 3, 1839; and now most of the principal cities as well as the States have their normal schools.

Norman, Henry, an English author; born in Leicester, England, Sept. 19, 1858; studied in France; was graduated at Harvard in 1881, and continued his studies at Leipsic University in 1881–1883. He inaugurated, in 1882, the agitation for the preservation of Niagara Falls, resulting in the acquisition of the surrounding territory by the United States and Canadian governments. He was for several years on the staff of "The Pall Mall Gazette," and London "Chronicle"; and connected with the New York "Times" and Chicago "Tribune." He was elected to Parliament in 1900. He traveled extensively and is the author of "The Preservation of Niagara Falls"; "The Real Japan"; "The Near East"; "The Peoples and Politics of the Far East"; etc. Knighted in 1906.

Norman Architecture, a style of architecture in the Middle Ages.

In France.—The Normans brought the Romanesque style to a high state of perfection in this country. While the simplicity of the entire structure and the general effect bear witness to the Roman origin of the style, yet there is displayed a rich treatment of details. Both piers and arches are molded, and the ornamentation, especially that which serves as a rich setting to the arches, consists of the most simple line patterns; as, for instance, the meander, or the zigzag, or of bands or fillets occurring in regular succession; frequently, also, it is composed of various enrichments resembling the squares of a chess board, lozenges, or nail heads. Norman workmanship was, at first, remarkable only for its solidity. The walls were of great thickness, and often built of rubble, faced with small squared stones — a manner of building which had been copied from the works which the Romans had left behind them in France.

In England.—English Romanesque (more commonly called Norman) architecture is to be considered as a branch and offshoot of that of Normandy, for, while many peculiarities of detail crop up, the main features of the original style are distinctly observed. The earliest work of the Normans which exists in England was conducted by Gundulph, who, after rebuilding his cathedral at Rochester, was employed by William to superintend the construction of the White Tower, in the Tower of London, which contains within its walls perhaps the only ecclesiastical remnant of the Conqueror's time at present in existence. Simplicity of design and detail is not met with in the same degree as in Normandy itself. Very richly molded features are introduced into heavy masses of building, and more ornamentation is employed, which is introduced in an arbitrary manner. The plan of the churches was the same as in Normandy. All were built with the semicircular chancel, but the arches of the nave usually rested on heavy cylindrical piers, hardly ever to be found in French churches, except in crypts. The windows and the doors were the same as in Normandy, and the Norman moldings were introduced with little alteration. The walls were remarkably thick and without prominent buttresses. Specimens of the time of Rufus are to be seen in the W. end and nave of Rochester cathedral; the choir, side aisles, and middle transept at Durham; in the walls of the lower part of the W. façade of Lincoln; the tower and transept of St. Alban's; and the oldest remaining parts of Winchester.

A strongly-marked mode of enrichment, resembling scales or diamonds in its design, was generally employed on the surface of the walls; the arches were ornamented for the most part with the usual zigzag. The character of the exterior of buildings in the Norman style may be described as heavy and massive. The windows were generally small. Blind, narrow, arcades often occur in the façades and towers, sometimes interlacing, and sometimes not so, in several ranges, one above the other. The Norman style is of frequent occurrence in

the case of the castles of the feudal lords of the epoch. The nucleus of these buildings, which were in reality fortresses, consisted of a high and massive tower, which served at the same time for the residence of the lord and for purposes of defense. This tower was only accessible by a flight of steps leading along the wall to an upper story of the building, and was only lighted by very small windows. In the last quarter of the 12th century the transition from the Norman to the Pointed style began. The earliest examples of this transition are the round part of the Temple Church, London, consecrated in 1185; the choir of Canterbury Cathedral, rebuilt in 1175; and the great tower at the W. end of Ely Cathedral, built by Bishop Ridel, who died in 1189.

Norman Conquest, in English history, the successful attempt made by William of Normandy in 1066 to secure the English crown from his rival Harold, son of Earl Godwin. It was no real conquest of the land and people by an alien race, but rather resembled in its chief characteristics the accession of William of Orange to the throne in 1688.

Normand, Henrietta Rae, an English painter; born in London, Dec. 30, 1859; married Ernest Normand, the painter, 1884; was educated at Queen's Square School of Art, Heatherley's British Museum, Royal Academy Schools. Medallist at Paris and Chicago Universal Exhibitions. She began to study art at the age of 13; exhibited her first picture at the Royal Academy in 1880; has been represented at the R. A. each succeeding year by important pictures Her paintings include "Ariadne" (1885); "A Naiad" (1886); Eurydice" (1886); "Doubts" (1887; "Zephyrus and Flora" (1888); "Death of Procris" (1889); "Ophelia" (1890); "La Cigale" (1891); "Flowers Plucked and Cast Aside" (1892); "Mariana" (1893); "Psyche at the Throne of Venus" (1894); "Apollo and Daphne" (1895); "Summer" (1896); "Isabella" (1897); etc.

Normandy, an ancient province of France, bordering on the English Channel, now divided into the departments of Seine-Inférieure, Eure, Orne, Calvados, and Manche; anciently comprised a portion of the kingdom of Neustria, and was ceded to Rollo, Rolf, or Raoul, by Charles III., in 911. William I., Duke of Normandy invaded England in 1066, and established a Norman dynasty, thereby uniting Normandy with the latter country. Philip Augustus conquered it in 1204, the French holding it till 1417, when it was recovered by the English, who held it till 1450, when it was finally wrested from them by Charles VII.

Norman French, the language spoken by the Normans at the time of the Conquest. It continued to be the legal language of England till the reign of Edward III., and is still employed on certain state occasions.

Normans (literally "north-men"), the descendants of the Northmen who established themselves in Northern France, hence called Normandy. Besides the important place occupied in history by the Normans in Normandy and England, bands of Normans established themselves in S. Italy and Sicily, and Norman princes ruled there from the middle of the 11th till the end of the 12th century.

Norns, the Parcæ of Scandinavian mythology, were three maidens, Urd, Verdandi, and Skuld—*i. e.*, Past, Present, and Future. They sit by the well of Urd, under the world-tree Ygdrasil in Asgard, and there determine the fate both of gods and men. Besides these three there are many inferior norns, both good and bad, answering to the genii of classical mythology; to such are attributable the unequal destinies of men in the world. Women who possessed the power of prediction or magic also bore this name.

Noronha, Fernando, a group of small islands belonging to Brazil; in the S. Atlantic; about 200 miles E. N. E. of Cape San Roque. The group, which comprises a main island, 6½ miles long and about 2 broad, and several smaller islets, is of volcanic character, phonolite and other rocks of late formation resting on a foundation of basalt. A curious calcareous sandstone is also common, consisting of sand and fragments of shells, rendered firm by the action of water. The climate is healthy, and the trade winds keep the temperature moderate. The islands are fertile, and maize, sugar, sweet potatoes, casavas, melons, and bananas are raised. The low hills and valleys of the main island are thickly wooded; a sort of fig (*Ficus noronhæ*), like the banyan drops aërial roots from its branches. The group was visited in 1775 by Captain Cook, and in 1832 by Darwin, who investigated its geology. The "Challenger" Expedition explored the smaller islands. The main island has been made a penal settlement.

Norris, Edwin, an English linguist; born in 1795; for more than 25 years was secretary to the Asiatic Society, and became a great authority on cuneiform writing. His great work is his "Assyrian Dictionary" (1868–1872), which marks an epoch in cuneiform studies. The Celtic dialects also received a share of his attention. He died in 1872.

Norris, William Edward, an English novelist; born in London, England, Nov. 18, 1847; son of the late Sir W. Norris, formerly Chief Justice of Ceylon; was educated at Eton. His first novel, "Heaps of Money," was published in 1877, and there followed "Mademoiselle de Mersac," "Matrimony," "No New Thing," "His Grace," "A Deplorable Affair," "The Countess Radna," "St. Ann's," "Matthew Austin," "A Victim of Good Luck," "Billy Bellew," "A Dancer in Yellow," "Clarissa Furiosa," "Marietta's Marriage," "The Widower," "Giles Ingilby," and several other books, and serials in the leading magazines.

WILLIAM E. NORRIS.

Norristown, a borough and county-seat of Montgomery co., Pa.; on the Schuylkill river, the Schuylkill canal, and the Philadelphia and Reading, the Stony Creek, and the Pennsylvania railroads; 16 miles N. W. of Philadelphia. Here are a Friend's Home for the Aged, Charity Hospital for the Insane, street railroad and electric light plants, waterworks, National banks, and several daily and weekly newspapers. The borough has pipe-covering and steel-casting works, shirt factories, machine shops, glass works, carpet mills, cigar factories, wire, rolling, cotton, and woolen mills, etc., and an assessed property valuation of nearly $10,000,000. Pop. (1890) 19,791; (1900) 22,265; (1910) 27,875.

Norrköping, a town of Sweden, ranking next in manufactures after Stockholm; at the head of the Bravik river; 113 miles S. W. of Stockholm; is a well-built modern town. First founded in 1384, it has been several times destroyed by fire. The rapid river Motala, which connects Lake Vetter with the Bravik, and which is spanned by several substantial bridges, affords considerable water power, by which the numerous manufactories are worked. Here are cloth mills, cotton spinning and weaving, manufactures of sugar, paper, tobacco, etc., and shipbuilding (gunboats, etc.). Here Charles IX. (1604) and Gustavus IV. (1800) were crowned. Pop. (1906) 44,760.

Norse, the language of Scandinavia. Old Norse is represented by the classical Icelandic, and still with wonderful purity by modern Icelandic. The literature includes the early literature of the people of Norway, Sweden, and Iceland.

Norte, Rio Grande del (rē'ō grän'dă del nor'tā), a river of Mexico, rising in the Rocky Mountains and emptying into the Gulf of Mexico; length about 2,000 miles. Its mouth is 1,200 feet wide, but is barred so as to afford entrance only to boats.

North, one of the four cardinal points of the compass. The N. is the direction of the true meridian from the equator to the North Pole. Magnetic N. is the direction of the magnetic meridian toward the N. magnetic pole. Also a country, region, or district, or a part of a country or region, situated nearer to the N. than another; a country or district lying opposite to the S.

North, Christopher. See WILSON, JOHN.

North, Sir Dudley, an English political economist; born May 16, 1641. At an early age he was bound to a Turkey merchant in London. He made a voyage to Archangel, next to Smyrna, where he settled for some years in trade. Afterward he settled in Constantinople, returning to England some years after with a considerable fortune, which he continued to increase by keeping an interest in the Levant trade. He became one of the sheriffs of London; was knighted; married the widow Lady Gunning; and was appointed a commissioner of customs next of the treasury, then of the customs again. Under James II. he sat in Parliament for Banbury, and after the Revolution made but a sorry defense of his actions as sheriff. His "Discourses upon Trade" (1691) anticipate in a striking manner some of the ideas of Adam Smith. He died Dec. 31, 1691.

North, Francis, Baron Guilford, an English statesman, brother of Sir D. North; born Oct. 22, 1637. He was educated at Cambridge; studied law at the Middle Temple, and was called to the bar in 1655. He was knighted and made solicitor-general in 1671; attorney-general in 1673; in 1674 Lord Chief-justice of the Court of Common Pleas; privy-councillor; and in 1682 Lord-keeper of the Great Seal, and Baron Guilford (September, 1683). He died Sept. 5, 1685.

North, Frederick, 8th Lord North and 2d Earl of Guilford, an English statesman; born April 13, 1732. He was educated at Eton and Oxford. When only 22 he entered the House of Commons; became a Lord of the Treasury in 1759; Chancellor of the Exchequer and leader of the House of Commons in 1767; and prime minister in 1770. He was largely responsible for the measures that brought about the loss of the American colonies; as a minister he was too ready to surrender his own judg-

ment to that of the narrow-minded and obstinate king. In 1778 he renounced the right of taxing the colonies, already seeing that the war was hopeless, and in 1782 he resigned. Fox's dislike of the terms of peace with America led him to enter into a coalition with North, whom he had for so many years inveighed against as a minister without foresight, treacherous, vacillating, and incapable. North and Fox took office under the Duke of Portland in 1783, but the coalition destroyed Fox's popularity, and the Portland administration only lasted a few months. He died Aug. 5, 1792.

North, Roger, an English historian, brother of Sir D. and Francis North; born in Tostock, Suffolk, England, Sept. 3, 1653. He was educated at Cambridge, entered the Middle Temple, and under the influence of his brother the lord-keeper, soon rose to a lucrative practice at the bar. At the Revolution his hopes of advancement were closed, and he cast in his lot with the nonjuring party, and retired to his estate of Rougham in Norfolk. In 1696 he married, and lived henceforth the life of a country gentleman and virtuoso, his only tastes being a passion for acquiring books, and for planting trees. His three biographies, and autobiography, and "Examen" (1740) of Dr. White Kennet's "History of England" give him a place in English literature. He died March 1, 1734.

North, Simeon, an American educator; born in Berlin, Conn., Sept. 7, 1802. He was president of Hamilton College, 1839–1857. His works include: "The American System of Collegiate Education" (1839); "Faith in the World's Conversion" (1842); "The Weapons in Christian Warfare" (1849); "Obedience in Death" (1849); "Half-Century Letter of Reminiscences" (1879). He died in Clinton, N. Y., Feb. 12, 1884.

North, Sir Thomas, an English translator. Of his life we know but little save that he was still living in 1603 when the third edition of his translation of Plutarch (first 1579) was published. This work, a translation from the French of Amyot, remains a noble monument of English, and was beyond doubt one of the fountains from which Shakespeare drew his knowledge of ancient history.

North Adams, a city in Berkshire co., Mass.; on the Hoosac river, and on the Fitchburg and the Boston and Albany railroads; 20 miles N. E. of Pittsfield. It comprises the villages of Greylock, Braytonville, Blackington, and Beaver. Here are the A. J. Houghton Public Library, North Adams Library, high school, North Adams Hospital, waterworks, electric lights, electric railroads, several National and savings banks, and several daily and weekly newspapers. The chief manufactures are tanned leather, lumber, iron castings, machinery, boots and shoes, and cotton, woolen, and print goods. North Adams has an assessed property valuation of more than $13,000,000. Nearby is the E. terminus of the Hoosac tunnel. Pop. (1890) 16,074; (1900) 18,643; (1910) 22,019.

Northallerton, the capital of the North Riding of Yorkshire, England, 30 miles N. N. W. of York. It has a town hall (1874); a fine cruciform church, Norman to Perpendicular in style; a cottage hospital (1877); and sites of a Roman camp and a Norman castle of the bishops of Durham. At Standard Hill, 3 miles N., was fought, on Aug. 22, 1138, the great battle of the Standard, in which Archbishop Thurstan routed David I. of Scotland, and which got its name from the banners of St. Peter, John of Beverly, and Wilfrid, hung out from a car in the English host.

North America. See AMERICA.

Northampton, a city and county-seat of Hampshire co., Mass.; on the Connecticut river, and on the New York, New Haven, and Hartford, and the Boston and Maine railroads; 17 miles N. W. of Springfield. It comprises the villages of West Farms, Mount Tom, Smith's Ferry, Loudville, Leeds, Florence, and Bay State. Here are the Burnham and Capen schools, Clarke Institute for Deaf Mutes (endowed by John Clarke with $3,000,000), SMITH COLLEGE (*q. v.*), the State Lunatic Asylum, Dickinson Hospital, Old Ladies' Home, the Soldiers' and Sailors' Memorial Hall, the First Congregational Church, of which Jonathan Edwards was pastor, Lilly, Forbes, and Clark libraries, Cosmian Hall, and the Hillyer Art Gallery. The city has waterworks, electric street railroads, electric lights, a number of National and savings banks, and daily and weekly newspapers. The manufactures include caskets, shovels, hoes, furniture, paper, brushes, pocketbooks, wire, baskets, bicycles, sewing machines, buttons, silk goods, oil stoves, sewing silk, cutlery, cotton and woolen goods, etc. The assessed property valuation exceeds $12,000,000. Pop. (1890) 14,990; (1900) 18,643; (1910) 19,431.

Northampton, a parliamentary and municipal borough of England, capital of the county of same name, on the left bank of the Nene, which is connected with the Grand Junction canal. Northampton has several noteworthy churches, especially one of the three remarkable round churches of the country — a Norman structure of great interest; and the other more important buildings are the town hall, the shire or county hall, the corn exchange, cattle market, infirmary, etc. The staple manufacture is boots and shoes for home and

export trade. The currying of leather is also carried on on a large scale. There are also iron and brass foundries, breweries, corn mills, etc. Iron-stone is found in the neighborhood, and smelting furnaces are at work. Pop. (1901) 87,021.

North Attleboro, a town in Bristol co., Mass.; on the New York, New Haven, and Hartford railroad; 30 miles S. W. of Boston. It comprises the villages of Adamsdale, Falls Village, Robinsonville, and Oldtown. Here are the Richards Memorial Library, Holmes Memorial Building, G. A. R. Memorial Hall, high school, street railroad, electric lights, and a National bank. It has extensive manufactories of cotton yarn, braid, silverware, and jewelry, and an assessed property valuation of nearly $4,000,000. Pop. (1890) 6,727; (1900) 7,253.

North Berwick, a fashionable watering-place of Haddingtonshire, Scotland; at the entrance to the Firth of Forth, 23 miles E. N. E. of Edinburg. Behind it rises conical North Berwick Law (612 feet). Tantallon Castle 3 miles E., fronting the Bass Rock is a magnificent ruin, finely described in Scott's "Marmion." A stronghold of the Douglasses, it resisted James V. in 1528, but in 1639 was "dung down" by the Covenanters. Robert III. made North Berwick a royal burgh.

North Britain, a name often given to Scotland, it forming the extreme N. part of the island of Britain.

Northbrook, Baron. See BARING.

North Cape, the extreme N. point in Europe in lat 71° 10′ N. It is not, however, on the continent, but on the island of Magerö. The extreme N. point on the continent is Cape Nordkyn (lat. 71° 6′ N.), 6 miles farther S. than the North Cape, and some 45 miles to the E. of it.

North Carolina, a State in the South Atlantic Division of the North American Union; bounded by Virginia, South Carolina, Tennessee and the Atlantic Ocean; one of the original 13 States; number of counties, 97; capital, Raleigh; area, 48,580 square miles; pop. (1890) 1,617,947; (1900) 1,893,810; (1910) 2,206,687.

Topography.—The E. and larger portion of the State is an undulating country descending toward the low and sandy coast. The W. part is mountainous, being crossed by two ranges of the Appalachian system, one forming the Tennessee boundary. These ranges bear different names, according to locality; such as Black, Stone, and Smoky Mountains. The E. range known as the Blue Ridge encloses an irregular plateau. The highest points are Mount Mitchell, 6,732 feet, and Clingham's Peak, 6,619 feet, in the border range; and Grandfather Mountain, 5,897 feet; and Sugar Mountain, 5,312 feet; in the Blue Ridge range. The coast line has a length of 400 miles and consists of a range of low islands and sand bars, locally known as "banks," separated from the mainland by shallow sounds. The largest of the latter are Albemarle and Pamlico Sounds. From the "banks" in many places, project promontories, dangerous because of their shoals, Cape Hatteras, Cape Lookout, and Cape Fear being the chief ones. The principal rivers are the Cape Fear, flowing 200 miles through the center of the State; Roanoke, and Chowan, flowing into the State from Virginia, and the Neuse, and Tar, emptying into Pamlico Sound. Along the coast are numerous swamps and peat bogs. The great Dismal Swamp of Virginia projects into the State, and there is a large swamp between the Albemarle and Pamlico Sounds.

Geology.—The mountain ranges of South Carolina are principally of Azoic formation, and the sandy E. portion of Tertiary and Quaternary deposits. The Azoic region is represented by gneiss, granite, and crystalline schists and contains two narrow and irregular strips of coal-bearing sandstone. In 1900 the principal mineral productions were coal, 17,734 short tons, valued at $23,440; gold, 1,379 fine ounces, valued at $28,500; silver, 11,200 fine ounces, valued at $6,944; sheet mica, 107,255 pounds; scrap mica, 4,450 short tons; mineral water, 125,295 gallons, valued at $29,799; talc and soapstone, 4,522 short tons, valued at $75,308; granite, valued at $257,962; sandstone, valued at $27,210; and clay products, valued at $815,975. Other important mineral resources are phosphate rock, alum, graphite, bismuth, kaolin, whetstone, sapphires, amethysts, emeralds, corundum, garnet and tourmaline.

Soil and Productions.—The swamp land when drained, and the river bottoms have exceedingly fertile soil and yield enormous crops, especially of rice and cotton. The N. counties known as the Bright Tobacco Belt, which extends from the Piedmont almost to the coast, produces a large percentage of the yellow tobacco of the United States. The mountainous sections are valuable as grazing lands and well adapted to stock raising and dairy farming. The peanut crop of the State exceeds 100,111 bushels annually. The principal farm crops in 1900 were corn, 29,790,180 bushels, valued at $16,980,403; wheat, 5,960,803 bushels, valued at $4,887,858; oats, 5,046,117 bushels, valued at $2,270,753; rye, 411,287 bushels valued at $312,578; buckwheat, 20,813 bushels, valued at $11,655; potatoes, 1,063,471 bushels, valued at $691,258; and hay, 176,680 tons, valued at $1,978,816. The cotton crop for the crop year 1899–1900 was 218,458 bales.

Manufactures.—In 1900 there were reported 7,226 manufacturing establishments,

82° A 81°30′ B 81° C 80°30′ D 80° E 79°30′ F 79°

WESTERN PART
OF
NORTH CAROLINA
Same Scale as Main Map

84° 83°30′ 83° 82°30′ 82°

NORTH CAROLINA

SCALE OF MILES

0 10 20 30 40 50 60 70

State Capital ⊛ County Seats ⊙

Size of type indicates relative importance of places

Hammond's 8 x 11 Map of North Carolina
Copyright, 1908, by C.S. Hammond & Co., N.Y.

78°30′ West H from 78° Green. J 77°30′ K 77° L 76°30′ M 76° N 75°30′

North Carolina

employing $76,503,894 in capital and 70,570 persons; paying $13,868,430 for wages and $53,072,338 for materials; and having an annual output valued at $1,835,104,431. The chief manufactures included cotton goods, fertilizers, flour, furniture, leather, lumber, oil, and tobacco.

Banking.—On Oct. 31, 1901, there were reported, 36 National banks in operation, having $3,121,000 in capital, $1,890,832 in outstanding circulation, and $1,733,850 in United States bonds. There were also 79 State banks, with $2,542,876 capital, $461,378 surplus, and $12,489,357 in resources; 17 private banks, with $177,312 capital, $82,533 surplus, and $1,581,755 in resources; and 13 mutual and stock savings banks, with $219,100 capital, and $2,096,453 in savings deposits.

Education.—At the end of the school year, 1899–1900, the children of school age numbered 669,530; the enrollment in public schools, 400,452; and the average daily attendance 206,918. There were 6,111 buildings used for public school purposes, public school property valued at $1,097,564; and 7,387 public school teachers. The expenditures for the year amounted to $931,143 and the receipts $986,514. For higher education there were 17 public high schools, 118 private secondary schools, 6 public and 7 private normal schools, 14 universities and colleges for men and for both sexes, and 9 women's colleges. Among the colleges are the University of North Carolina at Chapel Hill, Davidson College at Davidson, Trinity College at Durham, Biddle University at Charlotte, Shaw University and the State Agricultural and Mechanical College at Raleigh, and Wake Forest College at Wake Forest. The women's colleges include the Salem Female Academy at Salem, Claremont Female College at Hickory, the Baptist Female College at Raleigh, Greensboro Female College at Greensboro, Asheville College at Asheville, and Oxford College at Oxford.

Churches.—The strongest denominations in the State are the Regular Baptist, South; Regular Baptist, Colored; African Methodist; Methodist Episcopal, South; Presbyterian, South; Methodist Episcopal; Methodist Protestant; Christian; and Disciples of Christ. In 1899 there were reported 5,905 Evangelical Sunday-schools, with 46,897 officers and teachers, and 392,707 scholars.

Postoffices and Periodicals.—In 1901 there were 3,098 postoffices of all grades, and 253 periodicals, of which 27 were daily, 14 semi-weekly, 180 weekly, 1 bi-weekly, 7 semi-monthly, and 24 monthly.

Railroads.—The total length of railroads within the State on Jan. 1, 1901, was 3,699 miles, of which 45 miles were constructed during the previous year.

Finances.—In 1901 the total funded debt of the State was $6,117,350; and the recognized unfunded debt was $230,420. The assessed valuation in 1900 was, real estate, $165,968,278; personal property, $89,923,457; and railroads, $34,447,553; total valuation, $287,339,288. The State holds railroad and other stock valued at $4,400,000.

State Government.—The governor is elected for a term of four years and receives a salary of $3,000 per annum. Legislative sessions are held biennially and are limited in length to 60 days each. The Legislature has 50 members in the Senate and 120 in the House, each of whom receives $4.00 per day and mileage. There are 9 representatives in Congress. The State government in 1901 was Democratic.

History.—North Carolina was first partially colonized by a body of English under Raleigh in 1585, but no permanent settlement was made till 1663 when Charles II. made a grant of the territory to eight English gentlemen. In 1705 an internecine conflict took place among the colonists with reference to the claims of two rival governors. From 1711 to 1713 a war was waged with the Tuscaroras and other Indian tribes, who were ultimately reduced to subjection, the Tuscaroras going to New York and becoming one of the Six Nations. In 1769 the colony declared against the right of the home government to levy taxation. North Carolina, united with the other colonies in the Declaration of Independence and made the first declaration at Charlotte, May 20, 1775. A partisan warfare next ensued between the patriots and the loyalists, which latter were in strong force throughout the State. On March 15, 1781, General Green, with a force of 4,500 men, was attacked at Guilford Court House by a body of British troops, 2,000 strong, commanded by Lord Cornwallis, but the British though claiming victory were put in such plight that the surrender of Cornwallis at Yorktown was a necessary sequence. The National Constitution was adopted in 1789. The State joined the Southern Confederacy May 20, 1861, and furnished some of the very best troops in the Confederate army, having 125,000 in service and losing 40,000 by wounds and disease. The present constitution was amended in 1875, and again in August, 1900, when the suffrage was amended so that after Jan. 1, 1908, no one who is unable to read and write can vote.

CHARLES B. AYCOCK.

North Carolina, University of, a coeducational non-sectarian institution in Chapel Hill, N. C.; founded in 1795; has grounds and buildings valued at over $625,000; endowment funds, over $200,000; scientific apparatus, etc., $75,000; volumes in the library, 55,000; average number of faculty, 95; average student attendance, 825.

Northcote, James, an English artist; born in Plymouth, England, in 1746; studied art under Sir Joshua Reynolds; became highly successful as a portrait painter; and won both wealth and reputation. Two of his best works were for the Shakespeare Gallery — the "Murder of the Two Princes in the Tower," and "Hubert and Arthur." He published "Memoirs of Sir Joshua Reynolds," comprising "Anecdotes of his Contemporaries" (1813), and a "Supplement" (in 1815); and "Memoirs of Titian" (1830), in which he was assisted by Hazlitt. He died in 1831.

North Dakota, a State in the North Central division of the North American Union; bounded by Manitoba, Northwest Territory, Minnesota, South Dakota, and Montana; admitted to the Union, Nov. 2, 1889; number of counties 39; capital, Bismarck; area, 70,195 square miles; pop. (1900) 319,146; (1910) 577,056.

Topography.— The surface of the State is chiefly undulating prairie with occasional low hills. The great plateau of the Missouri extends across the State E. of the Missouri river, and the Turtle Mountains on the Canadian border contain the highest points in the State, Butte St. Paul, 2,500 feet and Bear Butte, 2,400 feet. The principal rivers are the Missouri, navigable throughout the State, and formed by the affluents Yellowstone, Little Missouri, Heart and Cannon Ball; the Mouse entering North Dakota from Canada and returning after a long circuit; the James river, the longest unnavigable river in the world; the Cheyenne; and the Red River of the North, forming the E. boundary. This river flows through a broad level plain, 50 to 60 miles wide and sufficiently elevated to be free from inundation, and containing some of the richest bottomland mould. The James river valley is one of the most noted artesian well districts in the world. There are numerous small lakes, but the only important one is Devil's Lake in the Turtle Mountains, an inland sea, with saline water and no visible outlet.

Geology.— The entire State has been inundated several times, the glacial drift being overlaid with lake mud. The entire Red river valley is the bed of an extensive lake, and railroad excavations have found lake shore lines, with sand and gravel beds. The W. portion of the State is underlaid with lignite, a brown coal, which burns readily and makes superior gas. Natural gas has been found, and brick and potter's clay are widely distributed. The Turtle Mountain region contains valuable building stone, and the Red river valley, salt, limestone, hydraulic cement, and iron. In 1900 the coal production was 129,883 short tons, valued at $158,348 and the clay products were valued at $92,399.

Soil and Agriculture.— The soil especially in the Red river district, is exceedingly fertile, the clay subsoil being nearly as fertile as the topsoil, and both free from stones. The principal forest trees are oak, birch, aspen, cottonwood, ash, willow, box-elder, plum, and bull-cherry. The principal farm crops in 1900 were, wheat, 13,176,213 bushels valued at $7,642,204; oats, 6,299,284 bushels valued at $2,015,771; corn, 381,184 bushels, valued at $160,097; barley, 1,998,840 bushels, valued at $699,594; potatoes, 1,536,860 bushels, valued at $753,061; and hay, 247,327 tons valued at $1,397,398. In 1901 there were 38,808 farms in the State, and 6,150 ranches.

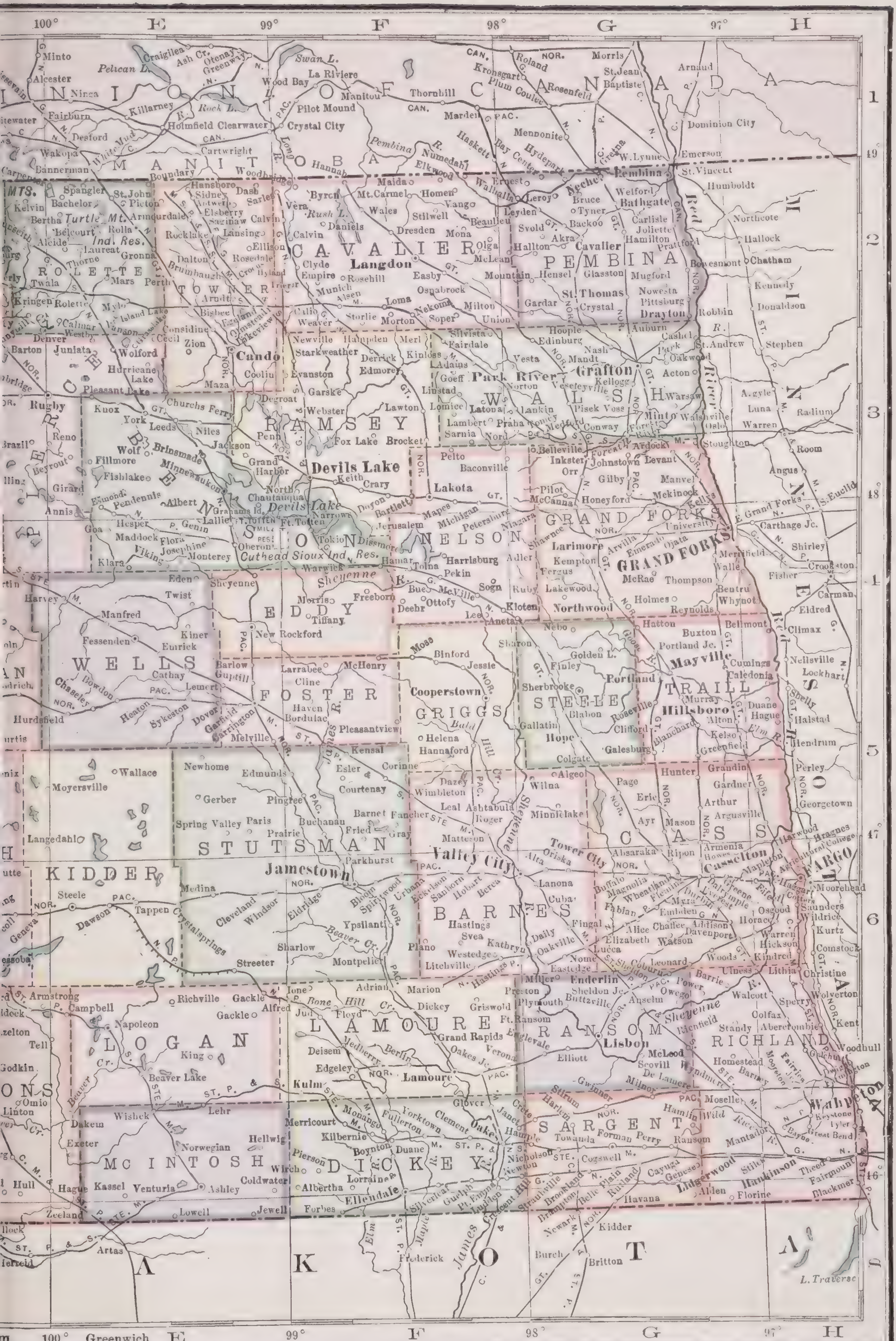
Manufactures.— In 1900 there were reported by the United States census, 1,130 manufacturing establishments, employing $5,396,490 capital and 2,398 persons, paying $1,222,472 wages, and $5,615,793 for raw materials; and having an annual output valued at $9,183,114. The greater part of the manufacturing is carried on in Fargo and Grand Forks. The principal articles of manufacture include flour and grist (70 mills), printing and publishing, masonry, saddlery and harness, packed meat, tobacco and cigars, railroad cars, carriages, and wagons, millinery, clothing, dairy products, foundry and machine shop products, timber and lumber, furniture, fire brick, and hydraulic cement.

Banking.— On Oct. 31, 1901, there were reported 36 National banks in operation, having $1,762,500 in capital, $783,676 in outstanding circulation and $728,750 in United States bonds. There were also 133 State banks, with $1,442,500 in capital, $192,866 surplus, and $7,728,224 in resources.

Education.— At the end of the school year 1899–1900 the children of school age numbered 87,130; the enrollment in public schools, 77,686; and the average daily attendance, 43,560. There were 2,601 buildings used for public school purposes, public school property valued at $2,587,866, and 4,083 public school teachers. The expenditures for the year amounted to $1,440,892 and the receipts, $1,456,496. For higher education there were 24 public high schools, 2 private secondary schools, 2 public normal schools, Northwestern Normal College, at Grand Forks, Fargo College, at Fargo, University of North Dakota, at University, and Red River Valley University, at Wahpeton. The schools had an endowment of land which was valued at about $50,000,000.

Churches.— The strongest denominations in the State are the Roman Catholic; Lutheran, Independent Synods; Methodist Episcopal; Presbyterian; Regular Baptist; Congregational; and Lutheran, General Council. In 1899 there were reported 694

NORTH DAKOTA
SCALE OF MILES
0 10 20 30 40 50
Indian Reservation Boundaries
Military Reservation Boundaries
State Capital
County Seat
Size of type indicates relative importance of places
104° A 103° B 102° C 101°
WILLIAMS
WARD
MONTRAILLE
McKENZIE
BOTTINEAU
McHENRY
McLEAN
DUNN
MERCER
OLIVER
BILLINGS
STARK
HETTINGER
MORTON
BOWMAN
ADAMS
FORT BUFORD MILITARY RESERVATION
FORT BERTHOLD INDIAN RESERVATION
STANDING ROCK INDIAN RESERVATION
MONTANA
SOUTH
Williston
Minot
Dickinson
Mandan
Bismarck
Missouri R.
Little Missouri R.
Cannon Ball R.
Heart R.
Knife R.
Riviere des Lacs
Souris or Mouse R.
Hammond's 8 x 11 Map of North Dakota
Copyright, 1909, by C. S. Hammond & Co., N.Y.
104° A 103° B 102° C Longitude 101° West



100°
E
99°
F
98°
G
97°
H
1
49°
2
3
48°
4
5
47°
6
46°
M A N I T O B A
D O M I N I O N O F C A N A D A
R O L E T T E
T O W N E R
C A V A L I E R
P E M B I N A
R A M S E Y
W A L S H
B E N S O N
N E L S O N
G R A N D F O R K S
E D D Y
W E L L S
F O S T E R
G R I G G S
S T E E L E
T R A I L L
K I D D E R
S T U T S M A N
B A R N E S
C A S S
L O G A N
L A M O U R E
R A N S O M
R I C H L A N D
M c I N T O S H
D I C K E Y
S A R G E N T
M I N N E S O T A
D A K O T A
Turtle Mt. Ind. Res.
Cuthead Sioux Ind. Res.
Devils Lake
Red River
Sheyenne R.
James R.
Pembina R.
Elm R.
Beaver Cr.
Bone Hill Cr.
Wild Rice R.
L. Traverse
Pelican L.
Swan L.
Rock L.
Langdon
Cavalier
Pembina
Drayton
Grafton
Park River
Cando
Rugby
Devils Lake
Lakota
Grand Forks
Larimore
Northwood
Mayville
Hillsboro
Portland
Cooperstown
Hope
New Rockford
Fessenden
Carrington
Jamestown
Valley City
Casselton
Fargo
Moorehead
Crookston
Lisbon
Enderlin
Wahpeton
Lamoure
Ellendale
Oakes
Ashley
Napoleon
Steele
Dawson
Minto
Emerson
Dominion City
St. Vincent
Humboldt
Hallock
Frederick
Britton
Greenwich

Evangelical Sunday-schools, with 5,376 officers and teachers, and 42,719 scholars.

Postoffices and Periodicals.— In 1901 there were 647 postoffices of all grades, and 183 periodicals, of which 7 were daily, 1 semi-weekly, 142 weekly and 8 monthly.

Railroads.— The total length of railroads within the State on Jan. 1, 1901, was 3,031 miles of which 122 miles were constructed during the previous year.

Finances.— On July 1, 1900, the total bonded debt of the State amounted to $845,000, and the floating debt, $161,093. The assessed valuation was real estate, $73,574,494; personal property, $43,629,991, including railroad property valued at $17,367,525; total valuation, $117,204,485; tax rate $4.50 per $1,000.

State Government.— The governor is elected for a term of two years and receives a salary of $3,000 per annum. Legislative sessions are held biennially and are limited in length to 60 days each. The legislature has 103 members, each of whom receives $5 per day and mileage. There is one representative in Congress. In 1901 the State government was Republican.

History.— The first permanent white settlement was made in 1780 by a party of French Canadians, near Pembina. Fur trading posts were established early in the 19th century and Lewis and Clark spent the winter of 1804–1805 in the present town of Mandan. In 1810 Lord Selkirk built a fort at Pembina, supposing it to be British soil. The region was first opened to settlement by a treaty with the Dakota Indians in 1851. In 1861 the Territory of Dakota was organized with Yankton as capital, and including Idaho, Wyoming, and Montana. The territory was divided into North and South Dakota, and these admitted to the Union as States in 1889. In November of that year the State government was formed and the first legislature convened.

North Dakota, University of, a coeducational non-sectarian institution in Grand Forks, N. D.; opened in 1883; has aggregate endowment, $2,000,000; grounds and buildings valued at over $600,000; volumes in the library, 35,000; ordinary income, $175,000; average number of faculty, 75; average student attendance, 900; graduates since opening, over 750.

Northeast Boundary Dispute, in American history, the dispute between the United States and Great Britain in regard to the northeastern boundary of the United States. The treaty of 1783 defined the boundary, but the definition was differently interpreted by the two governments. In 1831 the King of the Netherlands, as arbitrator, rendered a decision acceptable to neither party. In the disputed territory serious disturbances occurred, and actual war for a time seemed imminent. At last the controversy was settled by the Ashburton Treaty (1842), whereby the present line was defined, to the benefit of both nations. Free navigation of the St. John's river was accorded to each country, about seven-twelfths of the territory, together with Rouse's Point, was given to the United States, and other amicable provisions were agreed upon.

Northeast Cape. See CHELYUSKIN, CAPE.

Northeast Passage, a passage for ships along the N. coasts of Europe and Asia to the Pacific Ocean, formerly supposed likely to be of commercial value. The first to make the complete voyage by this passage was the Swedish explorer Nordenskjöld, after it had been from time to time attempted in vain for upward of three centuries.

Northern Drift, in geology, a name formerly given to boulder-clay of the Pleistocene period, when its materials were supposed to have been brought by polar currents from the N.

Northern Giant, a figurative designation sometimes applied to Russia, alluding to its size, its marvelous growth, and its vast population.

Northern Mythology. See MYTHOLOGY.

Northmen, a name applied to the ancient inhabitants of Scandinavia, or Norway, Sweden, and Denmark, but more generally restricted to those sea-rovers called Danes by the Saxons, who sailed on piratical expeditions to all parts of the European seas, made their first appearance on the coast of England in 787, and from the year 832 repeated their invasion almost every year, till they became masters of all the country under their King Canute, and reigned in England during the next 50 years, down to 1042, when the Saxon dynasty was restored in the person of Edward the Confessor. A Danish invasion penetrated to the Meuse in 515, but was repelled. The victories of Charlemagne over the Saxons led to a league being formed between that people and the Danes; and Gottfried, King of Jutland, with his piratical bands, ravaged the French and Spanish coasts, even as far as the Straits of Gibraltar. Their great invasion of France, however, did not take place till 841, after which the whole coast of W. Europe, from the Elbe to the Guadalquivir fell a prey to the Northmen. In 837 they had sacked Utrecht and Antwerp, and fortified themselves on the island of Walcheren, spreading themselves on the mainland. Flanders was obstinately defended; but Friesland, Lower Lorraine, and Neustria fell without resistance, Roland devastated Holland, and appeared on the Seine, while Gottfried ravaged the valleys of the Meuse and Scheldt. Hastings, at the

North Polar Expeditions

head of a band of Northmen, sacked Bordeaux, Lisbon, and Seville, defeated the Moorish conquerors of Spain at Cordova, overran Italy and Sicily, and crossed the straits into Morocco.

In 885, they laid siege to Paris, but were at length bought off by Charles the Fat. Rollo, one of the most renowned of the Norman chieftains, after ravaging Friesland and the countries watered by the Scheldt, accepted the hand of a daughter of Charles the Simple, and received with her, under the tie of vassalage, possession of all the land in the valley of the Seine, from the Epte and Eure to the sea, which then went by the name of Normandy. They rapidly adopted the more civilized form of life that prevailed in the Frankish kingdom — its religion, language, and manners — but inspired everything they borrowed with their own vitality. Their conquest of England, in 1066, gave that country an energetic race of kings and nobles, on the whole well fit to rule a brave, sturdy, but somewhat torpid people like the Anglo-Saxons. But though the Normans had acquired comparatively settled habits in France, the old passion for adventure was still strong in their blood; and in the course of the 11th century, many nobles, with their followers, betook themselves to S. Italy, where the strifes of the native princes, Greeks, and Arabs, opened up a fine prospect for ambitious designs. In 1059, Robert Guiscard, one of the 10 sons of the Norman count, Tancred de Hauteville, all of whom had gone thither, was recognized by Pope Nicholas II. as Duke of Apulia and Calabria, and in 1071 as lord of all Lower Italy. His brother and liegeman Roger conquered Sicily, 1060–1089. Roger II. of Sicily united the two dominions in 1127; but in the person of his grandson, William II., the Norman dynasty became extinct, and the kingdom passed into the hands of the Hohenstauffen family.

North Polar Expeditions, expeditions of discovery in the Arctic regions. In 1517 Sebastian Cabot was commissioned by Henry VIII. to search for a N. W. passage round America to India; and from that time onward the discovery of such a passage became a favorite project with explorers. Frobisher, Davis, Hudson, Bylot, and Baffin successively engaged in this enterprise. Then after a lapse of nearly two centuries the record of Arctic research was taken up by such men as Ross and Parry (1818), who were followed by Sir John Franklin. Franklin set sail in command of the "Erebus" and "Terror" in May, 1845, and by the month of July reached Whalefish Islands in Davis' Strait. On July 26, the ships were seen in lat. 74° 48′ N.; lon. 66° 13′ W.; after which no further intelligence concerning them was received. It was not, however, till the beginning of 1847 that serious apprehensions were entertained regarding the expedition. The most strenuous efforts were then made by both the English and the Americans to obtain tidings of Franklin. Among the numerous expeditions sent out by sea and land in search of the missing navigator and his company were those of Richardson and Rae (by land, 1847), of Moore (1848–1852), of Kellet (1848–1850), of Shedden (1848–1850), of Sir James Ross (1848–1849), of Saunders (1849–1850), of Austin and Ommaney (1850–1851), and of Penny (1850–1851). In 1850 MacClure set out by Bering Strait on a search expedition, and to him is due the honor of having ascertained the existence of the long-sought-for N. W. passage. Other expeditions between 1850 and 1855 were: Collinson's, Roe's, Kennedy's, Maguire's, Belcher's, MacClintock's, and Inglefield's. In 1853 Rae, proceeding to the E. side of King William Sound, obtained the first tidings of the destruction of Franklin's ships. In 1855 Anderson, proceeding up the Great Fish river, also discovered relics of the "Erebus" and "Terror." At length MacClintock (1857–1859) set all doubts at rest regarding the fate of Sir John Franklin and his companions by establishing the fact that they had died in 1847. Dr. Kane made some important observations during the progress of his Arctic explorations, 1853–1855. Then followed the expeditions of Dr. Isaac Hayes in 1860 and 1869, and those of Capt. Charles Hall in 1860 and 1864.

Similarly efforts were also made to discover a N. E. passage to the Pacific Ocean. In 1553 Willoughby rounded North Cape; in 1556 Burrough reached the S. point of Nova Zembla and Waigatch Island; in 1580 Pet and Jackman penetrated into the Sea of Kara; in 1594–1596 Barents discovered Bear Island and Spitzbergen, and rounded the E. point of Nova Zembla. Dashnef in 1648 discovered Bering Strait, which was rediscovered in 1728 by Bering, whose name it bears. A more correct idea of the configuration of the coast on either side of Bering Sea was first obtained by Cook in 1778; but with the exception of this, to the Russians is due nearly all the credit, till recently, of the explorations on the North Asiatic coasts. The N. E. passage was at last accomplished by Professor Nordenskjöld of Stockholm, who in 1878 sailed E. along the whole of the N. coast of Europe and Asia, emerging through Bering Strait early in 1879.

The N. portion of the American continent, in the region of the Coppermine river, was first explored by Hearne in 1771. In 1789 Mackenzie discovered the great river called after him. The N. coast E. to the Great Fish river was explored by Franklin, Richardson, and Back in two expedi-

tions by land, the first, 1819-21, and the second, 1825-26, while in 1834-35 Back, in company with King, proceeded down the Back or Great Fish river. Finally Lieutenant Schwatka headed an overland expedition in 1879-80 in search of the journals of the Franklin expedition.

Recent expeditions have generally been with the object of getting as near the pole as possible. The Germans sent out their first expedition to the polar regions in 1868 under Captain Koldeway, and a second in 1869 under the same captain. An Austrian expedition under the conduct of Lieutenants Payer and Weyprecht, dispatched in June, 1872, discovered Franz-Josef Land, to the N. of Nova Zembla. In 1875 England sent out an expedition under Captain Nares. It went up the W. side of Greenland and returned in October, 1876. One of its sledge parties reached lat. 83° 20′ N., long among the highest latitudes attained. Of later expeditions may be mentioned that of the unfortunate and ill-advised "Jeannette" (1879), sent out under the command of Lieutenant De Long, to explore the Arctic Sea through Bering Strait; those of Mr. Leigh Smith in 1880 and 1881, in the latter of which he lost his vessel; and that of Sir C. Young for the relief of the former. An expedition sent out by the United States under Lieutenant Greely (1881-1884) established a new record in the approach to the pole, reaching 83° 24′ N., 40° 46′ W., but suffered greatly from famine, losing 19 out of 26 men. In 1888, S. Greenland was crossed from sea to sea by Nansen. In 1892 Lieutenant Peary traced the Greenland coast to lat. 82° N. In 1895, Nansen reached the farthest point N. attained up to that time, 86° 14′, or only 260 statute miles from the pole; but in 1899-1900 the Duke of Abruzzi's expedition reached 86° 33′. Lieutenant Peary, U. S. N., sailed in 1899 on an expedition prepared to spend three years in search of the pole, and in 1902 reached 84° 17′. In July, 1905, Peary (now Commander) sailed from New York on his fourth expedition. He succeeded in reaching lat. 87° 6′ N., 203 miles from the goal. The possibility of utilizing air-ships for Arctic service has been much discussed. In 1907 preparations were being made by Walter Wellman for an expedition from Spitzbergen in the largest dirigible balloon ever constructed. Capt. Roald Amundsen sailed from Christiania in June, 1903, with a crew of seven men, in the "Gjöa," a walrus sloop. His chief purpose was to relocate the magnetic pole. Before the end of 1905 Captain Amundsen announced the safe arrival of the "Gjöa" in Alaskan waters. He was the first to accomplish the Northwest Passage since its discovery by McClure in 1851. He believed that the magnetic pole is not stationary. See Arctic Expeditions; Peary, Robert E.

Northrop, Cyrus, an American educator; born in Ridgefield, Conn., Sept. 30, 1834; was graduated at Yale in 1857, and at its law school two years later. In 1860 he was admitted to the bar, and in 1861 was clerk of the Connecticut house of representatives, and of the senate of the following year. He was professor of rhetoric and English literature at Yale in 1863-64, leaving there to become president of the University of Minnesota.

North Sea, or **German Ocean,** that portion of the Atlantic Ocean extending from the Straits of Dover to the Shetland Islands, bounded on the E. by Norway and Denmark; on the S. by Hanover, the Netherlands, Belgium, and France, and on the W. by the British Islands; length, 700 miles; breadth. 420 miles. It communicates with the Atlantic by the Straits of Dover and Pentland Firth, and with the Baltic by the Skager-rack, the Cattegat, the Sound, and the Great and Little Belts. It receives the waters of the Elbe, Rhine, Weser, and Scheldt, on the E., and the Thames, Ouse, Humber, Tyne, Tweed, Forth, and Tay on the W. Navigation is very difficult and dangerous, owing to the sand banks along the English coasts, and extending N.-E. from the Firth of Forth, and one N. W. from the mouth of the Elbe. The fisheries of the North Sea are important, and employ many thousands of people. Lights both stationary and floating are placed along the difficult parts of the coasts for the convenience of traffic, which of late years is enormous.

North Sea and Baltic Canal. See Baltic and North Sea Canal.

North Star. See Pole Star.

Northumbria, the extreme N. of the ancient English kingdoms, stretching from the Humber N. to the Firth of Forth, and separated W. from Cumbria and Strathclyde by the Pennine range and the Ettrick Forest. Bernicia, the district N. of the Tees, had for its first king Ida (547-559), who built Bamburgh as his capital. His grandson, Ethelfrith, mounted the throne in 593, and having married the daughter of Ella, who in 560 had formed the kingdom of Deira out of the district between the Tees and the Humber, set aside the rights of his boy brother-in-law Edwin, and so united both Bernicia and Deira into one kingdom. But the ousted Edwin, returning, defeated and killed the usurper in 617, and himself became King of the Northumbrians as well as Bretwalda. Under him Northumbria was Christianized. In 633 he fell in battle against Penda of Mercia and the Welsh Cadwallon, but a year later St. Oswald, son of Ethelfrith, cleared the country of the invaders, and united both divisions under his rule. His brother and successor, Oswy, was forced to yield Deira to Oswin, son of Osric, but in 654, by a great victory in which Penda perished, was able to unite his kingdom. He reigned till 670.

Northwest Boundary Dispute, a dispute between the United States and Great Britain regarding the northwestern boundary of the United States. It was a part of the contest for possession of the Oregon territory, to which claims were also advanced by Russia and Spain. By 1825, however, settlements with these countries were made, the dispute continuing between Great Britain and the United States. A strong American party demanded as the northern boundary latitude 54° 40′, and "Fifty-four forty, or fight" and "All of Oregon or none" became political watchwords. By a compromise in 1846, latitude 49° was agreed upon as the boundary from the Rocky mountains to the channel between Vancouver Island and the mainland, navigation of the waters involved being left free to both parties. See SAN JUAN BOUNDARY.

Northwestern Provinces, the former designation of the United Provinces of Agra and Oudh (*q. v.*).

Northwestern University, a coeducational institution in Evanston, Ill., founded in 1851, under the auspices of the Methodist Episcopal Church; has endowment funds of over $4,250,000; grounds and buildings valued at over $2,500,000; scientific apparatus, etc., $300,000; volumes in the library, 128,000; ordinary income, over $1,000,000; average number of faculty, 375; average student attendance, including summer school, 4,800.

Northwest Territories. This term is loosely applied to all that portion of Canada which is not organized in provinces, including the districts of Ungava, Keewatin, Mackenzie, Yukon, and Franklin. Officially, the Northwest Territories of Canada in 1907 were composed of the districts of Mackenzie (area, 562,182 square miles, 29,548 square miles being under water), Ungava (area, 354,961 square miles, 5,852 square miles under water), and Franklin (area, broadly estimated at 500,000 square miles). Total area of these territories, 1,417,143 square miles. The extensive district of Keewatin, which lies between Hudson bay and Fox channel on the E. and Mackenzie district and the provinces of Manitoba and Saskatchewan on the W., was created by an act passed in 1876, out of that portion of the Northwest Territories lying to the N. and W. of Manitoba. It was not included in the Northwest Territories, but was placed under the control of the lieutenant-governor of Manitoba. Its area is 516,571 square miles, of which 16,380 square miles are water. The territory of Yukon also has a government distinct from that of the Northwest Territories. The Northwest Territories are bounded on the N. by the Arctic Ocean; on the W. by the Yukon Territory; on the E. by Baffin bay and the coast portion of Labrador, which is a dependency of Newfoundland; and on the S. by the provinces of British Columbia, Alberta, Saskatchewan, and Quebec, and Keewatin district. They are governed by a commissioner and a council of 4 members, appointed by the governor-general in council at Ottawa. They are almost wholly unsuited to agriculture on account of the short summer and the long, rigorous winter. The soil of Ungava is rocky; but the valley of the Mackenzie river, which drains the larger part of the Mackenzie district, has forests of spruce, pine, tamarack, and aspen poplar.

History.—This immense region with undefined boundaries was formerly under the jurisdiction of the Hudson's Bay Company. In 1869 it was surrendered to Canada for the sum of £300,000. In 1870 the province of Manitoba was formed out of it; in 1876 Keewatin was made a district; in 1882 the districts of Athabasca, Alberta, Saskatchewan, and Assiniboia were formed; in 1895 the remaining portion was divided into the districts of Mackenzie, Franklin, and Ungava. In 1901 the Yukon Territory was organized, and in 1905 the provinces of Alberta and Saskatchewan were formed out of the districts of Athabasca, Alberta, Saskatchewan, and Assiniboia.

Norton, Andrews, an American theologian; born in Hingham, Mass., Dec. 31, 1786; was graduated at Harvard in 1804, and was Dexter professor of sacred literature there in 1819-30. He was a distinguished exponent of Unitarianism. His chief writings are "Reasons for not Believing the Doctrines of Trinitarians" (1833) and two works on "The Genuineness of the Gospels." He died in Newport, R. I., Sept. 18, 1853.

Norton, Caroline Sheridan, an English author; born in London in 1808; granddaughter of Richard Brinsley Sheridan. Her poems include: "The Sorrows of Rosalie" (1829); "The Undying One" (the Wandering Jew, 1830); "The Child of the Islands" (1845); and "The Lady of La Garaye" (1862); her novels, "Stuart of Dunleath" (1847); "Lost and Saved" (1863); and "Old Sir Douglas" (1868). She died June 15, 1877.

Norton, Charles Eliot, an American author; born in Cambridge, Mass., Nov. 16, 1827; was graduated at Harvard in 1846; entered a commercial office in Boston; in 1849 went to India and Europe; and thenceforward led the life of a scholar. He became professor of the history of art at Harvard in 1875. His works include: "Considerations on Some Recent Social Theories" (1853); "The New Life of Dante" (1859); "Notes of Travel and Study in Italy" (1860); "Historical Study of Church-Building in the Middle Ages" (1880); "The Divine Comedy of Dante" (1891-92). He also edited writings of Carlyle, Emerson, Lowell, etc. He died Oct. 21, 1908.

Norton, Charles Ledyard, an American author; born in Farmington, Conn., in 1837. He was graduated at Yale in 1859; was editor of the "Christian Union" 1869–1879, and in 1893 became editor of "Outing." His chief works are "Canoeing in Kanuckia" (1878), with J. Habberton; "Handbook of Florida" (1890); "A Medal of Honor Man; or, Cruising among Blockade-Runners" (1896); and "A Soldier of the Legion." He died in 1909.

Norton, Charles Stewart, an American naval officer; born in Albany, N. Y., Aug. 10, 1836; was graduated at the United States Naval Academy in 1855; and was promoted rear-admiral in 1897. During the Civil War he served with distinction at Charleston, Hampton Roads, and Port Royal. He commanded the South Atlantic station in 1894–1896, and was in charge of the Washington navy yard and station in 1896–1898. He was retired in 1898 on reaching the age limit.

Norton, Thomas, an English dramatist; born in Bedfordshire, England, in 1532. He owes his place in literature to the fact that he was joint author with Sackville of the earliest English blank-verse tragedy called "The Tragedie of Gorboduc" (1560–1561), based on the legendry history of a British king. He died in 1584.

Norwalk, a town in Fairfield co., Conn.; on the Norwalk river, and on the New York, New Haven, and Hartford, and the Long Island Sound railroads; 60 miles S. W. of Hartford. Here are Norfolk and South Norwalk Public Libraries, Roberts Military School, Norwalk and St. Mary's Hospitals, Baird Institute, the Center and Over River High Schools, Norwalk Preparatory School (P. E.), Mead School for Girls, electric lights, electric street railroads, waterworks, National and savings banks, and several daily and weekly newspapers. The town has manufactures of paper boxes, stoves, earthenware, machinery, builders' hardware, air compressors, locks, cigars, elastic webbing, woolen goods, corsets, shirts, shoes, straw and fur hats, etc. It also has a large coast trade, and an extensive oyster industry. The assessed property valuation is $14,000,000. Pop. (1900) 19,932; (1910) 24,211.

Norwalk, a town and county-seat of Huron co., O.; on the Lake Shore and Michigan Southern railroad; 56 miles W. S. W. of Cleveland. It has a public library, waterworks, electric street railroad, National banks, several daily and weekly newspapers, and manufactories of organs, shoes, plows, sewing machines, tobacco, and umbrellas, besides railroad machine shops. The assessed property valuation exceeds $2,500,000. Pop. (1900) 7,074; (1910) 7,858.

***Norway** (Norwegian, Norge), a country in the N. of Europe, bounded on the N. E. by Russian Lapland, and E. by Sweden, and washed on all other sides by the sea; by the Arctic Ocean on the N., the Atlantic and the North Sea on the N. W. and W., and the Skager Rack on the S. It is about 1,080 miles in length; its greatest breadth is about 275 miles; but toward the N. it narrows in some places to 20 miles; area, 124,445 square miles; pop. (1900) 2,239,880; (1909, est.) 2,352,786. Capital, Christiania.

Topography.—The coast consists chiefly of bold precipitous cliffs, and is remarkable both for the innumerable islands by which it is lined, and the bays or fiords which cut deeply into it in all directions. The surface is very mountainous, particularly in the W. and N. Very commonly the mountain masses assume the form of great plateaus or table-lands, called fjelds or fields, as the Dovre Fjeld, Hardanger Fjeld, etc. The highest summits belong to the Sogne Fjeld, a congeries of elevated masses, glaciers, and snow fields in the center of the S. division of the kingdom, where rise Galdhöppigen (8,400 feet), the Glittretind (8,384), and Skagastölstind (7,879). The few important rivers that Norway can claim as exclusively her own have a S. direction, and empty into the Skager Rack. Of these the chief are the Glommen, 350 miles long, and the Drammen, 160 miles. The principal rivers in the N. are the Tana, which forms part of the boundary between Norway and Russia, and falls into the Arctic Ocean, and the Namsen, flowing into the Atlantic. The prevailing rocks of Norway are gneiss and mica-slate, of which the loftier mountains are composed. The most important minerals are iron, copper, silver, and cobalt, all of which are worked to a limited extent.

Climate.—The climate of Norway is severe on the uplands and in the interior bordering on Sweden. The harbors on the W. are never blocked with ice. Inland, even at places far S., this condition is frequent.

Industries.—The farms are generally the property of those who cultivate them, and commonly include a large stretch of mountain pasture, often 40 or 50 miles from the main farm, to which the cattle are sent for several months in summer. Stock-raising is an extensive and profitable branch of Norwegian agriculture. The horses are vigorous and sure-footed, but of a diminutive size; the ponies are among the best of their kind, and are often exported. The reindeer forms the principal stock in the extreme N. Among wild animals are the wolf, bear, elk, deer, fox, and lynx. The fisheries of Norway are of great value; they include cod, herring, mackerel, salmon, shark, walrus, seal, and lobster fisheries, the cod and herring fisheries being by far the most important. Norway is one of the best angling countries

*For Map, see SWEDEN.

in the world. Manufactures include cotton, woolen, flax, and silk tissues. Distilleries, brick works, saw and flour mills, are numerous; and there are foundries, machine works, lucifer-match works, tobacco factories, and sugar refineries.

Commerce.—The export trade includes fish, timber, wood pulp, whale and seal oil, metals, skins, feathers, furs, matches. The chief imports are grain, textile goods, wool, sugar, coffee, tobacco, wine, brandy, petroleum, etc. In 1905 the imports aggregated in value $83,706,000; exports, $50,631,000.

Finances.—In 1905 the revenue was $25,703,000; the expenditure, $26,634,000; and the debt, $84,700,000.

History.—In early times Norway was divided among petty chiefs (jarls), and its people were notorious for piracy (see NORTHMEN). Harold Haarfager, who ruled from 863 to 930, brought the whole country under his sway, and was succeeded by his son Eric. He was driven from the throne, which was seized in 938 by his brother, Haco I., who had embraced Christianity. Magnus the Good, son of St. Olaf and Alfhild, an English lady of noble birth, was called to the throne in 1035, and in 1042 he succeeded to that of Denmark and united both in one monarchy (see DENMARK). After his death the crowns of Norway and Denmark again passed to different sovereigns. In 1319 the crowns of Norway and Sweden became for a short time united in the person of Magnus V. In 1397, by the treaty of Calmar, the union of Denmark, Sweden, and Norway, under Margaret of Denmark, was ratified, and in 1412 Eric of Pomerania, her successor, was crowned king of the triple kingdom. Sweden afterward for a time became a separate kingdom; but the union between Denmark and Norway was drawn closer and closer, and very much to the disadvantage of the latter, which was ultimately degraded into a mere dependency of the former. The subsequent history of Norway becomes for a long period merely a part of that of Denmark. After the defeat of Napoleon by the Allies in 1813, it was arranged by the treaty of Kiel, in 1814, that Denmark must cede Norway to Sweden, and the result was the union of the two countries under the Swedish crown. The union was accompanied with a certain amount of friction, partly owing to the democratic character of the constitution of Norway, in which country titles of nobility were abolished early in the nineteenth century. The right claimed by the king to veto absolutely bills passed by elected representatives met with an overwhelming protest from the people, the contest lasting till 1884. A grave constitutional struggle later arose between the two countries from the demand for greater independence for Norway in her foreign policy. A referendum vote in favor of dissolution was taken Aug. 13, 1905; and by another vote on Nov. 18, Prince Charles of Denmark was elected king. He accepted the throne as Haco VII., Nov. 20. The government is a limited hereditary monarchy. The king, except in a few cases, is not allowed to nominate any but Norwegian subjects to public offices under the crown. He has the veto power over acts of the Storthing or legislative assembly. Members of the Storthing are elected every three years by direct vote of the qualified citizens. It has two chambers, the Odelsthing, containing three-fourths of the members, and the Lagthing, one-fourth. The country is divided into districts, each electing one representative. The great body of the people are Protestants of the Lutheran confession, which is the state religion, but other sects are freely tolerated. Elementary education is gratuitous and compulsory. Besides primary schools, there are many secondary schools. There is but one university, that of Christiania. The people are almost entirely of Scandinavian origin. More than half of the inhabitants live on the coast and along the numerous fiords. Most of the towns are small, the majority of the people living in the rural districts. The chief ports are Bergen, Christiania, and Trondhjem. The capital is Christiania. See SWEDEN.

Norway Maple, a tree of the genus *Acer* (*A. platanoides*), having large handsome leaves, heart-shaped, five-lobed, glossy, and deep green. It is a native of the northern and midland parts of continental Europe. Its wood is valued for turning, and sugar is made from its sap.

Norway Spruce. See FIR.

Norwegian Luther College, an educational institution in Decorah, Ia.; founded in 1861, under the auspices of the Lutheran Church; has grounds and buildings valued at over $130,000; volumes in the library, about 15,000; average number of faculty, 15; average student attendance, 190.

Norwegian Stove, an apparatus which may be used either to retain heat derived from other sources or serve as a refrigerator. It consists of a square wooden box lined with a soft, non-conducting substance; cow's hair is the substance actually employed. The lid is similarly lined. The interior is arranged for one or more saucepans, which, when inserted in the stove, are completely surrounded by the material. The meat or other substance in the saucepan being brought to the boiling-point in the ordinary manner, the pan is inserted in place in the stove, where the radiation of heat being prevented by the lining, the contents remain at a boiling heat a sufficient time to insure their being thoroughly cooked. When used as a refrigerator, the lining prevents the access of warm air to the cooler object within. No heat is ever

applied to the apparatus, which is designed merely to maintain the temperature of an object already heated. It is only adapted for articles cooked by water or steam.

Norwich, city; one of the county-seats of New London co., Conn.; on the Thames river, and on the Central Vermont and the New England railroads; 13 miles N. of New London. It comprises the villages of Greeneville, Yantic, Norwich Town, Fair Ground, Norwich, and Taftville. Here are a Free Academy, the Otis Free Academy, a public hospital, Norwich libraries, electric street railroads, gas and electric lights, National banks, and several daily and weekly newspapers. It has manufactures of firearms, locks, cotton and woolen fabrics, printing presses, bicycle chains, type, silk ribbons, electrical supplies, leather, belting, machinery, rolled and cast iron, harness, stoves, furnaces, nickel-plated goods, hosiery, etc., and an assessed property valuation of $10,282,675. Pop. (1890) 16,156; (1900) 17,251; (1910) 20,367.

Norwich, a town and county-seat of Chenango co., N. Y.; on the Chenango river, the Chenango Canal, the Lackawanna, and the New York, Ontario, and Western railroads; 41 miles N. N. E. of Binghamton. It contains a stone court house, circulating libraries, National banks, and several weekly newspapers, and has manufactures of pianos, blast-furnaces, hammers, carriages, drugs and medicines, silk goods, chairs, machinery, etc. The assessed property valuation exceeds $2,000,000. Pop. (1900) 7,004; (1910) 7,422.

Norwich, a city of England, capital of the county of Norfolk, on the river Wensum, 56 miles N. E. of Cambridge, and 96 miles N. N. E. of London. It is 5 miles in circumference, and is skirted on the N. and E. by the river. Prominent among the public buildings are the castle, built about the 10th century, the cathedral in the Norman style, the corn exchange, town hall, and St. Andrew's Hall. There is also a public library of 20,000 volumes, and the library of the Norwich Literary Institution of 15,000 volumes. Its manufactures include bandanas, bombazines, shawls, crapes, gauzes, damasks, camelets, muslins, silk, and cotton fabrics, and shoes; also iron and brass foundries, oil, corn and mustard mills, etc. Pop. (1901) 111,728.

Nose, the organ of smell, consisting of two parts, one external, the nose, the other internal, the nasal fossæ. The nose is a triangular pyramid projecting from the center of the face, above the upper lip, divided internally by the septum or columna into two, forming the nostrils. The sense of smell is produced by the action of the olfactory nerve on the meatuses of the nasal fossæ.

Nosology, that branch of medicine which treats of the distribution and arrangement of diseases into classes.

Nostalgia, homesickness; a form of melancholia sometimes occurring in persons who have left their homes. The symptom from which it derives its name is an intense desire to return home; and this is accompanied by great mental and physical depression, which may end fatally.

Nostoc, or **Nostock,** in botany, the typical genus of the sub-order or order *Nostochineæ,* or *Nostocheæ,* or *Nostochacæ.* The definitely formed hard pellicle of the rind inclosing the frond is composed of a gelatinous substance, globose, lobed or forked, imbedded in which are numerous more or less beaded filaments, or necklace-like lines of globules, some of which are larger than the rest. Reproduction is by cell division of the endochrome of these larger cells, or by zoöspores. The species are generally green, though sometimes blue. They are found on damp ground, wet rocks, mosses, etc., and in fresh water, either free or attached to stones. According to Fries, *N. lichenoides* and *foliaceum* are the the lichens *Collema limosum, C. flaccidum,* etc., surcharged with water.

Nostradamus, Michel, a French astrologer; born in St. Remy, Provence, France, Dec. 14, 1503. After graduating in medicine at Montpelier, in 1529, he acquired the reputation of a skillful physician by successfully arresting the progress of a pestilential disease. But he aimed at the character of an astrologer and adept in the occult sciences, and published a volume of obscure metrical rhapsodies in 1555, under the title of "Prophetical Centuries." Though some persons regarded these with contempt, and the author as an imposter, there were not wanting persons of distinction who had faith in these prognostics; one of which bore so remarkable an allusion to the death of Henry II., that Nostradamas received many presents, and was appointed first physician to Charles IX., who came himself in person to Salon, where Nostradamus then resided, for the purpose of visiting him. He died in Salon, France, July 2, 1566.

Nota, Alberto, an Italian dramatic poet; born in 1755. Of his numerous comedies, "The Proud Woman," a graphic and amusing description of manners, is perhaps the best. Many of them have been translated into French, Spanish, German, etc. He died in 1847.

Notables, Assembly of. One of the stipulations obtained by the nobles from Louis XI. of France, by the treaty of St. Maur (Oct. 29, 1465), was, that he should call an assembly of notables, to consist of 12 prelates, 12 knights and squires, and 12

lawyers. The Guises summoned an assembly of notables at Fontainebleau, Aug. 20, 1560. L'Hôpital caused one to be assembled at Moulins in January, 1566. Richelieu assembled one in Paris in 1626. An assembly of notables was summoned by the advice of Calonne, to consider how the financial difficulties of the country were to be met, Jan. 29, 1787. It met Feb. 22, and was dismissed May 25. They were again convoked by the king, with the concurrence of Necker, Nov. 6; but their resistance to innovations compelled the court to half measures, which helped to prepare the way for the revolution.

Notary, a public official authorized to attest signatures in deeds, contracts, affidavits, and declarations. They protest bills of exchange and notes, draw up protests after receiving affidavits of mariners and masters of ships, and administer oaths. Also called a notary public.

Originally, among the ancient Romans, a person employed to take notes of trials, proceedings in courts, contracts, etc., a shorthand writer. This kind of work was at first usually performed by slaves, but the notarii, as they increased in ability and raised themselves above the servile ranks, gradually assumed the duties and functions of the tabelliones, writers who, under the Roman law, were employed in drawing up contracts, wills, and commercial documents, and the work which fell to them in this capacity corresponded very closely to some of the business now undertaken by the modern notary public, the solicitor, attorney and conveyancer.

Notation, a marking. In architecture it is a system of signs, marks, or characters appended to figures, when used to denote dimensions on drawings, as ′ for feet, ″ for inches, ‴ for parts; as 10′ 6″ = 10 feet, 6 inches. In arithmetic it is a system of figures or characters used to represent numbers. Two methods of so doing are at present in use, the Roman and the Arabic.

In the Roman method seven characters are employed called numeral letters. These standing separately represent the following numbers: I. for 1, V. for 5, X. for 10, L. for 50, C. for 100, D. for 500, M. for 1,000. By combinations of these characters, in accordance with the following principles, every number may be expressed: (a) When a letter stands alone, it represents the number given above, as V. for 5; (b) when a letter is repeated the combination stands for the product of the number denoted by the letter by the number of times which it is taken: thus, III. stands for 3, XXX. for 30, etc.; (c) when a letter precedes another, taken in the order given above, the combination stands for the number denoted by the greater diminished by that denoted by the less: thus, IV. stands for 5 less 1, *i. e.*, 4; XC. for 100 less 10, *i. e.*, 90, etc.; (d) when a letter, taken in the order given above, follows another, the combination stands for the sum of the numbers denoted by the letters taken separately; thus, XI. stands for 10 plus 1, *i. e.*, 11; LV. for 50 plus 5, *i. e.*, 55; CIV. for 100 plus 4 [IV. = 5 less 1, *i. e.*, 4 as in (c)], *i. e.*, 104; MDCCCLXXXV. for 1885. This method of notation is now little used except for dates, headings of chapters, etc.

In the Arabic, or rather the Hindu, method, introduced by the Arabs into Europe at the close of the 10th century, numbers are represented by the symbols, 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, and their combinations according to conventional rules. The characters are called figures or digits, and taken in their order, stand for naught, one, two, three, four, five, six, seven, eight, nine; the value of the unit depends on the place which the figure occupies in the scale adopted. The value of each figure or digit increases in a tenfold ratio from the right to the left; the number of places of the digit from the right to the left indicating the power of 10 and the digit itself to the number of such powers intended to be expressed: thus, 10 = 10 taken once = 10; 200 = 10 squared taken twice = 2×10^2; 7,656 = $7 + 10^3 + (6 \times 10^2) + (5 \times 10) + 6 = 7{,}656$, the values of the places being as follows: 7 (thousands), 6 (hundreds), 5 (tens), 6 (units).

Notation in chemistry is the written language of that science. The system now in use belongs exclusively to modern times, but in all ages signs of some kind or other seem to have been employed to represent the various kinds of matter. In 1815 Berzelius proposed the use of the initial letter of the element, and the employment of coefficients to express the number of the same atoms in the compound, bringing chemical notation almost to its present state. Thus sulphate of soda = Na_2SO_4, indicating that the compound is formed of two atoms of sodium (natrium), one of sulphur, and four of oxygen. In organic compounds, the constitution of which is known, the symbols are so arranged as to show the various groups of radicals $\begin{matrix}CH_3\\CO(C_2H_5)O\end{matrix}$ = ethylic acetate, but butyric acid, with the same number of atoms, is expressed by $\begin{matrix}CH_3(CH_2)_2\cdot\\COHO\end{matrix}$.

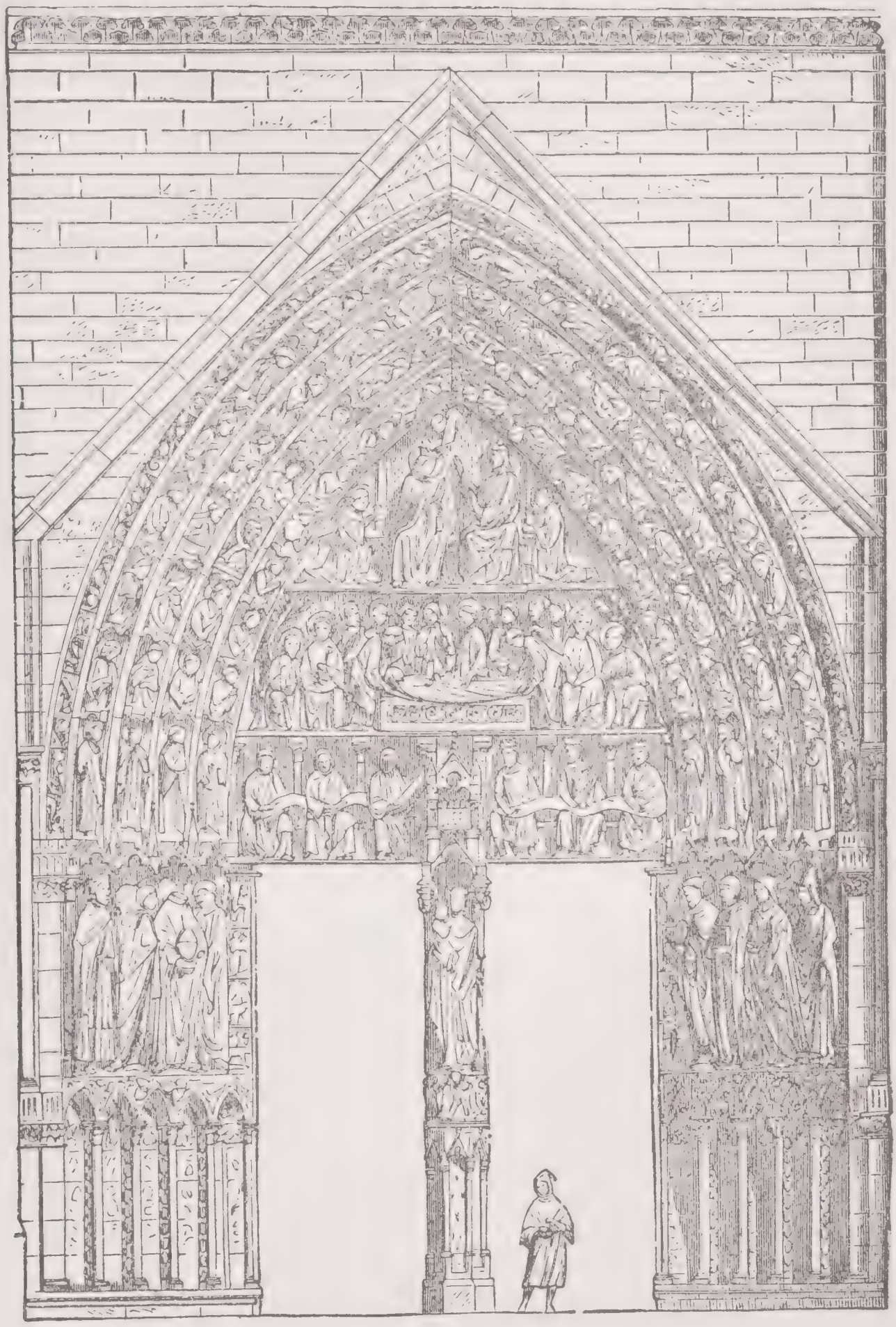
In mathematics, the conventional method of representing mathematical quantities and operations by means of symbols.

In music, the system or method of expressing musical sounds in writing, by means of signs, characters, figures, or marks.

Note, in music, a character which, by its place on the staff, represents a sound, and by its form determines the relative time or continuance of such sound.

are developed in its surrounding sheath. It is often spoken of as the chorda dorsalis.

Notornis, a gigantic coot, with rudimentary wings, from the post-Tertiary



PORTAL OF CHURCH OF NOTRE DAME.

Notochord, in animal physiology, a fibrocellular rod which is developed in the embryo of vertebrates immediately beneath the spinal cord. It is persistent in the lower vertebrates, but in the higher is replaced in the adult by the vertebræ, which

geological formations of New Zealand, which may possibly be still living. A living example was taken by some sealers in Dusky Bay in 1859, and described by Walter Mantell. The head, throat, and under-surface dark-blue; rump, upper tail co-

verts, less wing coverts, and scapulars brownish-green; wing-feathers blue, with broad terminal bands of verditer-green; bill bright red, tarsi and toes lighter, claws horn-color.

Nototherium, an extinct genus of marsupial or kangaroo-like animals, the fossil remains of which are found in deposits of Upper Pliocene age in Australia. The *N. Mitchelli* is a described species of this extinct genus.

Not Proven, in Scotch law, a verdict returned by a jury when there is not sufficient evidence to convict the prisoner at the bar, while there is some apparent foundation for the charge. Its practical effect is equivalent to a verdict of "not guilty," and the accused cannot be tried afterward for the same offense.

Notre Dame, a title of the Virgin Mary, and the name of many churches in France, and particularly of the great cathedral at Paris, which was founded in the 12th century, and forms a prominent object in the city. The corner stone of Notre Dame de Paris was laid in 1163 by Pope Alexander III., who was then a refugee in Paris, but the building was not finally completed for 100 years. In 1845 the church was thoroughly restored, and the edifice became one of the most imposing in all ecclesiastical architecture. The interior is 132 yards long, 53 yards wide, 37 yards high, and contains 37 chapels. The great bell in the S. tower which weighs about 30,000 pounds, was cast in 1686; and the stained glass of the three famous rose windows dates from the 13th century. Owing to its position in the heart of the old city Notre Dame does not present a striking appearance; it is only on nearer approach and when the marvellous sculptures are examined in detail that its claim to preëminence among French churches is recognized.

Notre Dame, University of, an educational institution in Notre Dame, Ind.; founded in 1842 under the auspices of the Roman Catholic Church; has grounds and buildings valued at over $2,000,000; scientific apparatus, etc., $200,000; volumes in the library, about 60,000; ordinary income, $100,000; average number of faculty, 85; average student attendance, 1,000.

Nott, Eliphalet, an American educator; born in Ashford, Conn., June 25, 1773. He was ordained a Presbyterian minister in 1795. After holding pastorates in Cherry Valley and Albany, N. Y., he became president of Union College in 1804, where he remained till his death. His chief works are: "Counsels to Young Men" (1810), and "Lectures on Temperance" (1847). His funeral sermon on the death of Alexander Hamilton was famous, and in the school readers for many years. He died in Schenectady, N. Y., Jan. 29, 1866.

Nottingham, a town near the middle of England, capital of the county of same name, on the Leen, near its junction with the Trent, 110 miles N. W. of London. It occupies a picturesque site overlooking the Vale of Trent, and has one of the finest and largest market places in the kingdom. The castle, which crowns the summit of a rock, rising 133 feet above the level of the Leen, was originally built by William the Conqueror as a means of overawing the outlaws frequenting the recesses of Sherwood Forest. Dismantled during the Protectorate, it subsequently became the property of the Duke of Newcastle, who in 1674 erected a large mansion on part of the site. This, after being partly burned in riots connected with the reform movement in 1831, now contains the Midland Counties Art Museum, free library, etc. The principal educational and literary institutions are the University College and Technical School, high school for boys, the Blue-coat School, the school of art, the People's Hall, and the Mechanics' Institute. An arboretum covering 18 acres is a feature of the town. The staple manufactures are hosiery and lace, the latter being a sort of specialty. There are also manufactures of cotton, woolen, and silk goods, and of articles in malleable and cast iron. Nottingham was a place of importance in Anglo-Saxon times, and was twice or thrice taken by the Danes. Charles I. raised his standard here in 1642, and next year the town and castle were taken by the Parliamentarians. Serious riots, occasioned by the introduction of machinery, took place in 1811–1812 and 1816–1817. Pop. (1901) 239,753.

Nottingham, Heneage Finch, 1st Earl of, an English statesman; born in Eastwell, England, Dec. 23, 1621. He was an ardent royalist, was called to the bar in 1645, and at the Restoration was appointed solicitor-general, in which capacity he signalized his zeal in the prosecution of the regicides. In 1661 he was elected member for the University of Oxford and obtained a baronetcy, and six years afterward took a prominent part in the impeachment of the Earl of Clarendon. In 1670 he became attorney-general, and in 1675 he obtained the chancellorship. In 1681 his services were rewarded with the earldom of Nottingham. Dryden has handed down to posterity his portrait in "Absalom and Achitophel," under the character of Amri. He died Dec. 18, 1682.

Noumenon, in Kant's philosophy, an object conceived by the understanding or thought of by the reason, as opposed to a phenomenon, or an object such as we represent it to ourselves by the impression

which it makes on our senses. The noumenon is an object in itself, not relatively to us.

Noue, François de la, called BRAS DE FER (Iron Arm), a French Huguenot commander: born near Nantes, France, in 1531. His "Political and Military Discourses" (1587) are deemed masterpieces. He was killed at Lamballe, France, in 1591.

Noun, a name; a word used to denote any object of which we speak, whether animate or inanimate, material or immaterial. Nouns include: abstract substantives, like "virtue," which denote the qualities of things simply, significative only of mental conceptions; and concrete substantives, in which a single attribute stands synecdochically for many. Concrete nouns are subdivided into proper, common, collective, and material. Proper nouns, are such as are the names of individual persons or things; as Thomas, Rome. Common nouns are the names of a class of things: as, book, house, horse. Collective nouns are the names of aggregates: as, army, fleet, flock. Material nouns are the names of materials or substances; as, gold, iron, water. Some grammarians class adjectives as well as substantives as nouns, distinguishing the former as nouns-adjective and the latter as nouns-substantive.

Noureddin, Malek=al=adel Nour=ed=Deen Mahmoud, Sultan of Syria and Egypt; born in Damascus, Turkey, Feb. 21, 1116. He succeeded his father in 1145, and continued the war with the Christians; his success in which, and especially his complete conquest of Edessa gave occasion to the second crusade, preached by St. Bernard, and led by Louis VII. and the Emperor Conrad III. Noureddin compelled the crusaders to raise the siege of Damascus. Their own want of discipline was fatal to success, and in 1149 they retired. The Sultan immediately attacked and defeated Raïmond, prince of Antioch, who fell in the battle. The next year he unsuccessfully besieged Tell-basher, a dependency of Edessa held by Josceline de Courtenay; but he soon after captured Josceline, and made himself master of Edessa. In 1154 he added Damascus to his dominions, and made the city his capital. The war continued, and in 1159, Noureddin was defeated by the Christians near the lake of Gennesareth, and was menaced by the Greek Emperor Manuel Comnenus. By giving up to Manuel all the Christian captives, 6,000 in number, he induced him to relinquish his enterprise. And soon after one of his generals defeated and made prisoner the famous Renaud de Chatillon, who was kept in captivity at Antioch for 16 years. Noureddin being called in to support one of the rival claimants to the caliphate of Egypt, effected the conquest of it, and made it his own. The great Saladin was governor, but was ambitious of being an independent sovereign, and refused to obey the orders of Noureddin. The latter was preparing to pass into Egypt, when he was attacked with the quinsy, and died at Damascus, May 15, 1174.

Nourse, Henry Stedman, an American author; born in Lancaster, Mass., April 9, 1831; was graduated at Harvard University in 1853; Professor of Ancient Languages at Phillips Exeter Academy in 1853–1855; captain of the 55th Illinois volunteers, and commissary of musters, 17th Army Corps, in 1861–1865; member of the Massachusetts House of Representatives in 1883; and of its Senate in 1885–1886. He became a member of various institutions and historical societies, and published a large number of books, among them "Early Records of Lancaster, 1643–1725" (1884); "The Story of the 55th Regiment of Illinois Infantry" (1887); "History of the Town of Harvard, Mass."; etc. He died Nov. 14, 1903.

Novalis, pseudonym of FREDERICK VON HARDENBERG, a German writer; born in Wiederstädt, Prussia, May 2, 1772. He was the son of Baron von Hardenberg, and was sent in 1790 to the University of Jena; after which he passed to that of Leipsic, in 1792. About the year 1797 he published his "Hymns to Night"; and between that time and the year 1801, when his premature death took place, he produced a number of works displaying a boundless imagination and a love of the mystical and supernatural such as is not to be equalled any other writer. In 1800 he gave to the world his wild and grotesque romance entitled "Henry of Ofterdingen." A complete collection of his writings was made by his friends Tieck and Frederick Schlegel. He died in Weissenfels, Prussia, March 25, 1801.

NOVALIS.

Novara, capital of an Italian province; 60 miles N. of Turin; with several fine churches, a trade in silk, grain, and wine, and manufactures of silk, cotton, and linen. Here the Sardinians were utterly defeated by the Austrians under Radetzky, March 23, 1849. Pop. (1909) 45,248.

Nova Scotia

Nova Scotia, the most easterly province of the Dominion of Canada, bounded on the E. and S. by the Atlantic Ocean, on the N. and N. W. by the Gulf of St. Lawrence, and on the W. by the bay of Fundy and the province of New Brunswick. It consists of the peninsula of Nova Scotia and the island of Cape Breton, which is separated from the mainland by a narrow strait called the Gut of Canso. It has an extreme length of 360 miles and an average breadth of about 65 miles. Area, 21,428 square miles, of which 360 square miles are water.

Physical Characteristics.—Except for the narrow isthmus which joins it to New Brunswick, the province is surrounded by water. The surface presents no striking configurations, but is moderately undulating, and there are few elevations higher than 1,200 feet. There are three hill ranges: the Cobequid, which runs from the bay of Fundy coast through Cumberland and Colchester counties; the N. and S. range, extending along the immediate coast line of the bay of Fundy from Minas basin to St. Mary's bay; and the Atlantic coast range, running from Cape Sable to Cape Canso. There are fertile, sheltered valleys between these ranges. Geologically, the main plateau of Nova Scotia proper, extending along the Atlantic coast and including the E. half of the peninsula, is of the Devonian age and formation. The Cobequid plateau is also Devonian.

The deep indentations of the coast line, both of Nova Scotia proper and of Cape Breton Island, are the most salient physical features. On the E. coast the chief inlets are Chedabucto bay, Halifax harbor, Margaret's bay, Chester basin, Green harbor, and a large number of other bays and inlets, some of which, as Ship harbor and Liverpool bay, communicate with interior lakes. On the W. and N. W. are St. Mary's bay, between the mainland and Digby Neck; the bay of Fundy, with Minas channel leading into Minas basin and Cobequid bay; and Chignecto bay, leading into Cumberland basin. On the N. side the coast line is comparatively free from deep and broad indentations, excepting St. George's bay and the Gut of Canso, which latter is about sixteen miles in its total length. The W. coast of the latter has few indentations; but on the N. E. coast there are several, the most remarkable being the Bras d'Or channels and lakes. The latter are really an inland sea connected with the Atlantic by Great and Little Bras d'Or channels, and are also connected by St. Peter's canal with St. Peter's bay, the Lennox Passage, and the Gut of Canso. In the peninsula are very many lakes, most of them small, Lakes Rossignol, Sherbrooke, and Ship Harbor being the largest. The rivers are numerous, but of no great size. The chief are the St. Mary's, Shubenacadie, Musquodoboit, Kennotcook, Avon, La Have, Annapolis, and Tusket.

Soil and Climate.—The soil in the valleys is a loam of great fertility; but in the hilly portions it is less fertile. A notable feature is the rich reclaimed marshland which borders the headwaters of the bay of Fundy and the rivers which drain into it. There is an alluvial soil deposited on the bay of Fundy coast and the basins of tributary rivers by the incoming tides of the bay, and these deposits, by the careful diking of the farmers of this region, have formed a soil productive of rich hay crops.

The climate is temperate, extremes of heat and cold being prevented by the action of the Gulf current near the S. W. extremity of the peninsula. The average temperature in summer is 65° F., and in winter 25° F. The valleys are also sheltered by the coast ranges, and the Annapolis valley is famous for the production of fruit.

Minerals and Mining.—The mineral resources are great, especially in coal; and gold, copper, lead, iron ore, manganese, gypsum, limestone, barytes, and antimony are found. For the year ending Sept. 30, 1906, the production of gold was 13,048 ounces, valued at $247,912; coal, 5,866,605 long tons, exceeding by more than 860,000 tons the production of 1905; coke, 508,082 net tons; gypsum, 247,840 net tons; limestone, 400,584 tons; molding sand, 1,460 tons; barytes, 3,500 tons. There is promise of great development in the mining of iron ore, which has not yet been vigorously worked, most of the ore smelted having been imported. In 1906 27,000 tons were mined.

Forests.—The forest trees are similar to those found in the St. Lawrence valley, and include both hard and soft woods, such as the rock maple, oak, elm, walnut, spruce, pine, and tamarack.

Fish and Furs.—The fisheries exceed in value those of any other province in the Dominion, and the product includes cod, lobsters, mackerel, herring, shad, salmon, and haddock. The value of the catch is about $8,000,000 annually. The industry owns about 14,000 boats and employs over 25,000 men. The fur-bearing animals include the bear, fox, deer, wolf, mink, and other smaller varieties.

Agriculture and Live Stock.—About one-sixth of the entire land area is under cultivation. Wheat and oats are the chief grains; potatoes, turnips, and other root crops are largely cultivated; and the production of apples, plums, and small fruits is abundant. Hay grown on the rich lands of the bay of Fundy and its river tributaries is an unusually rich crop, averaging from 2 to 4 tons per acre. The apple orchards of the Annapolis valley are famous, and large quantities of these and other fruits are exported to Britain. Peaches and grapes ripen in the sheltered valleys. Dairying is an important, profitable, and growing industry, and is largely carried on in factories. There

is an agricultural college for the instruction of farmers. Much attention is given to the raising of live stock, including horses, cattle, sheep, and swine.

Manufactures and Commerce.—Manufactures are less developed than in Ontario, but the new coal, iron, and steel industries at Sydney, Cape Breton Island, promise a considerable addition to the manufactured output. This amounted in 1905, according to the Dominion census for 1906, to $24,884,335, as compared with $13,730,099 in 1900, an increase of 81.24 per cent. The leading articles of manufacture are iron and steel, coke, sugar, agricultural implements, leather, wood pulp, cotton goods, rope and twine, etc. The iron and steel industries at Sydney are situated much nearer to Europe than any other similar industries on the continent. Some of the materials necessary for steel-making are found in the immediate vicinity, though the iron ore is mostly imported from Newfoundland.

The commercial facilities are good, the province being connected with Western Canada by the Intercolonial and Canadian Pacific railways, and with Canadian, American, and European ports by numerous steamship lines. The chief articles of import are woolen and cotton goods, machinery, sugar, molasses, etc.; the chief exports are dried fish, lobsters, lumber, apples, grain, butter and cheese, whale and seal oil, furs, etc.

Railways, Canals, and Shipping.—There are about 1,200 miles of railway in operation. Up to June 30, 1905, the provincial government had contributed $3,789,947 as bonuses in aid of railways, and the municipalities had contributed $333,024. There is a cable station at Sydney and another at Canso. The St. Peter's canal, which cost $648,547, connects the Bras d'Or lakes with Lennox Passage and the Gut of Canso.

In 1905 the province had 2,066 ships of 211,972 tons burden, or about 30 per cent. of the total shipping of Canada.

Government and Finance.—The affairs of the province are administered by a lieutenant-governor, appointed for five years by the governor-general in council, and assisted by an executive council of seven members responsible to the legislature. The latter consists of a legislative council of twenty-one members appointed for life by the lieutenant-governor in council, and a legislative assembly of thirty-eight members elected for four years on a very liberal franchise. Nova Scotia is represented in the Dominion House of Commons by eighteen members and in the Dominion Senate by ten members. Counties and towns are the units of local government. The judicial system consists of a supreme court and county courts. The judges are appointed by the governor-general in council.

Nova Scotia

The revenue of the province for the year ending Sept. 30, 1906, was $1,391,629, of which the chief sources were the annual Dominion subsidy, $432,805, and mining royalties and dues, $643,457. The expenditure was $1,375,588, of which the chief items were: debenture interest, $292,810; education, $272,971; and public charities, $177,411.

Education and Religion.—The public school system is free and undenominational, and controlled by a council which consists of the members of the provincial ministry and a superintendent of education. The provincial government and the municipalities both contribute to the support of the schools. Each county has an academy, which prepares pupils for matriculation at the universities. In the year ending July 31, 1906, there was a total enrollment of 100,332 pupils, the highest number ever recorded, and an average attendance of 58.9 per cent. There were 2,446 schools in operation and 2,578 teachers. The provincial normal school for the training of teachers is at Truro. There are also an agricultural college, schools for the blind, deaf, and dumb, rural schools for nature study, manual training schools, a school of mechanical science, and a school of art and design. Besides 13 colleges and academies not possessing degree-conferring powers, there are Dalhousie College, Halifax; King's College, Windsor; Acadia College, Wolfville; St. Francis Xavier's College, Antigonish; and the College of Ste. Anne, Church Point. The Presbyterian Theological College at Halifax confers degrees in divinity. The total attendance in these institutions for 1906 was 569, of which Dalhousie College had 362 and St. Francis Xavier's College 129.

According to the Dominion census of 1901 the members of the leading religious denominations were as follows: Roman Catholics, 129,578; Anglican, 66,107; Presbyterian, 106,381; Methodist, 57,490; Baptist, 83,233.

History and Population.—Nova Scotia was discovered by John Cabot in 1497, but was not settled until 1604, when Sieur de Monts established a post on the island of Ste. Croix. This was removed in the following year to a place afterward named Port Royal, on account of the beauty of its situation, and now named Annapolis. What is now Nova Scotia, New Brunswick, Prince Edward Island, and a part of the State of Maine was then the French province of Acadia, and Port Royal became the center of the conflict waged by England and France for over 150 years for the possession of this whole region. It was attacked and captured by an expedition of Virginia colonists in 1614. In 1621 the name of Nova Scotia appeared for the first time in a charter

granted by James I. to Sir William Alexander, covering all the territory of Acadia. The English did not, however, gain permanent possession until the capture of Port Royal in 1710, and the cession of the colony by the Treaty of Utrecht in 1713. This cession did not include Cape Breton Island, on whose E. coast the great fortress of Louisburg was erected; so that French power remained a menace in this region until the capture of Louisburg in 1758. The island was finally ceded to England along with Canada by the Treaty of Paris in 1763. Cape Breton was annexed to Nova Scotia in 1820. After the Treaty of Utrecht the aim of Britain was to induce settlers to counteract or destroy French influence in Nova Scotia, and with this object Halifax was founded in 1749, a large company of Scotch colonists brought out, and more than 6,000 French Acadians deported and scattered in the English colonies in 1755. Of no less importance in the Anglicizing of the province was the immigration in 1784 of thousands of United Empire Loyalists, who left the United States after the close of the Revolutionary War. A legislature was granted in 1758, and responsible government was won later, after a period of constitutional agitation, chiefly by the efforts of Joseph Howe (*q. v.*). In 1770 Prince Edward Island was separated from Nova Scotia, and in 1784 the latter was reduced to its present limits by the formation of New Brunswick into a province. Nova Scotia was one of the four provinces that entered into confederation in 1867.

According to the Dominion census of 1901 the population of Nova Scotia was 459,574, an increase of only 9,178 over that of 1891. It is composed mostly of the descendants of Scotch, English, and Irish settlers—especially the first named—and of the French who originally settled Acadia and were left behind after the expulsion of French inhabitants in 1755, together with a German element located chiefly in Lunenburg county. The steady flow of emigration to the United States has prevented a noticeable increase of the population.

The leading cities and towns, with their populations in 1901, are: Halifax, the capital (40,832); Sydney (9,009); Glace Bay (6,945); Yarmouth (6,430); North Sydney (4,646); Sydney Mines (3,191); Windsor (3,398); Pictou (3,235); Amherst (4,963); New Glasgow (4,447); Dartmouth (4,806); Springhill (5,178); Truro (5,993); Wolfville (1,412); Lunenburg (2,916); Westville (2,250); Annapolis (1,019); Shelburne (1,300); Digby (1,150); Liverpool (1,937); Antigonish (1,526); Parrsboro (2,705); Bridgewater (1,816); Canso (1,734); Louisburg (1,588); Kentville (1,731); Oxford (1,266).

Consult Dawson, "Acadian Geology"; Haliburton, "Papers on the History and Resources of Nova Scotia"; Dawson, "Handbook of the Geography and Natural History of Nova Scotia."

Novatianism, the doctrine taught by Novatian, a Stoic of the 3d century, who, it is said, was delivered from demoniacal possession, became a catechumen, and was ordained priest. In A. D. 251, he persuaded three country bishops to consecrate him and, according to Fleury, became the first anti-Pope. He consecrated other bishops, and sent them to various parts to propagate his views — that it was wrong to receive again into the Church those who had sinned gravely after baptism; that the Church had no power to absolve the lapsed and that second marriages were sinful. Novatianism lasted about 200 years, and then dwindled away.

Nova Zembla, two large islands in the Arctic Ocean, belonging to Russia, and lying N. from the N. E. corner of European Russia, separated from each other by the narrow strait Matotchk in Shar; length, 635 miles; breadth, 170 miles. The coasts swarm with seals, fish, and water-fowl. The interior is covered with stunted shrubs, short grass, and moss, and is frequented by reindeer, white bears, ermines, and Arctic foxes. It has no permanent inhabitants, but is visited by Russian hunters and fishers.

Novel, a prose narrative of fictitious events connected by a plot, and involving portraitures of character and descriptions of scenery. In its present signification the term novel seems to express a species of fictitious narrative somewhat different from a romance, yet it would be difficult to assign the exact distinction, though the former is generally applied to narratives of everyday life and manners; while the romance deals with what is ideal, marvelous, mysterious, or supernatural. Prose fiction written for entertainment is of considerable antiquity. Among the Greeks we find mention of a collection of stories known as the "Milesian Tales," before which a sort of historical romance, the "Cyropædia," had been produced by Xenophon (445–359 B. C.). There were several other Greek writers of fiction before the Christian era, but the most notable name is that of Heliodorus in the 4th century after Christ. He was followed by Achilles Tatius and by Longus. Among the Romans the chief names are Petronius Arbiter and Appuleius.

The romances of the Middle Ages were metrical in form, and the true novel as we at present understand it is of comparatively modern growth. It had its early beginnings in the stories of Boccaccio, contained in his "Decameron" (1358). The

Novel

success of this collection gave rise to numberless imitations, and since that time the development of the novel has been steadily progressive. At first we have nothing but tales of love intrigue, as in the "Decameron," in the "Hundred New Tales" (15th century), and the "Heptameron" of Margaret of Navarre (1559). But during the 16th and 17th centuries there is very marked progress, writers beginning very materially to enlarge and vary their sphere; and we now find produced the comic romance, the *picaresque* romance or romance of amusing roguery, and the pastoral romance. The first variety is worthily represented by the "Garagantua" and "Pantagruel" of Rabelais (died 1553). Next in point of date comes the "Life of Bertoldo" of Julio Cesare Croce, a narrative of the humorous and successful exploits of a clever peasant, which was as popular for two centuries in Italy as "Robinson Crusoe" in England. Some years after appeared the "Don Quixote" of Cervantes (1605), which gave the death-blow to the romance of chivalry. About the same time the first of the *picaresque* romances was given to the Spanish public. In this branch Matteo Aleman gives us in Guzman Alfarache a hero who is successively beggar, swindler, student, and galley-slave. It gave birth to a host of similar romances, and is said to have suggested to Le Sage the idea of "Gil Blas." The "Arcadia" of Sir Philip Sydney blends pastoral with chivalrous manners, and marks the transition to the romances of conventional love and metaphysical gallantry. In the 17th century prose fiction in most of its leading types had become an established form of literature in the principal languages of Europe.

The full-fledged modern English novel may be said to date from Defoe. The effect of his "Robinson Crusoe," "Colonel Jack," "Moll Flanders," etc., is caused by the delineation and skillful combination of practical details, which give to the adventures the force of realities. The novel of everyday life was further improved by Richardson, Fielding, and Smollett, of whom Richardson and Fielding were the most original and still rank among the masters of English fiction. The "Tristram Shandy" of Sterne displays admirable character painting, and humor deeper and finer in quality than that of his contemporaries, but can hardly be said to have any plot. Next appeared Goldsmith's "Vicar of Wakefield," which possesses a higher moral tone than any that had preceded it. Among the best works of secondary rank may be mentioned Johnson's "Rasselas," "Walpole's "Castle of Otranto," Madame D'Arblay's "Evelina," and Beckford's "Vathek." Ranking below these are the novels or romances of horrors, represented by the "Mysteries of Udolpho," and others by Mrs. Radcliffe, M. G. Lewis's "Monk," and Maturin's "Montorio." A return to stricter realism is manifested in Miss Edgeworth and Miss Austen, who describe domestic life with minuteness, good sense, a clear moral aim, and charming simplicity of style.

In France, among the novels treating of social life in the 18th century the most prominent are the "Life of Mariamne" and the "Successful Peasant" of Marivaux, "Manon l'Escaut" by the Abbé Prévot, the "New Héloise," and the "Émile" of Rousseau, containing the author's theories of love, education, religion, and society. In the department of humorous and satirical fiction the palm belongs to Le Sage, author of "Gil Blas," the "Lame Devil," etc. As a writer of satirical fiction Voltaire is entitled to high rank by his "Candide," "Zadig," "Princess of Babylon," etc. The translation of the "Arabian Nights' Entertainments" by Galland (1704–1717) revived the taste for the exaggerations of Eastern fiction, and brought a variety of works into the field teeming with genii, magicians, caliphs, sultans, princesses, eunuchs, slaves, etc. In Germany three great names tower above all others — Wieland; Jean Paul Richter, whose works abound in strokes of humor, pathos, and fancy; and Goethe, whose novels are attempts to represent or solve the great problems of life and destiny. Popular romantic legendary tales (Volksmärchen) constitute a special department of German literature, which was successfully cultivated by Ludwig Tieck, De la Motte, Fouqué, Chamisso, Clemens Brentano, Zschokke, Hoffman, Musäus, and others.

In entering on the 19th century the first name met with is that of the author of "Waverley." Sir Walter Scott introduced a new era in the history of English fiction, and may be said to have created the modern historical novel. Since his day the British novelists are perhaps the most numerous class in the list of authors; and among the more prominent we may note Galt, Lady Morgan, Charles Lever, Mrs. Gore, Theodore Hook, Disraeli, Bulwer-Lytton, Dickens, Thackeray, James, Ainsworth, the sisters Brontë, Mrs. Trollope, Anthony Trollope, Mrs. Craik, Kingsley, Marryat, George Eliot, Wilkie Collins, Miss Braddon, Mrs. Oliphant, Miss Thackeray, Miss Yonge, Thomas Hughes, Charles Reade, William Black, Thomas Hardy, Richard Blackmore, Walter Besant, W. E. Norris, James Payn, Clark Russell, Christie Murray, Rider Haggard, R. L. Stevenson, George Meredith, Hall Caine, James M. Barrie, Amelia E. Barr, A. Conan Doyle, and George Macdonald; besides whom there are a number of

clever rising men. In the United States it was not till after the Revolutionary War that the earliest attempts in prose fiction were made. The first notable adventurer in this field was Charles Brockden Brown, who was followed by J. Fenimore Cooper, Washington Irving, Edgar A. Poe, Nathaniel Hawthorne, Harriet Beecher Stowe, and Oliver Wendell Holmes. After these came a younger, and in some respects a more markedly American school, represented by such names as Bret Harte, Henry James, Julian Hawthorne, Gen. Lew. Wallace, Cable, Crawford, Howells, Roe, Mrs. Holmes, Augusta J. Evans, Frances Hodgson Burnett, Winston Churchill, P. L. Ford, Miss Murfree (Charles Egbert Craddock), and Mary Hartwell Catherwood.

The most celebrated of the French novelists of the 19th century are Madame de Staël, Chateaubriand, Victor Hugo, Dumas (father and son), Balzac, Alphonse Karr, George Sand, Feuillet, Prosper Mérimée, Edmond About, Erckmann-Chatrian, Gautier, Zola, Daudet, etc. The more noteworthy names in the German literature of fiction are those of Gutzkow, Wilibald Alexis (Wilhelm Häring), Hackländer, Spielhagen, Gottfried and Johanna Kinkel, Auerbach, Rodenberg, G. zu Putlitz, Gustav Freytag, Paul Heyse, Georg Ebers, Rosegger, etc. Among the most important novels in other languages are those in the Italian by Manzoni, in Danish by Hans Christian Anderson, in Swedish by Frederika Bremer, and Madame Carlen, in Norwegian by Andersen, in Swedish by Frederika Jokâi, in Russian by Ivan Tourguenieff and Tolstoï, and in Polish by Sienkiewicz.

Novel Assignment, a form of pleading which sometimes arose from the generality of the declaration, when, the complaint not having been set out with sufficient precision, it became necessary from the evasiveness of the plea to reassign the cause of action with fresh particulars.

Novel Constitutions, the supplementary constitutions of some Roman emperors, and, especially those of Justinian, so called because they appeared after the authentic publications of law made by such emperors. The Novel Constitutions (also called Novels), together with the Institute, Digest, and Code, constitute the whole body of law which passes under the name of Justinian.

Novello, Joseph Alfred, an English composer, son of Vincent Novello; born in 1810. At the age of 19 he established himself in London as a music publisher. Some years after he devised a system of printing cheap music, and succeeded in introducing this beneficial novelty, notwithstanding the general opposition of fellow-music-sellers. To his efforts is due the abolition of a vexatious printers' guild law, which had hampered the trade since 1811. A friend and admirer of Felix Mendelssohn, he eagerly introduced to English auditors the works of that great master, and aided him in translating "St. Paul," "Song of Praise," etc. In 1849 he associated himself with the energetic men who relieved England from "taxation on knowledge," and for years was the active treasurer of their society, the object of which was the repeal of the advertisement duty (accomplished in 1853), the repeal of the newspaper stamp (accomplished in 1855), duties on paper and foreign books, and the repeal of the security system. Ever ardent in promoting the progress of art, science, and social advancement, he materially assisted the inventive genius of his friend, Mr. Bessemer, in his scientific discoveries in glass, etc., and especially that of producing the metal now known as Bessemer steel. In 1856 he retired from business and established himself in Italy, the birthplace of his paternal ancestors. He died July 17, 1896.

Novello, Vincent, an English composer; born in London, England, Sept. 6, 1781. He officiated as organist in various chapels in London, and was one of the founders of the Philharmonic and similar musical societies. His musical compositions, chiefly sacred, are considered to have contributed much to the improvement of cathedral music. But it is as a painstaking editor of unpublished works of eminent musicians that he deserves chiefly to be remembered. He died in Nice, France, Aug. 9, 1861. His daughter, CLARA ANASTASIA; born in London in 1818; won great triumphs in the chief cities of Europe; but having in 1843 married Count Gigliucci, she quitted the stage in 1860. She died March 18, 1908.

November, the 11th month of the year. Among the Romans it was the 9th month at the time when the year consisted of 10 months, and then contained 30 days. It subsequently was made to contain only 29, but Julius Cæsar gave it 31; and in the reign of Augustus the number was restored to 30, which number it has since retained. Its festivals are All Saints (1), St. Hubert (3), St. Martin (11), St. Catherine (25), and St. Andrew (30).

Novgorod, a city of Russia; capital of a province; on the Volkhof, near where it issues from Lake Ilmen, 110 miles S. S. E. St. Petersburg. It is the cradle of Russian history. In 864, according to tradition, Rurik (a Varangian, apparently a Scandinavian), was invited there by the neighboring tribes, and from him begins the history of the country and the line of its sovereigns. As early as the 12th century it had important connection with the Hanse cities, and it became the market of N. E. Europe. During the time of its prosperity

the town was called Novgorod the Great, and had 400,000 inhabitants, and extended its sway to the White Sea and the River Petchora. Its government was a sort of republic. The greatness of Novgorod provoked the jealousy of the princes of Moscow, and in 1471 the Czar Ivan III. nearly destroyed the town, bereft it of its liberties, and exiled the most influential citizens; and when Archangel was opened for English trading-vessels, but especially after the foundation of St. Petersburg, its trade fell away, and the town rapidly declined. Of the existing ancient buildings the most remarkable are the Church of St. Sophia, founded in the 11th century, and built on the model of St. Sophia at Constantinople, possessing some remarkable paintings and tombs; several others of more than 30 churches; and wall surrounding the Kreml. There is a little trade, but hardly any manufactures. Pop. (1900) 26,972.

Novi, a town of Italy, 30 miles N. W. of Genoa. Here in 1799 the French were defeated (Aug. 15), and victorious (Nov. 6).

Novice, in ecclesiology, a person of either sex who is living in a monastery, in a state of probation, previous to becoming a professed member of an order. The time of probation is called the "novitiate," and must be at least one year; after which, if their behavior is approved, they are professed; that is, admitted into the order, and allowed to make the vows, etc. During their novitiate, the candidates are bound to conform to the discipline of the house; but they are under no permanent vows, and may leave if they find that the monastic life does not suit them. They are under the direction of a master or mistress of novices, whose duty it is to examine their characters and fitness for the religious state, and to try their strength, by exposing them to the most serious obstacles to perseverance which they are likely to encounter in the order.

Novikoff, Nicholai Ivanovitch, a Russian author; born near Moscow, April 27, 1744. He was for a time in the Imperial service, but settling in Moscow he became editor of the Moscow "Gazette," and founded the first circulating library in Russia. He published the "Old Russian Library," a collection of historical documents; "Russian Biographies"; a "History of the Jesuits" (for which he was imprisoned); etc. He died July 30, 1818.

Novogeorgievsk, a Russian fortress of the first rank, on the Vistula, 20 miles N. W. of Warsaw. With Warsaw, Ivangorod, and Brest Litovsk, it constitutes the Polish Quadrilateral.

Novum Organum, the second part of Bacon's great projected work, the "Instauratio Magna" (Great Instauration), published in 1620. It is written in Latin, and along with the "Advancement of Learning," forms the foundation of the inductive or Baconian system of philosophy.

Novy, Frederic George, an American chemist; born in Chicago, Ill., Dec. 9, 1864; was graduated at the University of Michigan in 1886; studied in Koch's laboratory, Berlin, in 1888, receiving the degree of M. D. in 1891. In 1897 he experimented in the Pasteur Institute, Paris, continuing his researches two years later in Prague. Meanwhile he had been made successively instructor (1881), assistant professor (1891), and junior professor (1893), of hygienic and physiological chemistry at the University of Michigan; and in 1901 was appointed a member of the United States Commission to investigate the bubonic plague in the Orient. On his return Professor Novy began a series of experiments which resulted in the discovery of a new compound called "benzozone," which was claimed to be a preventive for intestinal diseases, such as Asiatic cholera and typhoid fever. He wrote "Cocaine and Its Derivatives," "Laboratory Work in Physiological Chemistry"; etc.

Nox, or **Nyx,** in classical mythology, the goddess of night.

Noyade, the act of putting to death by drowning; specifically, a mode of execution adopted during the Reign of Terror by Carrier at Nantes, in 1789. The condemned persons were embarked in a vessel with a movable bottom, which was opened when the boat had reached the middle of the Loire, thus throwing the prisoners into the river.

Noyau, a cordial, generally prepared from white brandy, bitter almonds, sugar-candy, grated nutmeg and mace, and sometimes flavored with the kernels of apricots, peaches, the peel of oranges, etc.

Noyes, George Rapall, an American Biblical scholar; born in Newburyport, Mass., March 6, 1798; was graduated at Harvard in 1818, and studied theology at Cambridge Divinity School; licensed to preach 1822, and held pastorates at Brookfield and at Petersham, Mass. In 1840 he was made Professor of Hebrew and Oriental Languages and Dexter Lecturer on Biblical Literature at Harvard. Besides many reviews and sermons, he published new translations, with notes, of several books of the Old Testament. He died in Cambridge, Mass., June 3, 1868.

Noyes, John Humphrey, an American religious leader; born in Brattleboro, Vt., Sept. 6, 1811; was graduated at Dartmouth College in 1830; first studied law, and afterward divinity at Andover and New Haven. In 1838 he founded a com-

munity of Perfectionists near Putney, in 1847 one at Lenox, N. Y.; and subsequently one at Wallingford, Conn. In the latter years of his life he was much influenced by Fourier and was an enthusiastic exponent of communism. He published "The Second Coming of Christ" (Wallingford, 1859); "History of American Socialism" (Philadelphia, 1870); etc. He died in Niagara Falls, Canada, April 13, 1886.

Noyon, a town of France; department of Oise, 67 miles N. N. E. of Paris. It has a fine cathedral in the Transition style of the 12th century, a city hall (1485–1523), and a former episcopal palace. The Noviodunum of Cæsar, Noyon was a residence of Charlemagne and Hugo Capet, and the birthplace of Calvin.

Nubar Pasha, an Egyptian statesman; born in Smyrna in 1825; studied in Switzerland and France, and in 1842 was appointed reader and interpreter to the Viceroy Mehemet Ali. In 1850 he was sent as Egyptian agent to London, and then to Vienna. Under Said Pasha he conducted negotiations with the English government relative to the railroad from Cairo to Suez, and under Ismail Pasha his preferment was rapid. He was made a Bey, then a Pasha, Minister of Commerce (1864), and Minister of Foreign Affairs (1867). After being exiled in 1874 he was recalled (1878), and made prime minister. He was soon dismissed again, and began a series of plots against his old master. Ismail Pasha was deposed, and Nubar again became prime minister. He resigned in 1895 and retired to Paris, where he died Jan. 14, 1899.

Nubia, a comparatively modern name for a large region of Africa, formerly a portion of Ethiopia, and extending on both sides of the Nile from Egypt to Abyssinia; touching the Red Sea on the E. and the desert on the W. Nubia proper, or Lower Nubia, extends from Assuan on the Egyptian frontier to Dongola; beyond that is Upper Nubia. But of late the name of Egyptian Sudan, properly applicable to a section of Upper Nubia, has come to be used for Nubia in its widest sense, together with the once Egyptian territory actually in the Sudan, and the equatorial provinces. Under the Pharaohs Nubia was called Cush, but under the 20th dynasty it was recovered by a series of native rulers, who adopted the civilization of the Egyptians, and at a later date were Christianized. At present the country is occupied by races belonging to several different stocks, which have in most places become much mixed in blood. The chief elements are Arab, more or less mixed with Nilotic and Negro blood, mainly in Upper Nubia; Ababdeh and Bisharin between the Nile and the Red Sea; and Nubas and Barabira in Lower Nubia, on and near the Nile between Assuan and Dongola. The Semitic Arabs are comparatively recent intruders to this region. They entered Nubia after occupying Egypt in the 7th century, but were resisted by the Christian Dongolawi kings till the 14th century, when the Arabs, assisted by a large contingent of Bosnians, became masters of the land. Presumably, the aboriginal Negro population and tongue have been gradually modified by the admixture of Hamitic and Semitic elements. The various tribes, most of them active and warlike, are Moslems by faith, and till 1820 were ruled by their own chiefs. In that year Ismail Pasha made Nubia an Egyptian territory; and till 1881 it shared the fate of Egypt. Both in its lower and upper sections Nubia is for the most part an expanse of steppes or rocky desert, with patches where grass sometimes grows, and ravines in which moisture enough is found to keep alive a few mimosas or palms, and to raise pasture for gazelles and camels. There are also wells and small oases here and there, as on the chief caravan routes. The great "Nubian Desert" lies E. of the Nile, opposite the great W. bend of the river. Below Khartum rain is almost unknown; the climate is accordingly excessively hot and dry, and, except in the river ports after the fall of the Nile, is very healthy. The only exception to the general aridity is the narrow strip of country on both sides of the Nile, which nowhere exceeds 4 miles in breadth, and in many places is only a quarter of a mile wide. The most fertile part is near Dongola. A mountain barrier bounds the valley on both sides of the Nile, and consists of granite and sandstone.

Nucleobranchiata, a term used synonymously with *Heteropoda* to denote an order of the class of gasteropodous mollusca.

Nucleus, in astronomy, a term used often used to indicate the central part, or umbra, of a sun-spot, or one of the smaller dark spots contained within the umbræ. It is also used to denote the central condensation in the head of a comet or in a nebula.

Nudibranchiata, a section of *Opisthobranchiata.* Animal destitute of a shell, except in the embryo state; branchiæ always on back or sides; sexes united. It comprises five families: *Doridæ, Tritoniadæ, Æolidæ, Phyllirhoidæ,* and *Elysiadæ.*

Nuevo Leon. See NEW LEON.

Nuisance, in law, anything which unlawfully annoys or incommodes, or causes damage or inconvenience. Nuisances are of two kinds, private and public (or common): private when they affect the lands tenements, hereditaments, or comfort of particular individuals; public when they affect the whole community.

Nullification, in American politics, the doctrine formerly held by the extreme States' Rights party, of the right of a State to declare a law of Congress unconstitutional and void, and if the Federal government attempted to enforce it, to withdraw from the Union. As an instance, in 1832, during the presidency of Andrew Jackson, the free trade and States' Rights party in South Carolina, under the leadership of John C. Calhoun, her senator in Congress, asserted the doctrine of nullification in a State convention which declared the tariff acts of that year unconstitutional, and therefore null and void; that the duties should not be paid; and that any attempt on the part of the general government to enforce their payment would cause the withdrawal of South Carolina from the Union and the establishment of an independent government. President Jackson met this declaration with a vigorous proclamation, in which he declared that the laws must be executed, and that "the Union must and shall be preserved." South Carolina, standing alone, receded from her position under protest, and a "Compromise Bill," introduced by Henry Clay in 1833, providing for a gradual reduction of duties, for the time settled the controversy.

Nullipore, in botany, the same as corallines. The nullipores can form extensive accumulation of lime, as in the Leitha Kalk, a Tertiary stratum in Austria, largely made up of calcareous concretions. Mr. Carter thinks that coccoliths are nullipores. If so, they came into existence in early Palæozoic times; if not they do not certainly appear before the Tertiary.

Numantia. See SORIA.

Numa Pompilius, the second King of Rome; said to have reigned from 714 to 672 B. C. He was of Sabine origin, and was

COIN WITH HEAD OF NUMA POMPILIUS.

distinguished as a philosopher and legislator, though like the other early kings, he has more a legendary than a historical existence. He was regarded as the founder of the most important religious institutions of the Romans, and left writings explanatory of his system, which were burnt by order of the senate when accidentally discovered 400 years after his time.

Number, in grammar, that distinctive form given to a word according as it is intended to express or is spoken of one individual or several individuals. In English there are two numbers: the singular, which denotes one, or a single individual; the plural, which is used when two or more individuals are spoken of. In Greek, Sanskrit, and a few other languages, a third number was used, called the dual, when only two individuals are spoken of. In the oldest English a dual number existed in the case of pronouns. In phrenology, the name given by Combe to one of the perceptive faculties, the seat of which is placed by Spurzheim just above the external angle of each eye. It is supposed to give facility in arithmetical operations, and is called the organ of calculation.

Numbers, one of the books of the Old Testament. It spans a period of nearly 39 years, commencing with the second year of the wanderings, the second month, and the first day, and terminating in the 40th year. The Jews and the Christians of early and mediæval times implicitly believed in the Mosaic authorship of Numbers. Modern rationalists resolve the book into different portions, assigning each to a separate writer. One eminent critic of this school considered that 274 verses of Numbers constituted the original narrative; that six verses, appearing to belong to writings of some older time, were inserted by the Deuteronomist and the remaining 1,008 verses — more than three-fourths of the book — belonging to the Later Legislation. The 274 verses of the original narrative are thus given:

"Ch. x. 29-36, xi., xii., xiii. 1-3, 17-20, 22-24, 26 (except to Kadesh), 27-31, 33; xiv. 11-25, 39-45; xvi. 1, 2, 12-15, 23-34 (except Korah, etc., in vers. 1, 24, 27, 32); xx. 1, 14-22; xxi. 1, 13, 16-26, 31-35; xxii. 2-41; xxiii., xxiv., xxv. 1-5; xxxii. 1, 16-24, 33-42."

The six verses from old sources assigned to the Deuteronomist are xxi. 14, 15, 27-30. These views created some excitement when first published but they have failed to make any considerable impression on the Christian public.

Numbering Machine, a machine for impressing consecutive numbers on account or record books (a paging-machine), coupons, railway certificates, bank-notes, railway tickets, etc. The foundation idea is that of Blaise Pascal (1650), and consists of disks or wheels decimally numbered on their peripheries, the whole mounted on one axle upon which they turn freely, acting upon

each other in serial order. The first wheel of the series containing the units is moved one figure between each impact, and when the units are exhausted the tens come into action, and act in coincidence with the units, which continue their action.

Numeral, a figure or character used to express a number; as the Arabic numerals, 1, 2, 3, etc., or the Roman numerals, I., V., X., L., C., D., M., etc. SEE NOTATION.

Numeration, the art of expressing in characters any number proposed in words, or of expressing in words any number proposed in characters. The chief terms used for this purpose are the names of the digits from 1 to 10, 100, 1,000, etc. The term "billion" is of uncertain use; in Great Britain it is a million of millions; in France, the United States, etc., a thousand millions.

Numerical Aperture, in optics, the formula by which the illuminating and resolving power of high-power microscopic objectives is now calculated. Since it became customary to interpose water, oil, or other fluid between the object and the lens, it is found that a water-immersion lens of 97½°, and an oil-immersion of 82°, give equal results to a dry or air lens of 180°. This obviously depends on the diameter of the back lens of the objective, and this on the refractive index of the medium between lens and object. It is expressed by the formula, $n \sin u$, where n is the refractive index of the medium — air or fluid — and u the semi-angle of aperture. It is thus found that an oil-lens of 180° (oil of ref. index 1.52) has a numerical aperture of 1.52 against 1.00 for 180° in air. This only represents the comparative diameters of the effective pencils, and the relative illumination is, of course, obtained by squaring the numerical apertures to get the comparative areas of the pencils. We thus find that an oil-lens of 180° gives 2.310 the illumination of a dry objective of 180°.

Numidia, the name given by the Romans to a part of the N. coast of Africa, corresponding to some extent with the modern Algiers, and lying between Mauritania and the Roman province of Africa; on the S. it reached to the chains of Mount Atlas. The inhabitants of Numidia, as of Mauritania, belonged to the race from which the modern Berbers are descended. They were a warlike race, and excelled as horsemen, but were proverbially faithless and unscrupulous. Of their tribes the Massyli in the E. and the Massaœsyli in the W. were the most powerful. In the grand struggle between the Carthaginians and the Romans they at first fought on the side of the former, but subsequently the king of the Eastern Numidians, Massinissa, joined the Romans, and rendered them effectual service in the war with Hannibal. Favored by the conquerors, he united all Numidia under his sway. Of his successors in this kingdom Jugurtha and Juba are the most famous. After the victory of Cæsar over Juba I. in the African war Numidia became a Roman province (46 B. C.); but Augustus afterward gave the W. part, with Mauritania, to Juba II., and the name Numidia became limited to the E. part. Among important places were Hippo Regius, Zama, and Cirta (the residence of the Numidian kings), afterward called Constantina, a name still preserved in Constantine. For the modern history of Numidia, see ALGIERS.

Numismatics, the science and study of the coins of all nations. In the wider, though less accurate, acceptation of the term it includes also that of medals, both artistic and historical. The various branches of numismatics are (1) Greek, Phœnician, etc.; (2) Roman and Byzantine; (3) Mediæval and Modern; and (4) Oriental. The chief value of numismatics consists in the light which coins throw on history, The secondary importance of the science is purely artistic. The study of coins is also of great use in elucidating the mythology of the ancients, in fixing the chronology of the different systems of alphabetical writing (palæography) and in indicating the origin and gradual extension over the civilized world of the principal systems of weighing the precious metals (metrology). Historically, coins are of the utmost importance as being contemporary and authentic documents furnishing us with in many cases the only means of ascertaining the names of obscure cities and peoples, together with the chronological succession of their kings, tyrants, or chief magistrates. They record the successive phases of art from its earliest beginnings to its culminating point, and through all the stages of its decline, subsequent temporary revival and second decadence, to the present day.

Nummulite Limestone, an important member of the Eocene system of S. Europe, etc., consisting of a limestone composed of NUMMULITES (*q. v.*) held together by a matrix formed of the comminuted particles of their shells, and of smaller foraminifera. It attains a thickness of several thousand feet, and has been traced over a vast area. It occurs on both sides of the Mediterranean basin, in Spain and in Morocco. It enters largely into the composition of the Apennines, the Alps, the Carpathians, and the Balkans; it extends through Greece, Egypt, and Asia Minor, and thence through Persia and the Himalayas to the coasts of China and Japan.

Nummulites, or **Nummulina,** a genus of fossil foraminifera, the shells of which form immense masses of rock of Eocene age. They are circular bodies of a lenticu-

lar shape, varying in magnitude from the merest point to the size of a florin or larger. The shell is composed of a series of small chambers arranged in a concentric manner. The growth of the shell does not merely take place around the circumference, but each whorl invests all the preceding whorls, so as to form a new layer over the entire surface of the disk, thus adding to the thickness as well as the breadth, and giving the fossil its lenticular form. A thin intervening space separates each layer from the one which it covers, and this space at the margin swells out to form the chamber. All the internal cavities, however, seem to have been occupied with the living sarcode, and an intimate connection was maintained between them by means of innumerable parallel tubuli, which everywhere pass from one surface to another, and which permitted the passage of the sarcode as freely as do the minute pores or foramina of the living foraminifera. The name is given to them from their resemblance to coins. The genus appears first in the Carboniferous system, where it is represented by one small form. Several species are also met with in Jurassic and Cretaceous rocks, but the genus reached its maximum in Eocene times. It is represented at present by only a few small forms.

Nun, a virgin or widow who has consecrated herself to the service of God by the three vows of poverty, chastity, and obedience, and bound herself to live in a religious house under a certain rule. The first authentic notice of nuns is that by St. Anthony, who, when retiring from the world, placed his sister in a house of virgins. St. Augustin, of Hippo, and St. Scholastica, sister of St. Benedict, both founded nunneries, and all the great orders of men have orders of women affiliated to them or following their rule as closely as difference of sex will permit. Communities founded since the Council of Trent mostly follow the rule of St. Augustin, with certain modifications. Nearly all nuns are bound to the recitation of the divine office in choir, and take their meals in common, but each has a separate cell. Their occupations vary. Some devote themselves to the work of education, to nursing the sick, or the care of the poor. Others are contemplative. Excommunication is pronounced against any one attempting to force a woman to become a nun against her will, or to prevent her from becoming a nun without just cause. Also a name given to a variety of pigeon, having its head almost covered with a veil of feathers; a name sometimes given to the smew. Also the blue titmouse.

Nunc Dimittis ("now thou lettest depart"), the first two words of the Latin version of the canticle of Simeon given in Luke ii: 29-32, and used as the designation of the whole canticle, which forms part of the evening service in the Book of Common Prayer.

Nuncio, a messenger; one who announces; one who brings tidings.

Specifically, a papal ambassador of the second rank, not being a cardinal, who represents the Pope at a foreign court. An ambassador who is also a cardinal is styled a legate. Previously to the Council of Trent the papal nuncios acted as judges in the first instance of matters which lay within ecclesiastical jurisdiction; since that time they have been formed into a kind of court of appeal from the decisions of the respective bishops. This jurisdiction, however, holds good only in those countries which are themselves subject to the decretals and discipline of the Council of Trent.

Nuncupative Will, a will made by the verbal declaration of the testator, and depending merely on oral testimony for proof, though afterward reduced to writing. Nuncupative wills are now abolished, but with a proviso that any soldier in actual military service, or any mariner or seaman at sea, or a person in sudden deadly peril, may dispose of his personal estate by making an oral statement before a number of witnesses.

Nundydroog, a fortified hill in Mysore, India, 31 miles N. of Bangalore, and 4,810 feet above the sea. The extensive fortifications on the plateau summit were erected by Hyder Ali and Tippoo Saib, and were stormed by a British force in 1791. The place is now used as a health resort by Europeans from Bangalore.

Nuneaton, a market town of Warwickshire, England, on the Anker river and the Coventry canal; 22 miles E. of Birmingham. It has a good Gothic parish church, some remains of a 12th-century nunnery, with a modern church built thereon, and a grammar school (1553). The ribbon manufacture has given place to worsted, cotton, and woolen spinning. "George Eliot," born at Griff, 2 miles to the S., went to school at Nuneaton, and here witnessed the riot described in "Felix Holt."

Nunez, Alvar (Cabva de Vaca), a Spanish soldier; born in Jerez de la Frontera, Spain, in 1490. In 1528 he was royal treasurer on an expedition sent to Florida; in 1540 was appointed governor of Paraguay; in 1544 was deposed; tried by the Grand Council of the Indies, banished to Africa, but was recalled later and made judge of the Supreme Court of Seville. He wrote two valuable historical books, "Shipwrecks" and "Commentaries." He died in Seville, Spain, about 1560.

Nuñez, Rafael, a South American statesman; born in Carthagena, New Granada, Sept. 28, 1825; studied there; was

elected to Congress in 1851; was secretary of the treasury; consul of Colombia at Havre and Liverpool; was president of Bolivar three times. His publications include: "Essays on Socialism," (1876); "Political Reform in Colombia" (1885). He died in Bogota, Sept. 18, 1894.

Nuñez de Arce, Gaspar, a Spanish dramatist and poet; born in Valladolid, Spain, Aug. 4, 1834. Of his plays the most notable are the comedies "Who is the Author?" (1859); "Neither So Much nor So Little" (1865); "El Laz de Leña," a drama in five acts on the subject of Don Carlos. Among his remarkably popular lyric and patriotic poems are: "The Last Lament of Lord Byron" (23d ed. 1884); "Battle Cries" (5th ed. 1885); "Vertigo" (25th ed. 1886); "An Idyl and an Elegy" (18th ed. 1886).

Nuphar, in botany, yellow water-lily; brandy-bottle; the typical genus of the tribe or family *Nupharidæ*. Sepals four, five, or six; petals many, yellow; stamens many, inserted beneath the disk; filaments short, flattened; fruit an ovoid berry of separable carpels, with many seeds. Known species three or four. The Turks prepare a cooling drink from the flowers of *N. luteum*. The seeds well washed are eaten in times of scarcity; the bitter and astringent stems have been given in dysentery, and the leaves are said to be styptic.

Nuraghe, or **Nurhag,** the name of round towers, in shape truncated cones, of which 3,000 are scattered about the island of Sardinia. They vary from 20 to 60 feet in diameter, rise 30 or 40 feet above the ground, with two or three stories of domed chambers connected by a spiral staircase, and are made of granite, limestone, basalt, porphyry, sandstone, and schist, built in regular courses of roughly hewn stone, without cement. Some of the stones in the lower courses weigh 12 tons each. Believed to be of Phœnician origin, they closely resemble the brochs of Scotland.

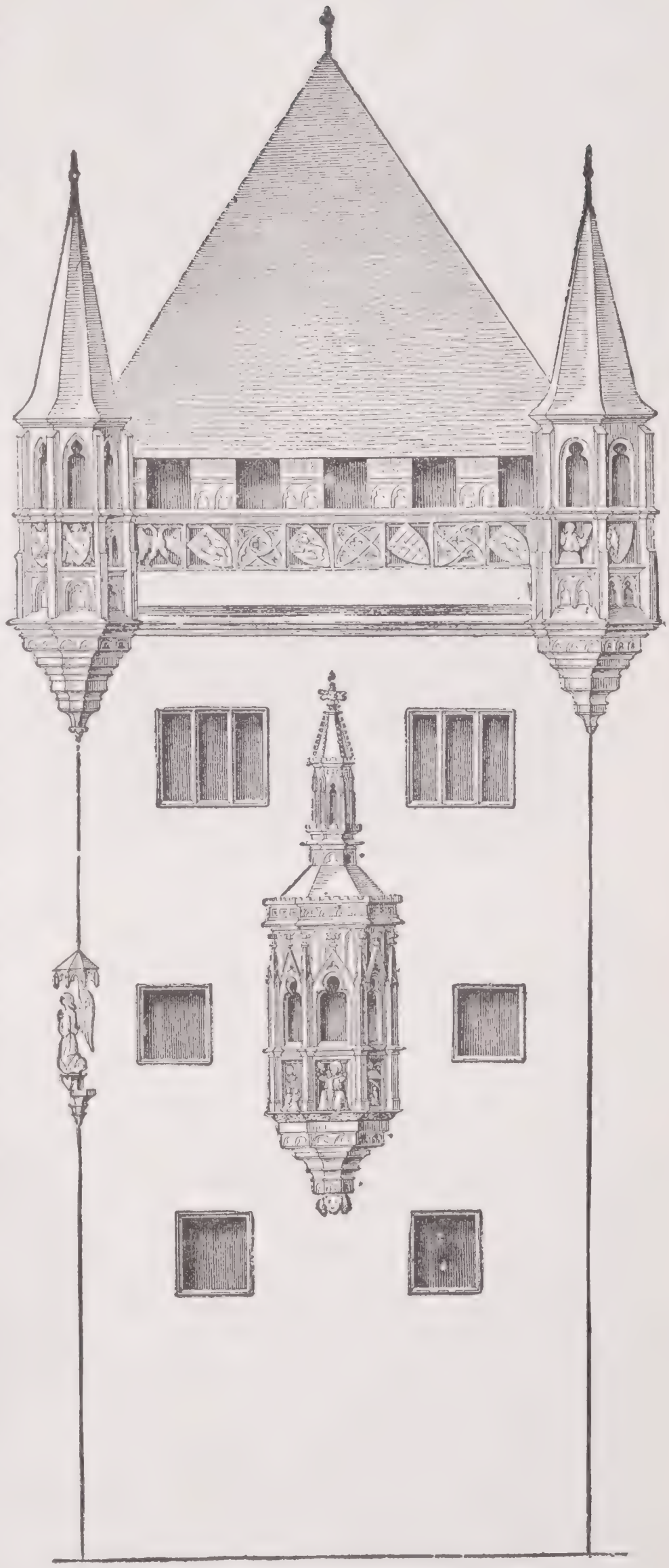
Nur ed-Din Mahmud, or **Malek al-Adel,** emir and Sultan of Syria; born in Damascus, Turkey, in 1117. His father, Omad ed-Din Zenghi, originally governor of Mosul and Diarbekir under the Seljuk sultans, had established his independence, and extended his authority over Northern Syria. Nur ed-Din Mahmûd succeeded him in 1145, and changed the seat of government from Mosul to Aleppo. From this time onward his life was one long duel with the Christians — the Crusaders, Hospitallers, Templars, and Knights of the Latin kingdom of Jerusalem. The most notable incidents in this contest may be briefly summarized. Count Joscelin, in an attempt to recover his capital, Edessa, was signally discomfited under its walls, and his army almost annihilated. This gave occasion to the second Crusade. The Crusaders were, however, foiled by Nur ed-Din before Damascus, and, being defeated in a number of conflicts, abandoned their enterprise. The emir next conquered Tripolis and Antioch, the prince of the latter territory being defeated and slain in a bloody conflict in June, 1149; and before 1151 all the Christian strongholds in Syria were in Nur ed-Din's hands. He next took possession of Damascus (which till this time had been ruled by an independent Seljuk prince) in 1153. In 1157 the Christian orders suffered a severe defeat near Paneas; but an illness which prostrated their enemy in 1159 enabled them to retake some of their lost territories. Recovering, Nur ed-Din soon won back what had been taken from him, and turned his attention to Egypt, then governed by the effeminate and degenerate Fatimites. In 1168 his brother, Asad al-Din Shirkoh, overran Egypt, but, dying soon afterward, was succeeded by his nephew, the celebrated Saladin, who completed the conquest of the country, and restored the Sunnite faith. This won for Nur ed-Din the gratitude of the Caliph of Bagdad, who created him Sultan of Syria and Egypt. Nur ed-Din, however, grew jealous of his able young lieutenant, and was preparing to march into Egypt in person, when he died in Damascus in May, 1173.

Nuremberg, a city in the Bavarian province of Middle Franconia, Germany; on the Pegnitz river; 95 miles N. by W. of Munich. It is the quaintest and most interesting town of Germany, on account of the wealth of mediæval architecture which it presents in its many-towered walls, its gateways, its picturesque streets with their gabled house fronts, its bridges, and its beautiful Gothic fountains. The Burg or royal palace, built (1024–1158) by Conrad II. and Frederick Barbarossa, commands a glorious view of the surrounding country, and is rich in paintings and wood-carvings; in its courtyard is a coeval linden tree. Of eight fine churches the two finest are St. Lawrence (1274–1477), with two noble towers 233 feet high, exquisite stained glass, the famous stone tabernacle (1495–1500) by Adam Krafft, and the wood-carvings of Veit Stoss; and St. Sebald's (1225–1377), with the superb shrine of Peter Vischer. Other noteworthy objects are the Italian Renaissance town hall (1622); the new law courts (1877); the gymnasium, founded by Melanchthon (1526); the Germanic museum (1852); an industrial museum (1871); a library of 70,000 volumes; Albert Dürer's house; and the statues of him, Hans Sachs, and Melanchthon, with the "Victoria" or Soldiers' monument (1876). Though the glory of Nuremberg's foreign commerce has long since passed away, the home trade is still of high importance. It

Nut

includes the specialties of metal, wood, and bone carvings, and children's "Dutch" toys and dolls, which, known as "Nuremberg wares," find a ready sale in every part of Europe, and are largely exported to America and the East. In all there are close on 200 factories, producing also chemicals, ultramarine, type, lead-pencils, beer, etc., and the town besides does a vast export trade in hops and import trade in colonial wares from the Netherlands.

First heard of in 1050, Nuremberg was raised to the rank of a free imperial city by Frederick II. in 1219. In 1417 the Hohenzollerns sold all their rights to the magistracy. This put an end to the feuds which had hitherto raged between the burg-grafs and the municipality; and Nuremberg for a time became the chief home in Germany of the arts and of inventions — watches or "Nuremberg eggs," air-guns, globes, etc. Simultaneously it grew rich with the fruits of the great commerce which it maintained between the traders of the East and the other European marts. The discovery of the Cape passage to India deprived it of its monopoly, and the Thirty Years' War still further weakened the city, which a century before had embraced the Reformed doctrines. Still, in 1803 it was allowed to retain its independence, with a territory of 483 square miles, containing 80,000 inhabitants; but, in consequence of disputes with Prussia, it entered into the Rhenish Confederation, and in 1806 was transferred to Bavaria. Pop. (1910) 332,539.



A HOUSE FRONT IN NUREMBERG.

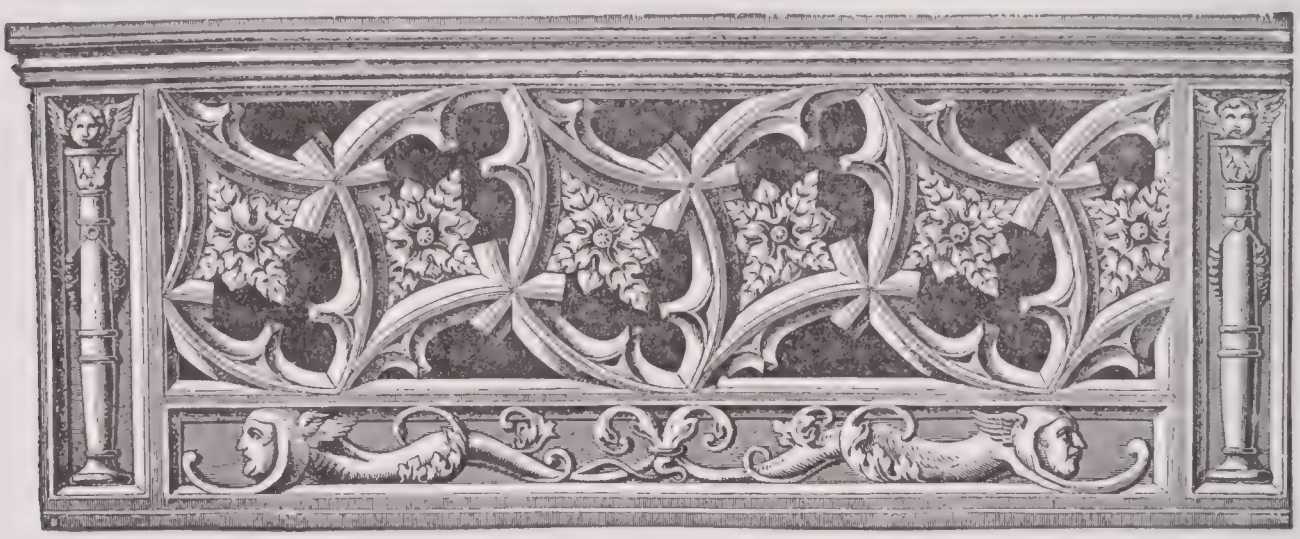
Nut, the name popularly given to the roundish fruit of certain trees and shrubs, consisting of a hard shell inclosing a kernel; as, a walnut, a cocoanut, a hazelnut, etc. In the United States, as in England, the name nut, without distinctive prefix, is commonly given to the hazelnut, but in France to the walnut. In botany, the term nut is used to designate a one-celled **fruit,** with a hardened peri-

carp containing, when mature, only one seed. The *Achenium* was by the older botanists generally included in this term. Some of the fruits to which it is popularly applied scarcely receive it as their popular designation. The hazelnut is an excellent example of the true nut of botanists. In mechanism, a short internal screw, which acts in the head of an external screw, and is employed to fasten anything that may become between it and a flange on the bottom of the external screw or bolt. A piece of metal with a cylindrical grooved hole, screwed upon the end of a screw bolt. In nautics, a projecting nozzle on each side of the shank of an anchor, to hold the stock firmly in its place.

Nutation, in astronomy, irregularities in the movement of the earth's equinoxes and her axis. As the attraction of the sun, tending to drag the equator down to the ecliptic which causes the PRECESSION OF EQUINOXES (*q. v.*), is the greatest at the solstices and ceases at the equinoxes, the precession of the equinoxes cannot be uniform, but varies from time to time. Similarly the moon produces a slight variation in different parts of her monthly revolution. But besides this, the moon, which does not move in the ecliptic, but in an orbit inclined to the plane of the ecliptic, has a movement like that of the precession of the earth's equinoxes, which causes the place of the intersection of her orbit with that of the sun to revolve every 19 years. During half of this time the moon's path is little inclined to the earth's equator, while during the remaining portion of the time it is much inclined. Hence her influence over the time of the earth's equinoxes is unequal. In botany, the curvatures of the stem which make growing portions of plants successively assume different directions without obvious cause. It is well seen in climbing plants. In pathology, a morbid nodding or oscillation of the head.

Nut Cracker, in ornithology, the genus *Nucifraga*, and especially *N. caryocatactes*, common in Southern Europe, a visitor to the N. portions of the Continent; flocks have been seen in Switzerland. They feed on the seeds of pine and beech, and on nuts, which they fix in some convenient crevice and hammer with the beak till the kernel is exposed. The plumage is of different shades of brown, studded with long white spots. Clark's nutcracker is *N. columbiana*.

Nut Hatch, in ornithology, *Sitta europæa*, a well-known bird; the upper parts delicate bluish-gray, throat white, under parts reddish brown, rich chestnut on flanks. It is extremely shy. The bill is wedge-shaped; in habits it resembles the creeper, but has the power of descending the trunk of a tree head downward, which the latter bird never does. The nut hatch is insectivorous, using its bill to pry off the bark to get at the insects underneath.



BALCONY OF A HOUSE IN NUREMBERG.

NUT CRACKER (NUCIFRAGA CARYOCATACTES).

Nutmeg, the kernel of the fruit of *Myristica moschata* or *fragrans.* This fruit is a nearly spherical drupe of the size and somewhat of the shape of a small pear. The fleshy part is of a yellowish color without, almost white within, and four or five lines in thickness, and opens into nearly equal longitudinal valves, presenting to view the nut surrounded by its arillus, known to us as "mace." The nut is oval, the shell very hard and dark-brown. This immediately envelops the kernel, which is the nutmeg as commonly sold in the shops. The tree producing this fruit grows principally in the islands of Banda in the East Indies, and had been introduced into Sumatra, India, Brazil, and the West Indies. It reaches the height of 20 or 30 feet, producing numerous branches. The color of the bark of the trunk is a reddish-brown; that of the young branches a bright green. The nutmeg is an aromatic, stimulating in its nature, and possessing narcotic properties, very grateful to the taste and smell, and much used in cookery. Nutmegs yield by distillation with water about 6 per cent. of a transparent oil having a sp. gr. .948, an odor of nutmeg, and a burning, aromatic taste.

Nutmeg State, Connecticut. Its sons possess such a reputation for shrewd habits that they have been jocularly charged with manufacturing and selling nutmegs made of wood and colored to imitate the real article.

Nutrition, in animal physiology, the function exercised in the growth and development of the body. The blood in the capillaries is the source from which all the tissues derive their nutrition, the materials for it being prepared in the blood; then, each individual part by a process of cell growth carries on the work. In vegetable physiology, it consists of seven processes: absorption, circulation, respiration, transpiration, excretion, assimilation, and growth. The nutrient substances — some of them essential and all of them useful — are carbon, oxygen, nitrogen, hydrogen, sulphur, iron, calcium, potassium, magnesium, phosphorus, sodium, and chlorine. The organs of nutrition are the root, stem, and leaf.

Percentage of nutrition in various articles of food:

Raw Cucumbers .. 2	Raw Beef.....26
Raw Melons..... 3	Raw Grapes.....27
Boiled Turnips.... 4½	Raw Plums.....29
Milk 7	Broiled Mutton.....30
Cabbage 7½	Oatmeal Porridge...75
Currants 10	Rye Bread.....79
Whipped Eggs....13	Boiled Beans.....87
Beets 14	Boiled Rice.....88
Apples 16	Barley Bread.....88
Peaches 20	Wheat Bread.....90
Boiled Codfish.....21	Baked Corn Bread..91
Broiled Venison...22	Boiled Barley.....92
Potatoes 22½	Butter 93
Fried Veal.....24	Boiled Peas.....93
Roast Pork.....24	Raw Oils.....94
Roast Poultry.....26	

Nuttall, Thomas, an American naturalist; born in Settle, England, in 1786. By trade a printer, he came to the United States; traveled extensively in the Mississippi valley, exploring both the Missouri and the Arkansas rivers, and also visited the Pacific coast. Part of his observations appeared in "A Journal of Travels into the Arkansas Territory." He also published a "Manual of the Ornithology of the United States and Canada." From 1822 to 1834 he was Professor of Natural History in Harvard, but having inherited an estate in England, returned to that country and died there Sept. 10, 1859.

Nux Vomica, the seeds of *Strychnos nux vomica.* They contain two alkaloids, strychnia and brucia, with a peculiar acid. Nux vomica has been used in dyspepsia, in some kinds of paralysis, in debility after rheumatic fever, etc. In overdoses the strychnia which it contains produces tetanus.

Nyangwe, an Arab trading station on the Upper Kongo or Lualaba, at the edge of the Manyema country; in lat. 4° 20′ S. From that point Stanley began the descent of the Lualaba in 1876.

Nyanza, an African word meaning lake, and especially applied to three bodies of water lying in the equatorial region of Africa. Of these the first was discovered in 1858 by Captain Speke, and by him named Victoria Nyanza. It is almost circular in form; 180 miles in diameter; has an area of 27,000 square miles; and is, with the exception of Lake Superior, the largest fresh water lake in the world. It is supposed to be one of the sources of the Nile. The second lake was discovered by Sir Samuel Baker in 1864, and named Albert Nyanza. It is 80 miles N. W. of Victoria Nyanza, and forms a part of the course of the Nile. It is 14 miles long and 40 wide. The water is fresh and very deep. The Albert Edward Nyanza was discovered by Stanley in 1876 and lies S. W. of Albert Nyanza.

Nyassa, or **Nyanja,** one of the equatorial great lakes of East Africa; about 260 miles S. E. of Tanganyika and 400 inland from the E. coast. It lies at an altitude of 1,570 feet, is very deep in the middle, shelving rapidly from the shores, which are rocky and high. Long and narrow, it measures 350 miles from N. to S. and an average of 40 miles from E. to W. The Shire river emerges at its S. extremity, and goes S. to the Zambesi The waters of the lake are sweet and abound in edible fish. Though the Portuguese had knowledge of the existence of the lake under the name of Maravi early in the 17th century, Livingstone was the first to fix in 1859 its exact situation and to navigate it.

Nyassaland, a name applied to the regions immediately S. W. and N. W. of Lake

Nyassa, but without conveying any precise limitation of boundaries, practically means the region in which the African Lakes Company of Glasgow has carried on its operations since its foundation in 1878; it works hand in hand with the missionaries of the Established and the Free Church of Scotland, whose principal stations are at Blantyre, some distance to the S. of the lake, and Bandawe, half way up its W. side. Both the commercial company and the mission stations were founded for the express purpose of counteracting the slave dealing of the Arab marauders. Nyassaland was the nucleus of what was in 1891 constituted British Central Africa Protectorate, under an Imperial Commissioner, with an area of 42,217 square miles, and (1899) 377 European inhabitants. Lying on the W. and S. shores of Lake Nyassa, it forms the E. portion of British Central Africa, which stretches toward the interior and the Zambesi. In 1907 all British Nyassaland, the Shire Highlands, and the greater part of the basin of the Shire river, were constituted the Nyassaland Protectorate, under a governor and councils.

Nyaya, one of the six schools of Brahmanic philosophy, and regarded as eminently orthodox. It was founded by Gotama, who must not be confounded with the Gotama or Gautama generally looked on as the founder of Buddhism, though the tenets of both were much akin. The Nyaya philosophy begins with the assertion that supreme felicity is derivable from true knowledge. Ignorance, by producing faults and activity, became the cause of birth. The world is a compound of good and evil, pleasure and pain; but it must be renounced, effort and activity abandoned, and the soul separated from body and mind. The world is held to be in a state of suffering, the doctrine of the transmigration of souls accepted, and men are urged to look forward to final emancipation from pain, birth, activity, fault, and false notions, in which case they shall attain supreme felicity.

Nyborg, a maritime town in Denmark, on the Great Belt, E. coast of Fyen Island; in the province of Svendborg; 17 miles E. S. E. Odense; formerly one of the chief citadels of Denmark; its fortifications were destroyed in 1869, and are now a promenade. The town was founded in 1170; several times a royal residence; and the birthplace of Christian II., 1481. The Swedes lost a great battle near the town, Nov. 14, 1659.

Nyctaginaceæ, a natural order of partly herbaceous plants, both annual and perennial, and partly shrubs and trees. There are about 100 known species, natives of warm countries. Some have beautiful flowers, as those of the genus *mirabilis,* known in gardens as Marvel of Peru.

Nyctalopia, in pathology, night blindness. Etymologically, this should mean that one sees comparatively well at night but badly during the day, and hemeralopia, that he sees well by day but badly by night. The two have, however, become hopelessly confused, and the preponderance of authority is in favor of employing them with a meaning opposite to their etymological one. Hippocrates used the word correctly; the erroneous meaning began with Galen. Both are forms of partial amaurosis, produced perhaps by imperfect nutrition of the retina. They sometimes arise in connection with scurvy.

Nycteribiidæ, in entomology, bat-lice; a family of *Pupipara,* parasitic on bats. They are wingless, but have a pair of halteres on the dorsal surface between the articulations of the posterior limbs.

Nyctibius, in ornithology, an American genus of *Caprimulgidæ,* sub-family *Podarginæ.* The tarsi are very short and feathered, and there is a strong tooth on the margin of the upper mandible. Sclater admits six species.

Nyctipithecus, in zoölogy, Douroucouli, night monkey, owl monkey; a genus of platyrhine monkeys, with five species, ranging from Nicaragua to the Amazon and Eastern Peru. They have large eyes, are nocturnal, and somewhat lemurine in appearance.

Nye, Edgar Wilson, an American humorist; born in Shirley, Me., Aug. 25, 1850; settled in Wyoming Territory; studied law, and was admitted to the bar in 1876. Afterward he removed to New York city, and became famous as a humorous lecturer and writer under the pseudonym of "Bill Nye." Among his works are: "Bill Nye and the Boomerang" (1881); "Forty Liars" (1883); "Remarks" (1886); "Fun, Wit, and Humor" (1889), with J. W. Riley: "Comic History of the United States" (1894); "Comic History of England" (1896). He died near Asheville, N. C., Feb. 22, 1896.

Nyköping, a seaport of Sweden; on a bay of the Baltic; 62 miles S. W. of Stockholm; manufactures machinery and cotton. The castle, now ruined, ranked in point of strength next to those of Stockholm and Calmar. King Waldemar was imprisoned here after his dethronement in 1288, till his death in 1302. Eric and Waldemar, brothers of King Birger, were left in 1317 to perish of hunger in a dungeon, the keys of which the king threw into the sea. In horror of this deed the people seized the castle and demolished it. In 1719 the town was taken and dismantled by the Russians.

Nylghau, in zoölogy, the largest of the few true antelopes found in India, where it is confined to the central parts. It frequents forests and low jungles, associating in small herds. The male, which has short, straight, erect horns pointing slightly forward, stands about four feet high at the

shoulders, with short, stiff mane, tuft of hair on chest and throat. Color, dark iron-gray or slate, darker on head and legs. The female is about one third smaller than the

NYLGHAU ANTELOPE.

male, and, like her young, is fawn-colored. The tongue is prehensile. Its skin makes excellent leather; but its flesh, from religious scruples, is not eaten.

Nym Crinkle. See WHEELER, ANDREW CARPENTER.

Nymphæa, in botany, white water lily; a genus of *Nymphæaceæ*, family or tribe *Nupharidæ*. Sepals four; petals expanded, white, blue, or red, in many series, the inner ones passing into stamens, adnate to the disk; ovary many-celled, with the styles radiating on the top; fruit a berry with the numerous seeds buried in the pulp. Known species about 20 from various regions. *N. alba* has orbicular, entire floating leaves, and large flowers; is frequent in lakes and still waters. It is occasionally seen with smaller flowers. The rhizomes dye gray; they have been used also for tanning leather, and beer has been made from them. *N. lotus*, an Indian species, has strongly toothed leaves and white flowers tinged with pink. It is used as an astringent in diarrhœa, cholera, and diseases of the liver, the root as a demulcent in piles, and the seeds as a cooling medicine in cutaneous diseases, and as an antidote for poisons. The roots are made into curries; the seeds also are eaten, as are those of *N. stellata*, another Indian species, in times of scarcity.

Nymphs, in Greek mythology, female divinities of inferior rank, inhabiting the sea, streams, groves, meadows and pastures, grottoes, fountains, hills, glens, and trees. Among them different classes were distinguished, particularly the Oceanides, daughters of Oceanus (nymphs of the great ocean which flows around the earth), the Nereids, daughters of Nereus (nymphs of the inner depths of the sea, or of the inner sea — the Mediterranean), Potameides (river nymphs), Naiads (nymphs of fountains, lakes, brooks, wells), Oréads (mountain nymphs), Napææ (nymphs of glens), and Dryads or Hamadryads (forest nymphs,

PEGASUS AND NYMPHS.

who were believed to die with the trees in which they dwelt). They were the goddesses of the fertilizing power of moisture, possessed prophetic power, and took interest in the nourishment and growth of infants, the chase, and dancing. They are among the most beautiful conceptions of the plastic fancy of the ancient Greeks.

Nystagmus, an involuntary movement of the eyeball due to clonic spasm of the muscles of the globe. It usually affects both eyes. The movement is usually horizontal, *i. e.*, from side to side, but it may be rotary.

O

O, the 15th letter, and the 4th vowel of the English alphabet. The shape of the written letter was probably suggested by the circular formation of the lips in uttering the sound. O is called the labial vowel, i being the palatal vowel, and a the guttural. In English o has six distinct sounds or shades of sound: (1) The sound of o in not, as in pot. (2) The same sound lengthened by a following r, as in or; and in the diagraph ou, as in fought, sought (unmarked, o). (3) The sound of o in go; and in the digraphs oe, as in foe, toe; oa, as in groan, moan, boat; and ou in though. This sound is modified by r following the vowel, as in more. (4) The sound of o in who, move, tomb; and in the digraphs oo, as in room, soon; and ou, as in through, wound. (5) The sound of u in bull or full, as in wolf, woman. (6) The sound of u in tub, as in son, love, come; and in the digraphs oe, as in does; oo, as in blood; ou, as in enough, tough. The long o in modern English, as in go, represents an Anglo-Saxon á, as in bone = Anglo-Saxon *bán*, loaf = Anglo-Saxon *láf*, stone = Anglo-Saxon *stán*.

O as a symbol is used:

1. As a numeral: (1) Among the ancients for 11, and with a stroke over ō for 11,000. (2) Now as the symbol of nothing, or a cipher.

2. In chemistry for the element oxygen.

3. In old music as the sign of *tempus perfectum*, or triple time; as the incomplete circle was of *tempus imperfectum*.

O, plural **oes,** an exclamation used in earnest or solemn address, entreaty, appeal, or invocation, and prefixed to the noun of address. Attempts have been made to distinguish between O and Oh by some writers; namely, that O should be used only in direct address to a person or personified object, and should never be followed by the exclamation point, while Oh should be used in mere exclamations, where no direct address or appeal is made to the object, and may be followed by the exclamation point or not, according to the nature or construction of the sentence. This distinction is, however, merely arbitrary, and is not regarded by most writers, even the best, the two forms being generally used indiscriminately.

O', in Irish proper names, a patronymic prefix corresponding to the Mac of the Highlands of Scotland; thus O'Connell means "the son of Connell."

Oahu (wä'hö), one of the Hawaiian Islands, between Molokai and Kauai, the most important island of the archipelago, on which is the capital Honolulu; length 37 miles; greatest breadth 25 miles; area 600 square miles. It is crossed by two mountain chains running parallel N. W. to S. E., between which is a large dry plain now only useful as pasture land; formerly, when irrigated, more fertile. Highest point Kaala, 3,890 feet. Pop. (1910) 82,028.

Oajaca, or **Oaxaca** (wä-hä'kä), a mountainous State in the S. of Mexico, bordering on the Pacific; area 35,382 square miles; pop. (1900) 948,633. The capital, Oajaca, lies 5,060 feet above the sea, in the fertile valley of the Atoyac. It contains a large cathedral (1729), a quaint bishop's palace, the Seminario Tridentino, and the State Institute, with 34 professors. The manufactures are chiefly chocolate, cotton goods, cigars, candles, and soap. Pop. (1910) 37,469.

Oak, any species of the genus *Quercus*, and specifically *Q. robur*, the common British oak. It is sometimes 60 to 100 feet high, with a girth of 70 feet. The branches are long and spreading; the leaves are sinuate-lobed, oblong-obovate; the catkins pendulous, appearing with the leaves in April or May; the fruit a cupola, externally with many adpressed imbricated scales. There are two varieties — *sessiliflora*, with sessile and *pedunculata*, with pedunculated flowers; the latter is the most common in natural woods. Its timber is whitish and hard, that of the other reddish and brittle.

Oak Apple, a spongy excrescence found on the twigs of the *Quercus pedunculata*. It is formed by the puncture of a cynips, and rises rapidly, being usually spheroidal in form, and about one to two inches in diameter. The oak apple must not be con-

founded with those beautiful little excrescences so common on the underside of the leaves of the oak, and known by the names of galls and spangles. They are also produced by the puncture of different species of cynips. The oak apple has some resemblance to the bedeguar of the eglantine, but is not so rough and fibrous on the surface. Oak apples are very astringent, containing tannic acid, and are used both for making ink and for dyeing and staining.

Oak Beauty, *Amphidasis prodromaria,* a handsome moth, variegated with white, brown, black, etc.; expansion of wings about two inches. The larva feeds on the oak.

Oakland, city, county-seat of Alameda co., Cal.; across the bay from San Francisco (6 miles), on the Southern Pacific, the Western Pacific, and the Santa Fé railroads. The South Pacific Coast Railway also finds there a great station and has built a strong mole for trans-shipment beside the southernmost of the jetties built by the Federal government in the western part of the deep. land-locked harbor. The city has 15 miles of water-front, and its harbor finds place for the largest sea-going vessels.

Oakland was settled in 1820 by Spaniards. In 1852 was incorporated as a town by Americans, and received a city charter in 1854. Its name arose from the numerous live-oaks originally covering the site, and even yet to be admired in gardens and on certain streets. The surface slopes down gently from the Coast Range hills on the N. and E.; the streets are broad, 146 miles of them paved, mostly with macadam. Whether as an industrial and commercial center or as a residential suburb of the great city across the bay, Oakland presents great attractions. Its inclination of surface towards the bay effects unhindered drainage; its location under the hills affords protection from the cold N. and E. winds, and, with the tempering air from bay and ocean, the climate is about perfect.

The industries of Oakland are numerous and increasing. The wage-earners number nearly 20,000, and the annual amount of wages paid (1900) is $10,302,000. The chief industries are ship-building, iron works and machine-shops, fruit-canning, lumber yards, manufactories of wagons and carriages, building, paving, the handling of commerce at the great wharves and coal-bunkers, the labors of the water company, operation of the 80 miles of street railways, etc. The combined terminal facilities of railroad and water-carriage give Oakland also a fine commercial activity, serving the needs of the fertile agricultural districts with their shipments of fruit, grains, etc. A number of excellent ferries connect it with San Francisco and other places across the bay, while electric roads N. and S. keep it in communication with the chief places in the county and along the bay shore,—places like Berkeley, seat of the University of California. The annual expenditures of the city in 1900 were $785,000, of which $295,000 were for the public grammar and high schools. Its public library of 40,000 volumes occupies a $50,000 Carnegie building (site $20,000 more), and there are many handsome business buildings and private residences representing the flourishing prosperity of the place. Pop. (1860), 1,543; (1870), 10,500; (1880), 34,555; (1890), 48,682; (1900), 66,960; (1910) 150,174.

Oakleaf Roller, *Tortrix viridana,* a small moth which is very destructive to trees and takes its name from the fact that the larvæ roll themselves up in the oak leaves, which gives them both food and shelter. The front wings are green, but the chief color is brown.

Oak Leather, a spawnlike white kid leather, running over the fissures of old oak. Sowerby described it as *Xylostroma giganteum.* It may be the immature form of *Dœdalea quercina,* or a species of Polyporus. It is common in the United States, and is used for receiving plaster.

Oakum, a tangled mass of tarred hempen fibers, made from old rope by untwisting the strands and rubbing the fibers free from each other. Its principal use is in caulking the seams between planks, the space around rivets, bolts, etc., for the purpose of preventing water from penetrating.

Oannes, the Babylonian sea-god. He is described as having the head and body of a fish, to which were added a human head and feet. In the daytime he lived with men to instruct them in the arts and sciences, but at night retired to the ocean.

Oar Fish, *Regalecus Banksii,* one of the ribbon-fishes, a peculiar deep-sea fish, 12 to 20 feet or more in length, but having a narrow and extremely compressed body.

Oases, fertile spots in a desert, due to the presence of wells or of underground water supplies. The best known and most famous historically are those of the Libyan Desert and the Sahara; they occur also in the deserts of Arabia and Persia, and in the Gobi. The French have created many oases in the Algerian deserts by sinking Artesian Wells (*q. v.*). The chief vegetation of the African oases is palms—especially date and doom palms; with barley, rice, and millet, when the fertile area is large enough to admit of settled occupation.

Oat, or Oats (*Avena*), a genus of edible grasses cultivated extensively in all temperate climates, and though principally grown as food for horses largely used when ground into meal as human food. There are about 60 species, the principal of which are *A. sativa* (the common oat), *A. nuda* (naked oat, pilcorn, or peelcorn), *A. orientalis* (Tartarian or Hungarian oat), *A. brevis* (short oat), *A. strigosa* (bristle-pointed oat), *A. chinensis* (Chinese oat), etc. The

cultivated species of oats are subdivided into a large number of varieties, which are distinguished from each other by color, size, form of seeds, quality of straw, period of ripening, adaptation to particular soils and climates, and other characteristics. The yield of oats varies from 20 bushels to 80 bushels per acre according to soil, etc. The weight per bushel varies from 35 to 45 pounds, and the meal product is about half the weight of the oats. The wild oat (*A. fatua*) is supposed to be the original of all the species, but its native country is unknown. In the calendar year 1909 the oat crop of the United States aggregated 1,007,353,000 bushels, from 33,204,000 acres, valued at $408,174,000. See Oatmeal.

Oates, Titus, an English impostor; son of a ribbon weaver; born in Oakham, England, in 1649. He took orders in the Church of England, and held benefices in Kent and Sussex; became afterward chaplain in the navy and was discharged for misconduct; turned Roman Catholic, and resided for some time at the Jesuit College of Valladolid and St. Omar, but was finally, in 1678, dismissed for repeated misdemeanors. Flung into the world as a mere adventurer he returned to England and concocted the story of the famous Popish Plot (*q. v.*). Various events gave color to the accusation, and in the public excitement created by the story several eminent Catholics were executed, while Titus Oates was lodged handsomely in Whitehall, and received a pension of $4,500 from Parliament. The effects of this perjury continued for two years till, after the execution of Strafford, there was a revulsion of public opinion. He was afterward convicted of perjury, sentenced to be pilloried five times a year, whipped from Aldgate to Newgate, and imprisoned for life. On the accession of William and Mary he was liberated, and lived to a good old age, enjoying an ill-deserved pension of $1,500 a year. He died in London, England, July 12, 1705.

Oath, a solemn affirmation or declaration made with an appeal to God for the truth of what is affirmed. By the appeal to the Supreme Being, the person making oath is understood to invoke His vengeance if that which is affirmed or declared is false; or, in case of a promissory oath, if the promise or obligation is willfully broken. Oaths are of two kinds: (1) Assertory oaths, or those oaths by which the truth of a statement is affirmed; as an oath sworn to the truth of an affidavit; (2) promissory oaths, or those oaths by which something is promised, or an obligation is assumed; as, the oaths of witnesses; the oath of allegiance, by which the person taking the oath promises allegiance to the government. Modern legislation has also provided particular forms of oaths, having permitted affirmations to be made by persons who have conscientious objections to take an oath. Witnesses are allowed to swear to the truth of their evidence in any way which is binding on their consciences. Also a careless and blasphemous use of the name of the Divine Being, or of anything divine or sacred, either by way of appeal or imprecation, or as a profane exclamation or ejaculation. Ex officio oath, in old English law, an oath whereby any person was obliged to make any presentment of any crime or offense, or to confess or accuse himself or herself of any criminal matter or thing, whereby he or she might be liable to any censure, penalty, or punishment whatsoever.

Oatmeal, panic-grass; a plant of the genus *Panicum*. Also the meal of the oat deprived of its husk. It is one of the most important and valuable articles of food, containing a greater proportion of proteine compounds than the finest wheaten flour. An analysis of a sample of oatmeal gave 13 per cent. of nitrogenous material, 60–70 per cent. of heat givers, and 3 per cent. of mineral matter. It is a strong food, and requires much cooking in order to burst its starch cells; the longer it is cooked the more digestible it becomes.

Oaxaca. See Oajaca.

Ob, or **Obi,** the great river of Western Siberia, rising in two branches, the Biya and the Katun (both of which have their origin in the Altai Mountains, within the frontier of the Chinese dominions) and flowing N. W. and N. for 2,120 miles to the great Gulf of Ob in the Arctic Ocean. Its chief tributaries are the Irtish, Tcharysh, Tom, and Tchulym, all navigable. On the banks of the Ob are Barnaul, Tomsk, and Narym. At present only a few steamers ply on the great water-system of the Ob, which nevertheless seems destined to become a great commercial thoroughfare. The explorations of Professor Nordenskjöld, but more especially the tentative voyages of Captain Wiggins in 1874 and 1876, from Dundee through the Kara Sea to the Gulf of Ob, repeated in later years, have proved the feasibilty of this direct route, and the accessibility of the great navigation system of the Siberian river to West European commerce.

Obadiah ("servant of God"), the name of various persons mentioned in the Old Testament (I Kings xviii: 3; I Chron. iii: 21, vii: 3, viii: 38, ix: 16, 44, xii: 9, xxvii: 19; II Chron. xvii: 7, xxxiv: 12; Ezra viii: 9; Neh. x: 5; Obadiah i: 1). Nothing is known of the history of the last-named prophet. He is not the same as the Obadiah of I Kings xviii: 3–7, or of II Chron. xvii: 7. Also the fourth of the minor pro-

phetic books. It contains only one chapter of 21 verses, denouncing vengeance against the Edomites for their unbrotherly conduct, when, on the occasion of the capture of Jerusalem by a heathen foe, they helped to plunder that capital, besides cutting off fugitive Jews and surrendering refugees (10–14). Prophecy is then made of the future glory in store for the Jews (17–21). If, as is probable, the capture of Jerusalem referred to was that by Nebuchadnezzar, then the book was written after the year 588 B. C. It is related to Jeremiah xlix: 7–22. (See specially Obadiah 1–6, 8, 16, and Jer. xlix: 14, 15, 16, 9, 10, 7, 12.) Which is the original has not been decided: Obadiah 1, 19, 21, is the same in theme as Amos ix: 11, which may possibly explain why Obadiah immediately follows Amos in the Bible.

Oban, a fashionable watering-place of Argyllshire, Scotland, 84 miles W. N. W. of Stirling, and 136 of Edinburgh. It curves round a beautiful and almost land-locked bay, which, sheltered from every wind by the island of Kerrera on the W. and by the high shores of the mainland, forms a spacious haven, crowded in summer by yachts and steamers. It is the great tourist headquarters of the West Highlands, possessing about 30 hotels and splendid steamboat facilities. Objects of interest are the picturesque ruins of Dunolly and Dunstaffnage Castles, and a prehistoric cave-dwelling, discovered in 1890.

Obé, or Obi, the name given to the magical arts or witchcraft practised by "Obeah-men" and "Obeah-women" among the negroes of the West Indies and the United States. It is substantially similar to the corresponding superstitions all the world over.

Obeid, El, capital of Kordofan, in the Sudan, 220 miles S. W. of Khartum. It consists of a number of villages, originally separate and inhabited by distinct races, but now joined together into one town. Gum-arabic, ivory, gold, and ostrich feathers are the chief articles of trade. Near this place, in 1883, a force of Egyptians under Hicks Pasha, with an English staff, was exterminated by a large army of the Mahdi. Pop. est. 35,000.

Obelisk, in printing and writing, in its Latin sense, a sign like a sharp-pointed spear (!) with which doubtful passages were marked, or references made to notes in the margin, or at the foot of a page; a dagger.

In architecture, a quadrangular, slender stone shaft, with a pyramidal apex. The width of the base is usually about one-tenth of the height, and the pyramidal apex has about one-tenth of the whole length. Obelisks were commonly formed from a single stone, mostly of granite. Obelisks were erected in pairs, and many still exist on the ancient sites, while others have been removed and set up elsewhere.

The obelisk was the Egyptian symbol of the supreme God. The Arabians called them Pharaoh's needles, and the Egyptian priests the fingers of the sun. The first obelisk is said to have been erected by Rameses, King of Egypt, in the time of the Trojan war; it was 40 cubits high, and employed 20,000 men in building. There are about a dozen Egyptian obelisks erected in Rome. One was erected by the Emperor Augustus in the Campus Martius, on the pavement of which was a horizontal dial that marked the hour, about 14 B. C. Of the obelisks brought to Rome by the emperors, several have been restored and set up by various Popes. The largest is that from Heliopolis. It is of granite, and now stands before the N. portico of the Church of St. John Lateran, where it was erected in 1588. Its whole height is about 149 feet; without the base, 105 feet. It was removed to Alexandria by Constantine, and to Rome by his son Constantius, and placed in the Circus Maximus. The obelisk at Luxor was presented to the French nation, in 1820, by Mehemet Ali, and was reërected in Paris in 1833. Its height is 73 feet. The obelisk presented to the English nation was removed to England and set up on the Thames Embankment in London. It is 68 feet 5½ inches in height, with a width at the base of 7 feet 10½ inches by 7 feet 5 inches. Of Egyptian obelisks 42 are known, some broken; 12 at Rome; 1, from Luxor, set up in the Place de la Concorde, Paris, October, 1836; 5 in England; 1 in Central Park, New York. The obelisks improperly named "Cleopatra's Needles" were erected by Thothmes III. at On (Heliopolis), about 1600 B. C. One was removed to Alexandria by Augusta, about 23 B. C. After being long embedded in the shore, it was acquired for Great Britain by Sir Ralph Abercromby, in 1801; but not removed till 1878, when it was erected on the Thames Embankment in the city of London.

The other was presented to the United States and now stands in Central Park, New York. Within the foundation and steps of the pedestal were found stones and implements engraved with emblematic designs. The obelisk was removed to the wharf and on the steamer waiting for it by means of cannon balls rolling in metal grooves. The shaft, pedestal, and steps of the obelisk were removed separately, the entire mass weighing 1,470 tons. The steamer bearing this freight left Alexandria, June 12, 1880, and arrived at New York, July 20. The iron tracks and can-

non balls were adjusted after some delay, and on these the monolith was disembarked Sept. 16. Next the rise and fall of the tide was utilized to float it up the North river and land it at the foot of Ninety-sixth street, where it was moved by steam power on tracks with rollers to Central Park. The track was two miles long, and was inclined, the upper part of it being laid on trestle-work, in order to bring the shaft, when it was to be raised, at a proper height

The battle to commemorate which the monument was erected took place June 17, 1775. Just 50 years later the Marquis de Lafayette laid its corner stone. It is 30 feet square at base and 231 feet high. It was dedicated in 1843.

Obelus, in printing and writing, a mark (thus — or +), so called from its resemblance to a needle, and used in old MSS., or old editions of the classics, to point out a spurious or doubtful passage or reading.

AN OBELISK.

above the pedestal. Pulleys, chains, and ropes were then attached, and, the signal being given, the great mass was rapidly and gently raised, and in a short time stood firmly on the base which had been previously securely put in place. (See GORRINGE, H. H.). The Washington obelisk at Washington is 555 feet high, and was dedicated Feb. 22, 1885. The Bunker Hill Monument may also be properly called an obelisk, and that with the Washington are the two most famous of American construction.

Ober, Frederick Albion, an American ornithologist, traveler, and author; born in Beverly, Mass., Feb. 13, 1849. He traveled extensively in Florida, the West Indies, Mexico, Spain, North Africa, and South America, and wrote: "Camps in the Caribbees" (1880); "The Silver City" (1883); "Young Folks' History of Mexico" (1883); "Montezuma's Gold Mines" (1887); "In the Wake of Columbus" (1893); "Knockabout Club Series" "Under the Cuban Flag" (1896); "My Span-

ish Sweetheart" (1897); "The Cacique's Treasure Cave" (1901); etc.

Ober-Ammergau. See AMMERGAU, OBER and UNTER.

Oberholtzer, Mrs. Sara Louisa (Vickers), an American poet; born in Chester co., Pa., May 20, 1841. Her works include: "Violet Lee and Other Poems" (1872); "Come for Arbutus" (1882); 'Hope's Heart Bells," a story of Quaker life (1884); "Daisies of Verse" (1886); and "Souvenirs of Occasions."

Oberlin, a town in Lorain co., O.; on the Lake Shore and Michigan Southern railroad; 34 miles W. S. W. of Cleveland. Here are the well-known Oberlin College, a school of telegraphy, business college, conservatory of music, National and State banks, electric lights, public and college libraries, and weekly and monthly periodicals. The town has an assessed property valuation of about $1,300,000. Pop. (1890) 4,376; (1900) 4,082; (1910) 4,365.

Oberlin, Johann Friedrich, an Alsatian clergyman; born in Strasburg, Aug. 31, 1740. He became pastor of Waldbach in the Steinthal (Ban de la Roche) district of Alsace in 1767, and set about ameliorating the wretchedness of the district and the people. Despite opposition he gradually effected a wonderful improvement in the morals, industry, and thrift of the community. Besides agriculture, Oberlin introduced straw-plaiting, spinning, and weaving into the community, so that the village of a few hundred became a town with 5,000 inhabitants, and a model to great numbers of philanthropists. He died in the Steinthal, Alsace, June 1, 1826.

Oberlin College, a coeducational nonsectarian institution in Oberlin, O., founded in 1833; has endowment funds exceeding $1,750,000; grounds, buildings, scientific apparatus, and other property valued at over $1,500,000; ordinary annual income, about $300,000; average number of faculty, 130; average student attendance, including summer school, 2,000; graduates, over 5,000; volumes in the library, about 105,000.

Oberon, in mediæval mythology, the king of the fairies. Wieland's beautiful poem, Weber's romantic opera of this name, the "Midsummer Night's Dream," and innumerable other poems and tales of which he is the hero, have made his name familiar. His wife's name was Titania, or Mab, whose powers have been so beautifully depicted in "Romeo and Juliet."

Obesity, a morbid accumulation of fat under the integuments to such an extent as to constitute a disease; it is a stronger term than corpulency.

Obi. See OB.

Obiter dictum, in law, an incidental opinion, as distinguished from a judicial dictum.

Object, in grammar and logic, the word, sentence, or member of a sentence or clause, denoting the person or thing on which the action expressed by a transitive verb is exercised; a word or member of a sentence or clause governed by a preposition, as in the sentence, "He wrote the letter," letter is the object of wrote; and in the sentence, "He disputed the fact of her death," the fact of her death is the object of disputed. In philosophy, the correlative of subject.

Objective, the combination of lenses which forms the principal part of a telescope or microscope, all the rest being accessories. In large telescopes the cost of the objective is about as much as the whole of the rest of the instrument. The purpose of the objective is to bring to a focus the cone or cylinder of rays falling on it from each point of any object under examination, and thus form an image of the object in the focal plane. This image can then be examined in various ways by different eye-pieces of the telescope or microscope used. If light of all wave-lengths were reflected alike, the making of objectives would be a simple matter. As it is, it is a difficult process, and one in which improvements are still to be looked for, and in which only the most skilled opticians are very successful. Telescope objectives are generally made of two lenses, one of crown-glass, the other of flint-glass. The crown-glass lens is a convex one, which would always give a shorter focal length than the two combined. The flint-glass lens is some form of concave lens, which makes the combination of longer focal length, and at the same time corrects so far as it can be done the unequal refraction of the crown lens. It is not possible with any combination of two lenses to make, perhaps, an absolutely perfect achromatic image in the focal plane; but great improvements have been made. The most nearly perfect object-glasses so far ground are the 30-inch objective of the telescope of the Russian Imperial Observatory at Pulkowa (1885), the 36-inch objective of the telescope of the Lick Observatory (1887), in California, and the 40-inch objective of the Yerkes telescope of Chicago University (1894), the first two made by A. Clark & Sons, the last by A. G. Clark, of Cambridgeport, Mass.

Oblates, the name of a class of religious bodies in the Roman Catholic Church, which differ from the religious orders strictly so called in not being bound by the solemn vows of the religious profession. The institute of oblates was one of the many reforms introduced in the diocese of Milan by St.

Charles Borromeo, toward the close of the 16th century. The members consisted of secular priests who lived in community, and were merely bound by a promise to the bishop to devote themselves to any service which he should consider desirable for the interest of religion. St. Charles made use of their services chiefly in the wild and inaccessible Alpine districts of his diocese. The oblates of Mary Immaculate, founded at Marseilles in 1815, have nine houses in Great Britain, two in Ireland, and are numerous in Canada, British India, and the United States.

Obligation, a term in law which describes the bond under which a person binds himself to pay within a certain time and in the breaking of which a penalty is involved; or the tie in general by which a person is legally bound to the performance of anything.

Oboe, a wind instrument of the reed kind, which at a very early date took its place as one of the essential instruments of the orchestra. It consists of a tube, made of box, ebony, or cocoawood, about 21 inches long, narrow at the top, but gradually widening toward the lower end or bell, and divided into three pieces or joints. In the upper and middle ends are holes, by stopping or opening which with the fingers, the natural scale is formed, the intermediate semitones being produced by means of the keys, of which some hautboys have but two, while others have 15, and sometimes more; they are seldom made now with less than 15 keys. Its range of available notes extends from B to G in alto. The tone of the hautboy is rich and sweet, and is particularly adapted to "piano" and "dolce" passages. This term is also given by organ builders to a reed stop similar in shape to the real hautboy.

Obolus, in Greek antiquities, a small coin of ancient Greece, originally of copper, afterward of silver, the sixth part of an Attic drachma, and equal to two and one-half cents. Multiples and sub-multiples of the obolus were also used, as 5, 4, 3, 2, 1½ oboli, and ½, ⅓, and ¼ of an obolus. Also a small weight, the sixth part of an Attic drachma.

Obongo, or **Abongo,** a tribe of pigmies who live in different parts of French Kongo in West Africa. They are between four and five feet in height, are of a brown color, and have bushy hair which grows over their bodies as well as their heads. They are nomadic, follow fishing and hunting, and build conical grass huts. See Bongo.

O'Brien, Fitz-James, an Irish-American author; born in Limerick, Ireland, in 1828. His writings comprise "The Diamond Lens and Other Stories," and many poems. His collected works appeared in 1881. He died in Cumberland, Md., April 6, 1862.

O'Brien, Jeremiah, an American patriot; born in Scarboro, Me., in 1740; moved to Machias, Me., in 1765, where on receipt of the news of the battle of Lexington he helped to erect a liberty pole. When the British armed schooner "Margaretta" reached Machias, and her captain ordered the pole taken down, O'Brien at the head of 60 volunteers captured the becalmed schooner, and rechristened her the "Machias Liberty." This was the first sea fight of the Revolution. For several months O'Brien cruised along the coast, taking a number of prizes, but subsequently, when in charge of the privateer "Hannibal," he was captured by two British frigates, and sent a prisoner to England. He escaped after a few months and returned to the United States. For a number of years he lived in Brunswick, Me., and was collector of the port of Machias at the time of his death, Oct. 5, 1818.

O'Brien, William, an Irish journalist and politician; the son of the late James O'Brien of Mallow; born in Mallow, Oct. 2, 1852; was educated at Cloyne Diocesan College and at Queen's College, Cork. He married, in 1896, Sophie, daughter of H. Raffalovitch, a banker in Paris. He became a journalist and founded the newspapers, "United Ireland" in 1880, and "The Irish People" in 1898, the latter the organ of a new agrarian movement called the United Irish League. He has always been a Nationalist, has been prosecuted nine times for political offenses and has spent two years in prison. He was M. P. for Mallow, 1883-85, unseated 1886, sat for N. E. Cork, 1887-1892, elected for Cork City 1902, resigned 1904, and reëlected without opposition in 1905. He is the author of "When We were Boys" (1893); "Irish Ideas" (1894); "A Queen of Men" (1896); and "Recollections" (1906), a work which throws much valuable light on matters political in Ireland from 1852 to 1883.

O'Brien, William Smith, an Irish politician; born in County Clare, Ireland, Oct. 17, 1803. He was educated at Harrow and Cambridge. In 1826, he entered the British House of Commons as member for Ennis, and, in 1835, was returned for Limerick, which he represented for 13 successive years. In July, 1848, he took part in the insurrection which broke out in County Tipperary, was arrested, tried at Dublin for high treason, and sent as a political convict for life to Tasmania. There, his exemplary conduct, and chivalrous observance of his parole of honor, became so marked, that, in 1856, the British government granted him a free pardon, and he returned home. He died in Bangor, North Wales, June 18, 1864.

Obscurantists ("lovers of darkness"), the name given to those who are supposed to look with dislike and apprehension on the progress of knowledge, especially to such as defend theological prejudices against what is believed to be scientific truth.

Observatory, a building devoted to the observation of astronomical, magnetic, meteorological, or other natural phenomena. The astronomical observatory is the one of most general interest. Astronomical observation began at an early date in China; the pyramids in Egypt seem in some way to have been associated with stellar observation; and the first historical observatory was founded in Alexandria 300 B. C. Its work was begun by Aristillus, and continued by Timocharis, Hipparchus, Aristarchus, and others. The first European observatory was built at Nuremberg by Bernard Walther in 1472, and this was followed in the 16th century by Tycho Brahe's famous observatory on the island of Hveen near Copenhagen, while another was erected by the Landgrave of Hesse at Cassel in 1561. Through the labors of Brahe practical astronomy became associated with the universities, so that Leyden and Copenhagen founded observatories. These were followed by the construction of the Royal Observatory at Paris (1667), the Greenwich Royal Observatory (1675), the Tusculan Observatory near Copenhagen (1704), Berlin (1705; new observatory 1835), Vienna (1756), Dublin (1785), Königsberg (1813), Sydney (1820), Cape of Good Hope (1820), Edinburgh (1825), Pulkowa near St. Petersburg (1839), Cambridge, Mass. (1839), Washington, D. C. (1845), Melbourne, (1853), Lick Observatory, California (1888), and the Yerkes Observatory at Lake Geneva, Wis. (1897).

Dun Echt Observatory, the private observatory of the Earl of Crawford, near Aberdeen, Scotland, has attracted considerable attention, as a center of distribution of astronomical telegraphic news, the Dun Echt circulars, in connection with the international code telegrams, being the medium of communication. It was with the Earl of Crawford that Messrs. Chandler and Ritchie, of Cambridge, Mass., first tested the practicability of their code system of astronomical telegrams, which has now been adopted all over the world.

The chief instrument used in the observatory is the telescope, whether in the form of the equatorial or in the mural circle and transit instrument, together with the sidereal and the solar clock. In the larger observatories the application of spectrum analysis, photography, photometry, etc., has greatly increased the number and variety of observations. The observatory building must be constructed in a very stable manner, and as the instruments must be out of contact with the walls they are attached to stone pillars that rest on foundations separate from the rest of the building. See DOME, OBSERVATORY: OBJECTIVE.

Obsidian (after Obsidius, a Roman, who first brought it from Ethiopia), in mineralogy, a vitreous lava, having sometimes the chemical composition of ORTHOCLASE (*q. v.*), or of a mixture of other minerals of volcanic origin. Sp. gr. 2.25–2.8. Forms important lava streams in the Lipari Islands, Iceland, Mexico, etc.

Ocala, a town and county-seat of Marion co., Fla.; on the Plant System and the Florida Central and Peninsular railroads; 5½ miles from the celebrated Silver Spring. It is noted as a center of the orange industry. It also produces Sea Island cotton, sugar cane, lemons, sweet potatoes, and phosphate. Pop. (1890) 2,904; (1900) 3,380; (1910) 4,370.

O'Callaghan, Edmund Bailey, a Canadian-American historian; born in Mallow, County Cork, Ireland, Feb. 29, 1797; was educated in Ireland and Frence; went to Quebec, Canada, in 1823, and was admitted to the practice of medicine in 1827. In 1834 he was editor of "The Vindicator"; two years later was elected to the assembly of Lower Canada; but after the insurrection moved to New York, where he was employed for years at Albany in editing the records of the State. In 1870 he moved to New York city, where he died May 27, 1880. Among his publications are "History of the New Netherlands" (New York, 1846); "Jesuit Relations" (New York, 1847); "Documentary History of New York" (Albany, 1847–1851); "Documents Relating to the Colonial History of New York," procured in Holland, England, and France by John R. Brodhead (11 vols. 1855–1861); "Voyages of the Slavers 'St. John' and 'Arms'" (1867); etc.

Ocarina, a musical instrument, first seen among the peasants of Calabria, and consisting, in its primitive shape, of a gourd-shaped clay bulb, pierced with a number of small holes and a mouthpiece. Its tone was sweet, but the range was exceedingly limited — less than an octave — but in the course of subsequent development its compass and power were greatly augmented, and a row of keys was added, with a piston inserted in the mouthpiece. Entire concerts have been given with an orchestra composed of ocarinas.

Occam, William of, a scholastic philosopher; born in Ockham, in Surrey, England, about 1270. He is said to have studied at Merton College, Cambridge, and also to have attended the lectures of Duns Scotus in Paris. He held several benefices in England, but entering the order of the

Cordeliers, the latter and more distinguished part of his life was passed on the Continent. In 1322 he attended a general assembly of Francisans at Pérouse, and there asserted the independence of princes in temporal affairs, and denounced the vices of the Pope. For this he was condemned by the Council of Avignon, and being compelled to flee from Paris (1328) he took refuge with Louis of Bavaria. Occam was entitled "The unique and invincible doctor," and is noted as the philosopher who gave the final blow to the Realism of the Middle Ages, and perhaps the first effective blow to the Pope's authority. He died in Munich, April 7, 1347.

Occasionalism, the system of "occasional causes," by which certain philosophers of the Cartesian school accounted for the apparent action of the soul on the body; *e. g.* in the phenomena of voluntary action. According to these theories (which were more or less clearly developed by different writers, the will was not the "cause" of the action of the body; but whenever the will required a motion, God caused the body to move in the required direction.

Occidente, Maria del. See BROOKS, MARIA GOWAN.

Occlusion, a term applied to the solution of a gas by a melted solid — as of oxygen by melted silver — which gas is given up by the melted material when it solidifies, so that in the case of silver the metal sometimes "spits" or gives off the gas in bubbles, thereby roughening its otherwise smooth surface. Sometimes the gas is absorbed or "occluded" (in a wider sense) even though the metal be not fused — *e. g.*, hydrogen gas by cold palladium, carbonic oxide by red-hot cast iron.

Occultations, eclipses, strictly, though the latter term is confined by usage to the obscuration of the sun by the moon, and of the moon by the earth's shadow, while the former is restricted to the eclipses of stars or planets by the moon. Occultations are phenomena of frequent occurrence; they are confined to a belt of the heavens about 10° 17½′ W., situated parallel to, and on both sides of, the equinoctial, and extending to equal distances N. and S. of it, being the belt within which the moon's orbit lies. These phenomena serve as data for the measurement of the moon's parallax; and they are also occasionally employed in the calculation of longitudes. As the moon moves in her orbit from W. to E., the occultation of a star is made at the moon's E. limb, and the star emerges on the W. limb. When a star is occulted by the dark limb of the moon (a phenomenon which can only occur between new moon and full moon) it appears to an observer as if it were suddenly extinguished, and this appearance is most deceptive when the moon is only a few days old. When an occultation occurs between full moon and new moon, the reappearance of the star at the outer edge of the dark limb produces an equally startling effect.

Occultism, the investigation of mysterious things, especially those that are supernatural; or supernatural power employed in human affairs as claimed by an astrologer; or modern theosophy, which claims a divine illumination and an insight into things hidden from ordinary people.

Occupancy, in law, the taking possession of those things which before belonged to nobody, and the right acquired by so taking possession. This, the original and only primitive method of acquiring any property, has been restrained and abridged by the laws of society, in order to maintain peace and harmony among mankind. For this purpose, gifts, contracts, wills, legacies, etc., have been introduced, in order to transfer and continue that property and possession in things personal which has once been acquired by the owner. In some few instances this original right of occupancy is still permitted and recognized. Thus the benefits of the elements, the light, the air, and water can only be appropriated by occupancy.

Ocean, the sea, using that term in its widest sense. Properly speaking, there is but one ocean or sea, all the salt water on the globe, with a few trifling exceptions like the Caspian, the Sea of Aral, and the Dead Sea, being more or less in complete communication with each other. Different portions of the ocean have received distinctive names. The Arctic, the Atlantic, the Indian, the Pacific, and the Antarctic oceans, five in all; or if the Atlantic and Pacific be separated into a N. and a S. portion by the equator, then there are seven in all. The unequal heating of portions of the vast expanse of water on the globe, the rotation of the earth, and other causes tend to keep the water in constant circulation and preserve it from being stagnant and impure. The winds also agitate the surface, producing waves. The attractions of the moon and sun cause tides. The area of the ocean is about 155,000,000 square miles, or nearly three-fourths of the whole surface of the earth. This space is distributed (in square miles), among the principal seas as follows: Arctic, 5,000,000; Southern, 10,000,000; Indian, 20,000,000; Atlantic, 40,000,000; Pacific, 80,000,000. This great volume of water largely modifies the temperature of the adjacent lands, tempering the heat of summer and the cold of winter. As far as observation has yet extended, the average depth of the ocean is not more than 2,000 fathoms, *i. e.*, somewhat above two miles.

Hammond's 8 x 11 Map of Oceania
Copyright, 1904, by C.S.Hammond & Co. N.Y.

OCEANIA AND THE PACIFIC

ON MERCATORS PROJECTION

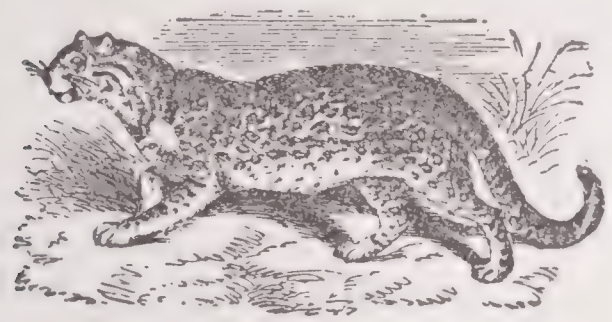
Ocean Steamer Routes, with distances in nautical miles

Submarine Cables

Telegraph Lines — Railways

G 170° Long. H° East 180° West J from 170° Green. K 160° L 150° M 140°

Ordinarily, the portion of the ocean fringing the shores is but a few hundred feet deep, but a little further from the land the depth suddenly becomes 2,000 fathoms or more. At 62° F., the relative density of salt and fresh water is as 1.0275 to 1. The ocean has been salt through all known geological periods. The origin of this saltness is a difficult geological problem. While on land the temperature rises as mines or borings become deeper, the opposite occurs with the ocean. As a rule, the surface water is the warmest. The old views as to



OCELOT.

the absence of animal life in ocean depths have been proved erroneous by comparatively recent expeditions. Abundant life has been brought up from the ocean depth. The level of the ocean remains permanent from age to age. It is the land that is upheaved or subsides, not the ocean which has risen to a higher or sunk to a lower level. The color of the ocean varies in different places, being as a rule greenish near the shore and blue in the deeper parts. The saltness of the ocean, the nature of the bottom where it is shallow, and the color of the clouds overhead, all modify the color.

Oceania, a name sometimes given to the fifth division of the globe, comprising all the islands which intervene between the S. E. shores of the continent of Asia and the W. shores of America. It naturally divides itself into three great sections — the Malay Archipelago, Australasia or Melanesia, and Polynesia.

Oceanus (-sē′-), in classical mythology, the god of the stream Oceanus, and the offspring of Cœlus and Terra, or Heaven and Earth. He espoused his sister Tethys, and their children were the rivers of the earth, and the 3,000 Oceanides or Nymphs of Ocean.

Ocellus, plural **Ocelli,** in entomology and zoölogy, a spot within a ring of another color, like the pupil within the iris, except that the central spot is often surrounded by additional concentric zones. Example, the ocelli on the tail coverts of the peacock, and those on the wings of the peacock-butterfly. Ocelli, the simple eyes or stemmata of insects, generally situated on the crown of the head between the great compound eyes. Used also of the simple eyes of spiders, crustaceans, mollusks, etc.

Ocelot, *Felis pardalis.* The fur has a tawny reddish ground, marked with black spots, aggregated in spots and blotches. It ranges through the wooded parts of tropical America, from Arkansas to Paraguay. Length, about four feet, legs short. It is cowardly, but voracious, and destroys a vast number of animals for the sake of sucking the blood, which it prefers to the flesh. In captivity it is playful and gentle.

Ochino, Bernardino, an Italian reformer; born in Siena, Italy, in 1487. He joined the Franciscan Observants, but in 1534 changed to Capuchin order, as being more strict. In four years' time he was vicar-general of the order, having already before joining it gained the reputation of a man of great piety and eloquence. In 1542 he was summoned to Rome to answer to the Inquisition for certain evangelical tendencies which had been manifested in sermons delivered by him at Venice three years before. Warned by Cardinal Contarini, Ochino turned back at Bologna and fled to Geneva, where Calvin gave him a welcoming hand. In December, 1545, he was appointed preacher to the Italian congregation in Augsburg, but 14 months later was driven from the city by the advent of the imperial troops. He first found refuge in England, invited there by Cranmer; he was made pastor to the Italian exiles and given a prebend in Canterbury Cathedral. In England he wrote the "Tragedy," a series of dramatic dialogues translated from the original Latin into English by Bishop Ponet, which is believed to have had some influence on Milton's "Paradise Lost." At Mary's accession (1553) Ochino fled to Switzerland, and ministered to the Italian exiles in Zurich for 10 years. Then the publication of "Thirty Dialogues," one of which the Calvinists stated to contain a defense of polygamy, occasioned his being banished precipitately from the canton. Ochino fled to Poland, but was soon driven thence by an edict directed against all foreigners, and died in flight in Schlackau, Moravia, in the end of 1564.

Ochoa y Acuna, Antonio (ō-chō′ä ē ä-kö′nä), a Mexican poet; born in Huichapam, April 27, 1783. His first satirical work appeared in 1806. In 1811 he was admitted to the Arcadia Mexicana, a society of poets; the same year he wrote "Don Alphonso," a tragedy. "Love by Proxy," a comedy, was presented in 1831. His works under the name of "Poems of a Mexican," have been issued in the United States (1820). He was a priest, and wrote under the name of "Pastor Antimio." He is greatly admired by his countrymen. He died in Queretaro, Aug. 4, 1833.

Ochre, a combination of peroxide of iron with water; but the name is generally applied to clays colored with the oxides of iron in various proportions. Considerable quantities of ochre are obtained from the ferruginous mud separated from tin and copper ores; and it is also found in natural beds some feet thick in the more recent formations. Ochres vary in color from a pale sandy yellow to a brownish red, and are much used in painting.

Ochterlony, Sir David, a British military officer; born in Boston, Mass., Feb. 12, 1758. He went out to India as a cadet at 18, and was made lieutenant-colonel in 1803. In the following year he defended Delhi against Holkar; but his greatest services were rendered against the Gurkhas. In 1814 he stormed their hill forts one after the other, and compelled them to sue for peace; on the renewal of the war in 1815 he shut up their principal chief in the hill fort of Malaun, forced it to surrender, and penetrated to within a few miles of the Nepalese capital. Peace was again made; and the treaty has remained in force down to the present time. Ochterlony was made (1816), a baronet for his success. He rendered excellent service in the Pindari and Maharatta wars of 1817 and 1818. He died in Meerut, July 15, 1825.

Ockley, Simon, an English Orientalist; born in Exeter, England, in 1678. He became Professor of Arabic at Cambridge in 1711, and published "History of the Jews," several translations from Oriental languages and a well-known "History of the Saracens." He died in Swavesey, England, in 1720.

Oclawaha ("crooked water"), a river of Florida, which after a very winding course of 275 miles flows into the St. John, about 25 miles S. of Palatka. Its banks are densely wooded, and the country so flat that the waters extend into the forest for a distance on either side. Many tourists visit it, and one of them relates that he steamed on this narrow river for five consecutive hours, and all that time was out of sight of land. He could only see trees and water.

Ocmulgee, a river rising in the central part of Georgia, running in a S. S. E. direction, passing the town of Macon, and ultimately uniting with the Oconee to form the Altamaha river, length about 200 miles.

Oconee, a river in Georgia, which rises in Hall county, and unites with the Ocmulgee to form the Altamaha at Colquitt; is navigable about 100 miles.

O'Connell, Daniel, called THE LIBERATOR OF IRELAND and THE GREAT AGITATOR, an Irish patriot; born in County Kerry, Ireland, Aug. 6, 1775. After receiving his education at the Roman Catholic College of St. Omer, and the Irish seminary at Douay, he became a student of Lincoln's Inn, London, in 1794; was admitted to the bar in 1798; and speedily rose to a large and lucrative practice as a special pleader. In 1809, he became popularly known by his fervent advocacy of Catholic emancipation, which he carried so far as to several times involve himself in personal rencontres. In 1815, having in one of his diatribes stigmatized the corporation of Dublin as "beggarly," he was challenged by Alderman D'Esterre, and a hostile meeting took place in which the latter fell. He sat in the British House of Commons in 1828–1841, and became Lord Mayor of Dublin in 1841. The return of the Conservatives to power in that year was the signal for renewed political agitation in Ireland. Repeal of the Union was the object sought, and O'Connell placed himself at the head of the movement. A monster meeting to be held at Clontarf, Oct. 8, 1843, was estopped by the government, and O'Connell sentenced to pay a fine of $10,000, and to be imprisoned one year. This judgment was shortly after reversed by the House of Lords, and O'Connell set at liberty. The return of the Whigs to power in 1836, and O'Connell's avowed adherence to that party, brought him into unpopularity with the "Irish" national party, which he had swayed for half a century, and his health also failing him, he retired from public life. He wrote "Memoirs of Ireland." While making a journey to Rome, he died in Genoa, Italy, May 15, 1847.

O'Connor, Feargus Edward, an Irish lawyer; born in Ireland, in 1796. He was educated at Portarlington and Trinity College, Dublin; was called to the Irish bar; and entered Parliament for Cork in 1832. At first a supporter of O'CONNELL (*q. v.*), he became estranged from his leader, and devoted himself to the cause of the working classes in England. His great stature and strength, his eloquence and enthusiasm, gave him vast popularity as a leader, and by his paper, the "Northern Star," he did much to advance the cause of Chartism. Elected for Nottingham in 1847, he presented the monster petition in the April of the following year. In 1852 he was found to be hopelessly insane, and he died Aug. 30, 1855.

O'Connor, John, an American-Canadian jurist; born in Boston, Mass., in January, 1824; was educated in Maidstone, Ontario, Canada; admitted to the bar in 1854; became a queen's counsel in 1873; and was successively president of the council, minister of inland revenue, and postmaster-general in Sir John A. Macdonald's administration, July, 1872–November, 1873. In 1880 he again became postmaster-general; a few months later secretary of state, and

in May, 1881, postmaster-general for the last time. He was commissioner for revising the statutes of Canada and Ontario, and in 1884 became judge of the High Court of Justice of Ontario. He died in Coburg, Ont., Nov. 3, 1887.

O'Connor, William Douglas, an American author; born in Boston, Mass., Jan. 2, 1833. He was on the editorial staff of the "Saturday Evening Post," Philadelphia, from 1854 to 1860, and afterward held several government places at Washington, D. C. His chief works are: "The Ghost" (1856); "Harrington" (1860), a novel; "Hamlet's Note-Book" (1886). He died in 1889.

O'Conor, Charles, an American lawyer; born in New York city, Jan. 22, 1804; was admitted to the bar in 1824, while still a minor. Among his most celebrated cases were the Forrest divorce case; the Slave Jack case; the Lispenard will case; the Lemon slave case, and the Mme. Jumel suit; became senior counsel for Jefferson Davis when the ex-Confederate President was indicted for treason, and was conspicuous in the suits against William M. Tweed in 1871. In 1869 he was elected president of the Law Institute of New York; in 1872 was nominated for President of the United States by one of the numerous Democratic conventions of that year, despite his protest, and was defeated; and in 1876 appeared before the Electoral Commission in support of the claims of Samuel J. Tilden. He died in Nantucket, Mass., May 12, 1884.

O'Conor, John Francis Xavier, an American educator; born in New York city, Aug. 1, 1852; was graduated at St. Francis Xavier College, and became a member of the Society of Jesus in 1872; took English studies in London, philosophical in Louvain, and Oriental at Johns Hopkins University; and was a professor at West Park College, Georgetown University, Boston College, and St. Francis Xavier College. He lectured on Christian and Greek art, Wagner operas, and cuneiform Assyrian, and published "Lyric and Dramatic Poetry" (1883); "Babylonian Inscription of Nebuchadnezzar" (1885); "Jesuit Missions in America" (1892); "Reading and the Mind" (1897); "Christ the Man of God" (1900); etc.

Oconostota, a Cherokee Indian king; born about 1708; was one of the six delegates who in 1730 visited King George II. He was for many years an ally of the British, his one act of treachery being so severely punished that he ever afterward maintained their friendship. He prophesied the final destruction of his race, and after being deposed, and wandering for years in drunken misery, died about 1810.

Oconto, a city and county-seat of Oconto co., Wis.; on Green Bay at the mouth of the Oconto river, and on the Chicago, Milwaukee and St. Paul, and the Chicago and Northwestern railroads; 28 miles N. E. of Green Bay. Contains a court house, public park, and National bank, and has several weekly newspapers; flour and planing mills, wagon factories, foundries, large lumber interests, and an assessed property valuation of over $1,000,000. Pop. (1890) 5,219; (1900) 5,646; (1910) 5,629.

Ocracoke Inlet, an inlet of North Carolina, forming a passage into Pamlico Sound, 22 miles S. W. of Cape Hatteras. On each side of the channel are dangerous shoals; on the bar are 14 feet at low water.

Ocrea, in Roman antiquities, a kind of greave or legging covering the foreleg from the knee to the ankle. It was made of tin, bronze, or other metal, modeled to the leg of the wearer, and fastened behind by straps and buckles, and generally richly ornamented by various designs embossed or chased upon it.

Octagon, in geometry, a polygon of eight angles or sides. A regular octagon is an octagon all of whose sides and angles are respectively equal to each other. The angle at the center of a regular octagon is 45°, and the angle at the vertex of any angle is 135°. The area of a regular octagon, whose side is 1, is equal to 4.8284271. In fortification a place having eight bastions.

Octahedron, in geometry, a solid contained by eight equal and equilateral angles. It is one of the five regular bodies.

Octans ("the Octant"), the constellation surrounding and including the South Pole of the heavens, and one of the 14 added to the heavens by Lacaille in connection with his work at the Cape of Good Hope. Its brightest star is of the 3.8 magnitude. The star Sigma Octantis, of the 5.8 magnitude, lies at present within about ¾° of the South Pole, nearer than any equally bright star to the North Pole, and it is much used in the Southern Hemisphere for the determination of the azimuth of transit instruments. The constellation is surrounded by Hydrus, Mensa, Chamæleon, Apus, Pavo, Indus, and Tucana. See LACAILLE, N. L. DE: TRANSIT INSTRUMENT.

Octave, in the Church calendar, the eighth day after a festival, counting in the festival day itself; also, the week after a Church festival. In music, the interval between any musical note and its most perfect concord, which is double its pitch, and occupies the position of the eighth note from it on the diatonic scale. The name octave is often given to the eighth note itself as well as to the interval.

Octavia, sister of Augustus, renowned for her beauty and purity of character, and

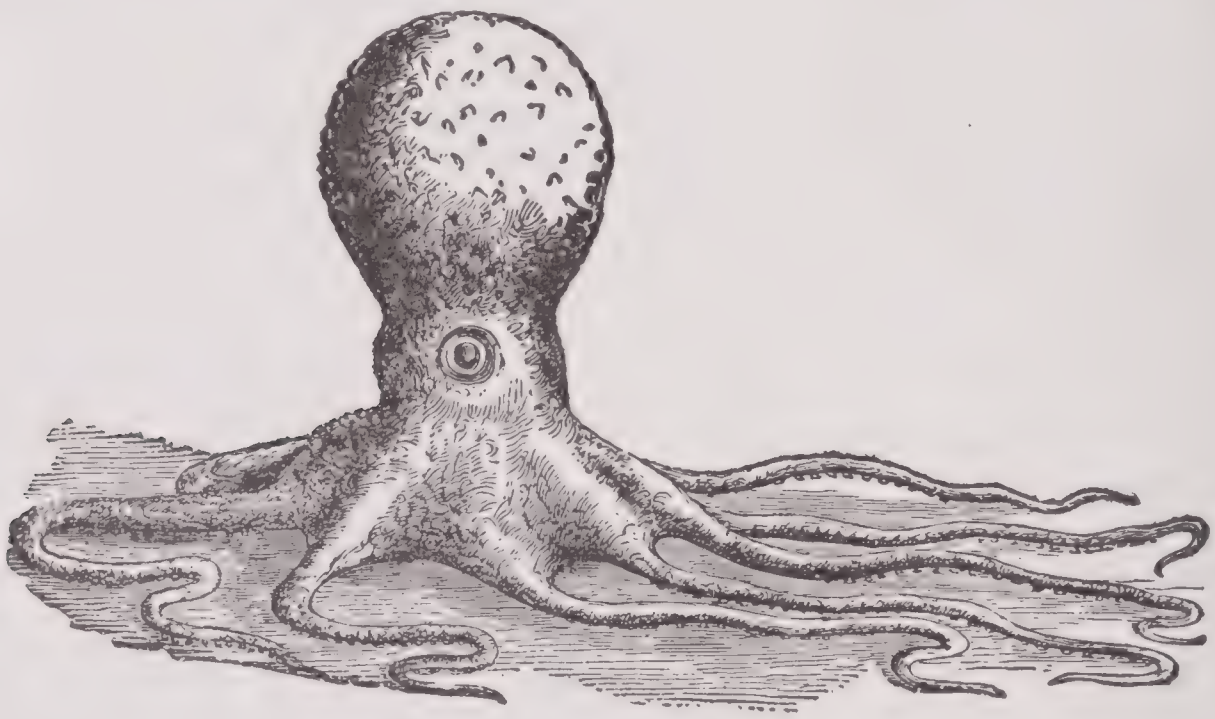
practical wisdom. She was first married to Marcellus, a noble Roman of consular dignity, and soon after his death (40 B. C.), to Mark Antony. This marriage, it was hoped, would strengthen the new alliance between Octavius, her brother, and Antony, her husband; and her influence more than once prevented fresh civil war, and alleviated the suffering of its victims. But Antony had seen Cleopatra; his passion for her had only slumbered; and he treated his wife with a contempt and cruelty which Octavius could not forgive, and which became the occasion of renewed war. When Antony set out for the East again, Octavia was not allowed to accompany him. She mourned sincerely his miserable end, and brought up all his children as her own. To all her bitter trials was added (23 B. C.) that of the death of the young Marcellus, her son by her first husband, and the destined successor of Augustus. She never rose above this sorrow, nor would hear the name of her son mentioned. She died in 11 B. C.

Octavia, a daughter of the Emperor Claudius by Messalina; born about A. D. 42. She was the sister of Britannicus, and, at the age of 16, became the wife of Nero. The latter divorced her and married Poppæa, at whose instance she was put to death in the 20th year of her age, A. D. 62.

Octavo, the size of one leaf of a sheet of paper, which has been folded so as to make eight leaves; hence, applied to a book printed with eight leaves to the sheet. It is generally written 8vo, and varies in size according to the sizes of paper employed; as, foolscap octavo (or 8vo), imperial octavo (or 8vo), etc.

October, the 8th month of the so-called year of Romulus, which became the 10th when Numa changed the commencement of the year to Jan. 1, though it retained its original name, notwithstanding the attempts made by the Roman senate, and the emperors Commodus and Domitian, who substituted for a time the terms Faustinus, Invictus, Domitianus. Many Roman and Greek festivals were celebrated in this month, the most remarkable of which was the sacrifice at Rome of the October horse to the god Mars.

Octopus, in zoölogy, the typical genus of the family *Octopodidæ*. The body is oval, warty, or cirrose, finless; arms long, unequal, suckers in two rows, mantle supported in front by the branchial septum. In the male the third right arm is hectocotylized. Found on the coasts of the temperate and tropical zones. Forty-six species are known, varying in length from one inch to more than two feet. They are the "polypi" of Homer and Aristotle; they are solitary animals, frequenting rocky shores, and are very active and voracious; the females oviposit on seaweeds or in empty shells. They are regularly exposed for sale in the markets of Smyrna and Naples, and the bazaars of India.



OCTOPUS.

Octroi, an old French term signifying a grant, privilege, or monopoly from government to a person or to a company. Octroi also signifies a tax levied at the gates of French cities, towns, etc., on produce brought in for use.

Ocuba Wax, a vegetable wax obtained from the fruit of *Myristica ocuba*. It is yellowish-white, of the consistence of beeswax, melts at 36°, and is soluble in boiling alcohol. Used in Brazil for the manufacture of candles.

Od, Odyl, or **Odyle,** the name given, in 1845, by Baron von Reichenbach to a natur-

al force, "imponderable" or "influence," which he believed himself to have discovered. He thought it was present in all bodies, but was developed especially by magnets, crystals, heat, light, and chemical and vital action. It was held to explain the phenomena of mesmerism, and has since been made to do duty anew for those of spirit rapping, table turning, etc. It has been credited with the ability to produce luminous appearances, visible, however, only to persons of peculiar sensitiveness.

Odalisk, or **Odalisque,** a female slave or concubine in the Sultan's seraglio or a Turkish harem; one of the ladies of the harem, of whom the Sultan has personal knowledge.

Odal Right, a free tenure of property, similar to allodial tenure, which prevailed in Northern Europe before the introduction of the feudal system. Odal or udal tenure still prevails in Orkney and Shetland.

Odd Fellow, a member of the Independent Order of Odd Fellows, a secret fraternal society instituted in England in the 18th century, and now having extensive lodges in Great Britain, Australia, Denmark, Switzerland, the United States, etc. Its organization is in lodges and encampments, grand lodges, grand encampments, and the Sovereign Grand Lodge of the World, and good moral character and belief in a Supreme Being are requisite for membership. The first lodge in the United States was established in 1819; the grand lodges of the United States reported in 1909 a membership of 1,441,403. The membership in Australasia, Germany, Denmark, Sweden, Switzerland, and the Netherlands was 890,965. The American order is not in affiliation with the English order entitled the "Manchester Unity of Odd Fellows," which in 1897 reported a membership of 900,668. The Rebekah lodges admit to membership female relatives of the male members. There is also an organization of colored Odd Fellows, entitled the "Grand United Order of Odd Fellows of America."

Ode, a poem of lyrical character, supposed to express the poet's feelings in the pressure of high excitement, and taking an irregular form from the emotional fervency which seeks spontaneous rhythm for its varied utterance. The Greeks called every lyrical poem adapted to singing — and hence opposed to the elegiac poem — an ode (*ōdē*, that is, song). The principal ancient writers who employed this form of verse were Pindar, Anacreon, Sappho, Alcæus, among the Greeks, and Horace among the Romans. As employed by English writers the ode takes either the Pindaric form of strophe, antistrophe, and epode irregularly arranged and contrasted; or, as in its later development, the form of a regular series of regular stanzas. The former style is found in Dryden's "Ode for St. Cecelia's Day," while the latter is seen in Shelley's "Ode to a Skylark." The masters of English poesy who have carried the ode to its highest achievements are Milton, Dryden, Collins, Grey, Coleridge, Wordsworth, Keats, and Shelley.

Odenburg. See OEDENBURG.

Odenwald, a forest and chain of mountains in Western Germany, between the Neckar and the Main, in the territories of Hesse, Baden, and Bavaria. The Odenwald is about 50 miles in length, and presents charming scenery.

Odeon, or **Odeum** (-dē'-), in Greek antiquities, a hall or theater in which musical and poetical compositions were performed in competition for prizes. Hence, a hall or building for the performance of musical or dramatic works.

Oder, one of the principal rivers of Germany, rising in the Oderberg on the tableland of Moravia, 1,950 feet above the level of the sea, traversing Prussia Silesia, Brandenburg, and Pomerania, then emptying into the Stettiner Haff, whence it passes into the Baltic by the triple arms of the Dievenow, Peene, and Swine, which enclose the islands of Wollin and Usedom. It has a course N. W. and N. of 550 miles, and a basin of 50,000 square miles. The rapid flow, induced by its very considerable fall, together with the silting at the embouchures of the numerous tributaries, renders the navigation difficult; great expense and labor being, moreover, necessary to keep the embankments in order, and prevent the overflowing of the river. Canals connect the Oder with the Spree, the Havel, and the Elbe; the Warthe is the only tributary of importance for navigation. On the banks of the Oder are Ratibor (where it is navigable for barges), Brieg, Breslau, Frankfort-on-the-Oder, Stettin, and Swinemünde.

Odessa, a city and seaport of South Russia, government of Kherson, on the N. W. coast of the Black Sea, half-way between the mouths of the Dniester and Bug. The bay is open and easy of access, with sufficient depth of water to float the largest ships near the town. The harbor, which is artificial, is formed of two moles, and is capable of accommodating over 200 vessels. It is defended by two batteries toward the sea; and on the E. side is a citadel, which commands the town and port. The principal buildings are the cathedral of St. Nicholas, the Admiralty, custom house, and exchange. In the center of the esplanade facing the port is a large statue in bronze, in honor of the Duke de Richelieu. The university has 492 students. A great drawback is the scarcity of wood and water, and the intensity of the heat, which frequently reaches 120°, and destroys the vegetation of the vicinity. Odessa is the emporium for the produce of

Southern Russia, and owes its rapid growth to its being declared a free port. Odessa is much frequented in the summer months by the Russian and Polish aristocracy, for the facilities afforded for sea bathing. The great trade of the town and its principal export, is corn, which, garnered here from the adjacent Ukraine and Moldavia, is shipped to almost every part of Europe. Odessa was founded by Catherine II., in 1794. Pop. (1900) 449,673.

Odin. See WODIN.

Odin, Hall of. See HALL OF ODIN.

Odoacer, the first barbarian King of Italy, son of one of Attila's officers; born about 434. He entered into the Imperial guards, in which he rose to an honorable rank. In 476 he was chosen chief of a confederate army, and was saluted by them King of Italy. He defeated the patrician Orestes at Pavia, banished his son, Romulus Augustus, last Roman emperor, and made Ravenna the seat of his kingdom. He obtained the title of "Patrician" from Zeno, emperor of the East, and did not assume the imperial ensigns. By his wise and honorable administration, he showed himself worthy of the dignity to which he was raised; but misery, desolation, and gradual depopulation were the prominent features of the condition of his kingdom. In 489, Theodoric, King of the Ostrogoths, invaded Italy, and Odoacer was three times defeated by him: first near Aquileia, then near Verona, and lastly near Ravenna. He was then beseiged three years in Ravenna, and at length, compelled by famine and the clamors of the people, he made a treaty with Theodoric, by which they were to rule jointly. But after a few days, Odoacer was assassinated by his conqueror, March 5, 493.

Odometer, an instrument employed for registering the number of revolutions of a carriage wheel, to which it is attached. Two wheels of the same diameter, and turning freely on the same axis, are placed face to face; the edge of one is cut into 100 teeth, and that of the other into 99 teeth, and an endless screw works into the notches in each wheel. When the screw has turned 100 times around, the wheel having 99 teeth will have gained one notch on the other, which gain is shown by an index attached to one wheel, which passes over a graduated arc on the other. Every 100 turns are thus registered on the second wheel, and all turns less than 100 are shown by a separate index. Now, instead of the screw turning on its axis, it is found more convenient to have the screw fast, and to allow the weight of the machine to be suspended freely, so that as the carriage wheel turns, the effect is the same as turning the screw on its axis.

Odonata. See DRAGON FLY.

O'Donnell, Leopold, a Spanish military officer; born in Santa Cruz, Teneriffe, Jan. 12, 1809. He was descended from an ancient Irish family. He entered the Spanish army when young, and espoused the cause of the infant Queen Isabella against Don Carlos (see CARLISTS). When the Carlists were overthrown he was created Chief of the Staff to Espartero. He took the side of the queen-mother in 1840, emigrated with her to France, and took up his residence at Orleans, where he planned many of the political risings which took place under the rule of Espartero. In 1843 his intrigues against Espartero were successful; and he was rewarded by the governor-generalship of Cuba, where he amassed a large fortune by favoring the iniquitous trade in slaves. When he returned to Spain (1848) he intrigued against Bravo Murillo and Narvaez; was made war minister by Espartero in 1854; but plotted against his benefactor, and in 1856 supplanted him by a coup d'état. He was in three months' time succeeded by Narvaez, but in 1858 he returned to power; in 1859 he commanded the army in Morocco, and after a tedious campaign took the Moorish camp, and the city of Tetuan surrendered, whereupon he was made Duke of Tetuon. In 1866 his cabinet was upset by Narvaez, and he died in Bayonne, France, Nov. 5, 1867.

O'Donovan, John, an Irish Celtic scholar; born in County Kilkenny, Ireland, July 9, 1809. He published (with Professor O'Curry) the "Brehon Laws," "Annals of the Four Masters," etc. He died in Dublin, Ireland, Dec. 9, 1861.

O'Donovan, William Rudolf, an American sculptor; born in Preston co., Va., March 28, 1844; in the Civil War he served in the Confederate army; after the war established a studio in New York city; became associate of the National Academy in 1878. Among his most noted works are the statues of Paulding at Tarrytown; Washington, for the Republic of Venezuela, at Caracas; Washington, for the monument commemorating the Peace, at Newburg, N. Y.; Washington, for the Trenton Battle monument; Archbishop Hughes, for St. John's College, Fordham; the memorial tablet to Bayard Taylor, at Cornell University; etc. He also made, with Thomas Eakins, the statues of Gen. U. S. Grant and Abraham Lincoln for the Memorial Arch, in Prospect Park, Brooklyn, N. Y.

Odontoglossum, an extensive genus of orchids, natives of Central America, much prized by cultivators for their magnificent flowers, which are remarkable both for their size and the beauty of their colors. A considerable number of species have been introduced into Europe, and grow well in a moderate temperature. *O. crispum* or *O. Alexandræ* is a superb flower, and is named after the Princess of Wales.

Odontophore, the so-called "tongue," or masticatory apparatus found in the mouth of the three classes of higher mollusks — the gasteropods, pteropods, and cephalopods — which are thus collectively known as the Odontophora. This structure consists of a gristly portion, which supports a ribbon or strap-like band provided with flinty or siliceous teeth variously disposed in a transverse manner.

Odontornithes, a sub-class of birds having the jaws furnished with true teeth sunk in distinct sockets or in a continuous groove. Wings well developed or rudimentary. It contains two orders, *Odontotormæ* and *Odontolcæ*.

Odyssey, a celebrated epic poem attributed to Homer, and descriptive of the adventures of Ulysses in his return home from the siege of Troy.

Œcolampadius, a German reformer; born in Weinsberg, Suabia, in 1482. His original name, JOHANN HAUSSCHEIN, was, according to the fashion of the time, turned into its Greek equivalent. He studied chiefly at the University of Heidelberg, became acquainted with Ruechlin, Capito, and Erasmus, assisted the latter in his edition of the Greek Testament, and afterward adopted the views of Luther. About 1519 he retired to a monastery, where he spent two years; his opinions becoming more decided, he quitted it, and found an asylum, like other reformers, with the knight Franz von Sickingen. He soon after settled at Basel, as pastor and Professor of Theology. He took the same view of the eucharist as Zwinglius, attended several theological conferences, and died in Basel, Switzerland, Nov. 24, 1531.

Œcumenical, universal, an epithet applied to the general councils of the Church. From the time of the Council of Chalcedon (451) the patriarchs of Constantinople took the title of œcumenical, in the same sense as the epithet Catholic is used in the Western Church. See COUNCIL.

Œdema, a swelling occasioned by the presence of water which collects in the interstices of the cellular tissues. The subcutaneous cellular tissue is the most frequent, but not the only seat of œdema. The other forms which are most frequently recognized during the life of the patient are œdema of the lungs and of the glottis. Œdema of the brain is of less frequent occurrence and less easily recognized, and œdema of the sub-mucous and sub-cellular tissue seldom produces symptoms sufficiently decisive to determine their nature. When the disease is associated with erysipelas, deep-seated suppuration, or a morbid state of the circulation, it is attended with great danger.

Oedenburg, a town of Hungary, on an extensive plain, 3 miles W. of the Neusiedler See and 48 miles S. by E. of Vienna. It is one of the most beautiful towns in Hungary, and has manufactures of candied fruits, sugar, soap, etc., and a large trade in wine, corn, and cattle, the neighborhood being rich and well cultivated. The Roman town of Scarabantia here was one of considerable importance; and numerous Roman remains have been found. Pop. (1900) 33,478.

Œdipus, in Greek legend the son of Laius, King of Thebes, who, after being married to Jocasta, consulted the oracle, which informed him that he was doomed to die by the hand of his own son. To prevent so fearful an accident, he ordered his wife, as soon as Œdipus, the child she was then pregnant with, was born, to destroy him. The affection of the mother prevailed over the duty and obedience of the wife; and she secretly sent the child away, by a confidential servant, with a command to expose it in some place where it would meet with a protector — instead of which, he cruelly bored the feet of the child and hung him on a tree suspended by his heels, on Mount Cithæron. In this situation he was discovered by a shepherd in the service of Polybius, King of Corinth, who carried him home and adopted him as his own son. As he grew up, the talent he displayed even with the imperfect education they were able to give him, soon enabled him to outstrip all his companions and acquire with avidity all the accomplishments of the age, which so excited their envy, that they taunted him with the baseness of his birth. Doubting the truth of the information as to his being illegitimate, Œdipus, so called on account of the deformity of his feet, resolved to proceed to Delphi to consult the oracle, and was told that if he returned to his home he would become his father's murderer. Knowing no father but the man who had adopted him, he turned from Corinth and proceeded toward Phocis, on the road to which, in a narrow pathway, he met his father Laius, who was in his chariot, accompanied by his armor-bearer. Being insolently ordered to make way, and refusing to comply, a contest ensued, in which the decree of the oracle was verified by Œdipus slaying both Laius and his attendant. Proceeding to Thebes, he was at-

ŒDIPUS AND THE SPHINX.

tracted by the enigma proposed by the Sphinx, and which he determined to solve — as Creon, who had succeeded Laius, promised any one who should succeed in doing so the crown of Thebes as a reward. The enigma was this: "What animal in the morning walks on four feet, at noon on two, and in the evening on three?"— which Œdipus explained by saying it was man, who, in his infancy, or in the morning of his life, crawls on his hands and feet; in his manhood, or the noon of his age, he stands erect and goes on two feet; and in old age, or the evening of his days, he supports his trembling limbs with a staff. This being the true explanation resulted in the death of the Sphinx (who destroyed herself, as the fable goes), and the accession of Œdipus to the throne of Thebes, he marrying Jocasta, his own mother. In his endeavors to find the murderer of Laius, he first became aware that the stranger he had encountered and killed was his father, on the knowledge of which his remorse was so great that he voluntarily deprived himself of sight and banished himself from his kingdom. He is said to have perished in a singular manner, the earth opening and engulfing him in its depths.

Oehlenschlæger, Adam Gottlieb, the greatest dramatic poet of the Scandinavian North; born in Vesterbro, near Copenhagen, Denmark, Nov. 14, 1777. He commenced his career on the stage, but abandoned the profession for literature, and finally became Professor of Æsthetics in his native city. Among his greatest works are: "The Death of Balder"; "The Gods of the North"; "Aladdin"; "Stærkodder"; "Hakem-Jarl"; "Palnatoke"; "Axel and Valborg"; "The Admiral Fordens Kjold"; etc. He died in Vesterbro, Jan. 20, 1850.

ADAM OEHLENSCHLÆGER.

Oehler, Gustav Friedrich, a German theologian; born in Ebingen, Würtemberg, June 10, 1812. He studied at Tübingen, labored as a teacher at Basel and Tübingen, became in 1840 professor in the theological seminary in Schönthal, and in 1845 ordinary Professor of Theology at Breslau, and in 1852 he was called to Tübingen to be head of the theological seminary. He wrote: "Introduction to Old Testament Theology" (1845); "Outlines of Old Testament Knowledge" (1854); "Relation Between Old Testament Prophecy and Heathen Soothsaying" (1861); "Old Testament Theology (1873–1874; English translation 1874–1875); and "Manual of Symbolism" (1876). He died in Tübingen, Würtemberg, Feb. 19, 1872.

Œil-de-bœuf, a name given to a round or oval opening in the frieze or roofs of large buildings for the purpose of admitting light to the interior.

Oeland, a long and narrow island in the Baltic, 4 to 17 miles from the E. coast of Sweden. It is 55 miles long and 5 to 1 broad; pop. 37,513. Scarcely more than limestone cliff, it is scantily covered with soil, but in some parts it is well wooded and has good pasture ground; there are large alum works; and the fishing is excellent all round the coasts.

Œneus, a King of Ætolia, whose kingdom was ravaged by the Calydonian boar; and who was dethroned by his brother, and killed by his nephews.

Œnothera, evening primrose; a genus of *Onagraceæ*, tribe Epilobeæ. The calyx limb is deeply four-cleft, the petals four, the stamens eight, the capsule four-valved, the seed many, naked. Known species about 100, all natives of the United States. *Œnothera biennis* is the common evening primrose.

Œnus. See Inn.

Oerebro, a town of Sweden, at the entrance of the Svarta into the Hjelmar Lake, 170 miles W. of Stockholm. It has an ancient castle, in which many diets have been held; and there is a trade in minerals and matches. Pop. (1909) 28,583.

Oersted, Hans Christian, a Danish physicist; born in Rudkjobing, Denmark, Aug. 14, 1777. He studied medicine at Copenhagen, where in 1806 he was appointed extraordinary Professor of Physics. He held numerous scientific appointments and honorary offices and distinctions, and may be regarded as the father of the science of electro-magnetism. He made numerous chemical discoveries. Of his many works the best known are "Manual of Mechanical Physics" (1845; 3d ed. 1859), and "Spirit in Nature" (1850). He died March 9, 1851.

Oesel, an island in the Baltic belonging to the Russian government of Liovnia, and lying across the mouth of the Gulf of Riga; length about 45 miles; area 1,000 square miles; pop. 50,600. The surface is undulating, broken by low hills, marshy, watered by numerous small streams, and well wooded. The coast is generally formed by high cliffs. The climate is milder than that of the neighboring continental districts. The only town is Arensburg, on

the S. E. coast. Many of the inhabitants of Arensburg are of German descent, as are the nobles and clergy of the island; but the peasantry are Esthonian. Long governed by the Teutonic knights, it became a Danish province in 1559, was given up to Sweden in 1645, and in 1721 fell into the hands of Russia.

Œsophagus, in anatomy, a slightly flexed canal, between the pharynx and the stomach, inclining to the left in the neck, the right in the upper thorax, and the left again through the posterior mediastinum. It is narrow and flat in the neck, and rounded in the lower and longest part. It passes through the diaphragm, and terminates nearly opposite the 10th dorsal vertebra in the cardiac orifice of the stomach. The passage of the food is caused by muscular contraction through the action of the parvagum nerve.

Œta, a mountain in ancient Greece, forming the S. boundary of Thessaly, and separating that country from Central Greece. At the E. extremity was the Pass of Thermopylæ. See THERMOPYLÆ.

Oettinger, or **Ottinger, Eduard Maria,** a German author; born in Breslau, Prussia, Nov. 19, 1808. He edited several satirical journals; and published a number of novels, among which is "Uncle Zebra" (7 vols. 1843). He also wrote a work entitled "Rossini" (1847), which is said to be a romance rather than a biography; and "Universal Biographical Bibliography" (2 vols. 1850–1854), the most complete work on that subject. He died near Dresden, June 26, 1872.

Offa, a King of Mercia, who attained the throne after Ethelbald, on defeating the usurper Beornred, A. D. 757. He brought Kent under his sway, and reduced the power of Wessex by a defeat inflicted in 777. He also defeated the Welsh, took from them part of their border lands, and to keep them within their new limits erected here the ramparts known as Watt's Dyke and Offa's Dyke. Latterly he murdered Ethelbert, King of East Anglia, and seized his kingdom. He founded the Abbey of St. Albans, and was a liberal patron to the Church. He died in 796.

Offa's Dyke, an entrenchment extending along the border of England and Wales, from the N. coast of Flintshire, on the estuary of the Dee, through Denbigh, Montgomery, Salop, Radnor, and Hereford, into Gloucestershire, where its S. termination is near the mouth of the Wye. In some places it is nearly obliterated by cultivation; in others it is of considerable height. Nearly parallel with it, about 2 miles to the E., is Watt's Dyke, which, however, seems never to have been so great a work. Offa, King of Mercia, is said to have erected Watt's Dyke in 765 to keep back the Welsh, and Offa's Dyke a few years later.

Offenbach, a manufacturing town of Hesse-Darmstadt, on the S. bank of the Main, 5 miles S. E. of Frankfort. Among its manifold industrial products are chemicals, fancy leather goods, machines, and carriages. The schloss is a residence of the princely House of Isenburg-Birstein. Pop. (1905), including Bürgel, 65,372.

Offenbach, Jacques, a French composer of opera bouffe; born of Jewish parents in Cologne, June 21, 1819. He went to Paris in 1833, and settled there, becoming orchestra leader in the Théâtre Français in 1848, and manager of the Bouffes Parisiennes in 1855. Offenbach composed a vast number of light, lively operettas, "Marriage by Lanterns"; "Elezondo's Daughter"; etc.; but the productions by which he is best known are a series of burlesque operas, in virtue of which he must be regarded as the inventor of the modern form of opera bouffe. Among the most notable are: "Orpheus in Hades" (1858); "La Belle Hélène"; "Bluebeard"; "The Grand Duchess"; "Genevieve of Brabant"; and "King Carotte." "Madame Favart" (1878) became almost as popular in England and the United States as in France. He died in Paris, France, Oct. 5, 1880.

Offertory, in the Roman Catholic Church, the first part of the Mass, in which the priest prepares the elements for consecration. In the office of the Church of England communion, it denotes the sentences which are recited by the officiating priest while the people are making their oblations or offerings.

Office, Divine, in the Roman ritual, a translation into English of *Divinum officium,* a phrase which occurs in the decree of Pius V., imposing the Breviary, as it at present exists, on the whole Roman Church, with certain specified exceptions. The Divine Office consists of Matins, with Lauds, Prime, Tierce, Sext, None, and Vespers with Compline. The daily recitation of the Divine Office in the Roman Church is obligatory (1) on all clerics who hold a benefice; (2) on all persons in holy orders; and (3) on all religious of both sexes professed for service of the choir. A remnant of this custom is found in the Preface to the Prayer Book, where it is enjoined that "Priests and Deacons are to say daily the Morning and Evening Prayer either privately or openly, not being let by sickness or some other urgent cause."

Officer, used absolutely, one who holds a commission in the army or navy. They are sometimes divided into combatant and non-combatant officers; the latter consisting of those discharging civil duties, as the medical, commissariat, or transport officers,

paymasters, etc. In the army officers are divided into general officers, staff officers, field officers, commissioned officers, brevet officers, and non-commissioned officers. In the navy officers are divided into commissioned, warrant, and petty officers.

Officinal Plants, those medicinal plants which have a place in the pharmacopœias of different countries, and which are therefore sold — or some of their products or preparations of them — by apothecaries and druggists. The medicinal plants cultivated to any considerable extent are all officinal, but many are also officinal which are not cultivated.

Offing, a nautical term for that portion of the sea beyond the mid-line between the coast and the horizon. Also for the position of a vessel, in that part of the sea beyond the mid-line between the coast and the horizon.

Og, King of Bashan at the time of the conquest of Canaan by the Israelites, by whom he and his people were destroyed.

Ogasawara Islands. See Bonin.

Ogden, a city and county-seat of Weber co., Utah; at the junction of the Weber and Ogden rivers, and on the Utah Central, the Southern Pacific, the Rio Grande Western, and the Union Pacific railroads; 37 miles N. of Salt Lake City. It is the seat of the Weber Stake Academy (Mormon), Sacred Heart Academy, the State Industrial School, the State School for the Blind, and the State School for the Deaf and Dumb. Here are street railroad, electric lights, National and private banks, and several daily and weekly newspapers. The industries comprise mining, iron founding, flour and lumber milling, brewing, and the manufacture of boots and shoes, woolen goods, brooms, vinegar, and other commodities. In Ogden Canon are large powder works and also the city's electric light plant. The streets are wide and well kept, and the business blocks substantially built. The assessed property valuation is about $7,500,000. Pop. (1900) 16,313; (1910) 25,580.

Ogden, Aaron, an American military officer; born in Elizabethtown, N. J., Dec. 3, 1756; was graduated at Princeton in 1773; took an active part in the events preceding the Revolutionary War; and he was one of the party that captured the "Blue Mountain Valley," a British vessel bound, with munitions of war, for Boston, in 1775. During the Revolutionary War he was successively paymaster, captain and aid-de-camp, serving under Lafayette, being engaged on various dangerous and difficult missions, and receiving the personal approbation of Washington. He was later lieutenant-colonel of infantry, and deputy quartermaster-general, U. S. A. After the war he studied law, was United States Senator, and governor of New Jersey. In the War of 1812 he was commander-in-chief of the New Jersey State militia, retaining that post in preference to becoming a Major-General in the regular army. He was a trustee of Princeton College, and president of the Society of the Cincinnati at the time of his death, in Jersey City, N. J., April 19, 1839.

Ogden, Francis Barber, an American inventor; born in Boonton, N. J., March 3, 1783; served as aid-de-camp to General Jackson in the battle of New Orleans, Jan. 8, 1815; is said to have been the first to apply the principles of the expansive power of steam, and the use of rectangular cranks in marine engines. In 1817 the first engine ever built on these lines was constructed in Leeds, England. The first screw propeller successfully introduced into practical use was launched by John Ericsson on the Thames, May, 1837, and was called the "Francis B. Ogden." The building of the first screw propeller for American waters was superintended by Mr. Ogden in Liverpool, where he was United States consul in 1829–1840. He died in Bristol, England, July 4, 1857.

Ogden, Frederick Nash, an American military officer; born in Baton Rouge, La., Jan. 25, 1837; entered mercantile life when a boy, but at the outbreak of the Civil War volunteered in the Confederate army. He subsequently became major of heavy artillery, and lieutenant-colonel of cavalry. After the war he again entered commercial life, and in 1868 founded the Crescent City Democratic Club, the most powerful political organization in New Orleans. He became Major-General of State militia; was president of the Red Cross Association of Louisiana during the yellow fever epidemic of 1878, and was chief superintendent of the World's Fair held in New Orleans in 1884. He died in New Orleans, La., May 25, 1886.

Ogden, Herbert Gouverneur, an American cartographer; born in New York city, April 4, 1846; was educated in private schools; appointed an aid in the United States Coast and Geodetic Survey in 1863, and an assistant in 1869. He served with the Nicaragua expedition in 1865, the first naval exploring expedition to the Isthmus of Darien in 1870, and was in charge of the party sent to locate the international boundary between British Columbia and Alaska, in 1893. He was a member of various scientific societies, a contributor to scientific journals, and a recognized expert in topography and cartography.

Ogdensburg, a city and port of entry in St. Lawrence co., N. Y.; at the confluence of the St. Lawrence and the Oswegatchie rivers, and on the Ogdensburg, Rome and Watertown, and the Central Vermont

railroads; 175 miles N. N. W. of Albany. The city has a large river trade, and a steam ferry to Prescott, Canada; contains a United States government building, refuge for the aged, orphanage, hospital, public library, street railroad and electric light plants, National and State banks, and daily and weekly newspapers. It has grain elevators, flour and lumber mills, and leather factories, and an assessed property valuation of over $4,000,000. Pop. (1890) 11,662; (1900) 12,633; (1910) 15,933.

Ogee, or **Ogive,** in architecture, a wave-like molding, having an inner and outer curve, like the letter S (see MOLDING). Also, a pointed arch, the sides of which are each formed of two contrasted curves, the one concave and the other convex. In ordnance, an ornamental molding, shaped like the letter S, used on guns, mortars, and howitzers.

Ogeechee, a river in Georgia which rises in Greene county and empties into Ossabaro Sound, 17 miles S. of Savannah; length, about 200 miles. It is navigable for steamers in its lower waters.

Ogham, or **Ogam,** a peculiar kind of writing used by the ancient Irish and some other Celtic nations. Also one of the characters, used in this kind of writing. They consisted principally of straight lines, the significance of which depended on their position relative to a chief line, through, over, or under which they were drawn, singly or in groups, either perpendicularly or obliquely. The place of this chief line was sometimes filled by the edge of the substance (usually stone) on which the oghams were incised. Also a particular mode of speech.

Oglesby, Richard James, an American lawyer; born in Oldham co., Ky., July 25, 1824. He was left an orphan at an early age and made his own way in life. He went to Illinois, where he was admitted to the bar in 1845. He served as a 1st lieutenant in the Mexican War; in 1849 was among the goldseekers who made the overland trip to California, where he engaged in mining for two years. In 1851 he returned to Illinois and resumed the practice of law; was elected State Senator in 1860, but resigned to enter the army in the Civil War. He was colonel of the 8th Illinois Volunteers, and before the close of the war was promoted Major-General. He was three times governor of Illinois, being first elected in 1864, reëlected in 1872, and again in 1885. He was elected United States Senator in 1873 and served six years. He died in Elkhart, Ill., April 24, 1899.

Oglethorpe, James Edward, an English military officer and philanthropist; born in London, England, Dec. 21, 1696. It was through his efforts that a colony was formed of insolvent debtors and persecuted Protestants, whom he brought to the United States and settled in Georgia, in 1733. He remained in the United States till 1743, when he returned to England. He died in Cranham Hall, Essex, England, in 1785.

Oglethorpe, Fort, a defensive structure erected by General Oglethorpe in 1737, on St. Simon's Island, Ala., near the mouth of the Alabama river. It was the scene of considerable fighting during the Revolution, as well as the War of 1812. Now in ruins.

Oglio (ōl′yō), a river of Northern Italy, which rises in the Alps, drains Lake Iseo, and falls into the Po; length, 150 miles.

O'Gorman, Thomas, an American clergyman; born in Boston, Mass., May 1, 1843; was educated in the United States and in France; received the degree of D. D. directly from Pope Leo XIII. in 1893; and was consecrated Roman Catholic Bishop of Sioux Falls, April 19, 1896. He held pastorates at Rochester, Minn. (1867–1878); at Faribault, Minn. (1882–1885); was first president of the College of St. Thomas, St. Paul, Minn.; and professor at the Catholic University of America, Washington, D. C. He wrote, "A History of the Roman Catholic Church in the United States."

Ogowé, or **Ogoway,** a river of West Africa, rising on the W. side of the watershed that parts its basin from that of the Kongo, in lat. 2° 40′ S., lon. 14° 30′ E., flows N. W. W., and finally curves round by the S. so as to pour its waters into Nazareth Bay, on the N. side of Cape Lopez. It forms a wide delta of about 70 square miles in extent. In the dry season (July to September) it shrinks to a narrow current winding between the rocky obstructions of its bed; at other times it is a deep, broad stream, navigable by boats; numerous islands and sandbanks and shallows prevent vessels of any size from ascending. It has been dominated by France, through her colony on the GABUN (*q. v.*), since 1885.

O'Grady, Hubert, an English dramatist; born in Dublin, Ireland, in 1841; was educated by the Christian Brothers; first sang in a choir, and after singing in music halls, made his début in the leading rôle of "The Shaughraun" in 1876. His success as an actor was great, but was eclipsed by his fame as a playwright. Among his best known plays are: "The Gammoch"; "Eviction"; "Emigration"; "Famine"; and "The Priest Hunter." He played the leading part in all his plays, traveling through Great Britain, and in 1890 going to Australia. He died in Liverpool, England, Dec. 19, 1899.

Ogyges, said to have been the first King of Attica and Bœotia, in the 18th century B. C. In his reign is stated to have occurred the great deluge that covered the

whole of Greece. That event has been placed as occurring 260 years before that of Deucalion; viz., about 1764 B. C. Ogyges belongs rather to mythology than to history.

Ogygia, a genus of *Trilobites,* family *Asaphidæ,* from the Lower Silurian. It resembles the type genus *Asaphus,* but the tail is more conspicuously marked, the hypostome is rounded, the glabella distinctly furrowed, and the pleuræ of the thorax have only rudimentary fulcra.

O'Hara, Theodore, an American lawyer, author of the poem "The Bivouac of the Dead"; born in Danville, Ky., in 1820. He was a lawyer and journalist; at one time an officer in the United States navy; connected with the Lopez and Walker movements; served as captain and major in the Mexican War; afterward, for a year, in the United States cavalry; and in the Civil War as a colonel on the Confederate side. He died in Barbour co., Ala., June 7, 1867.

O'Higgins, Ambrosio, real name AMBROSE HIGGINS, a South American administrator; born in County Meath, Ireland, about 1730. He went to Spain when a young man, where he was educated, and then became a trader in Chile. He obtained a commission in the army and rose rapidly; was captain-general of Chile 1788–1796, and viceroy of Peru from June 6, 1796, till his death in Lima, Peru, March 18, 1801.

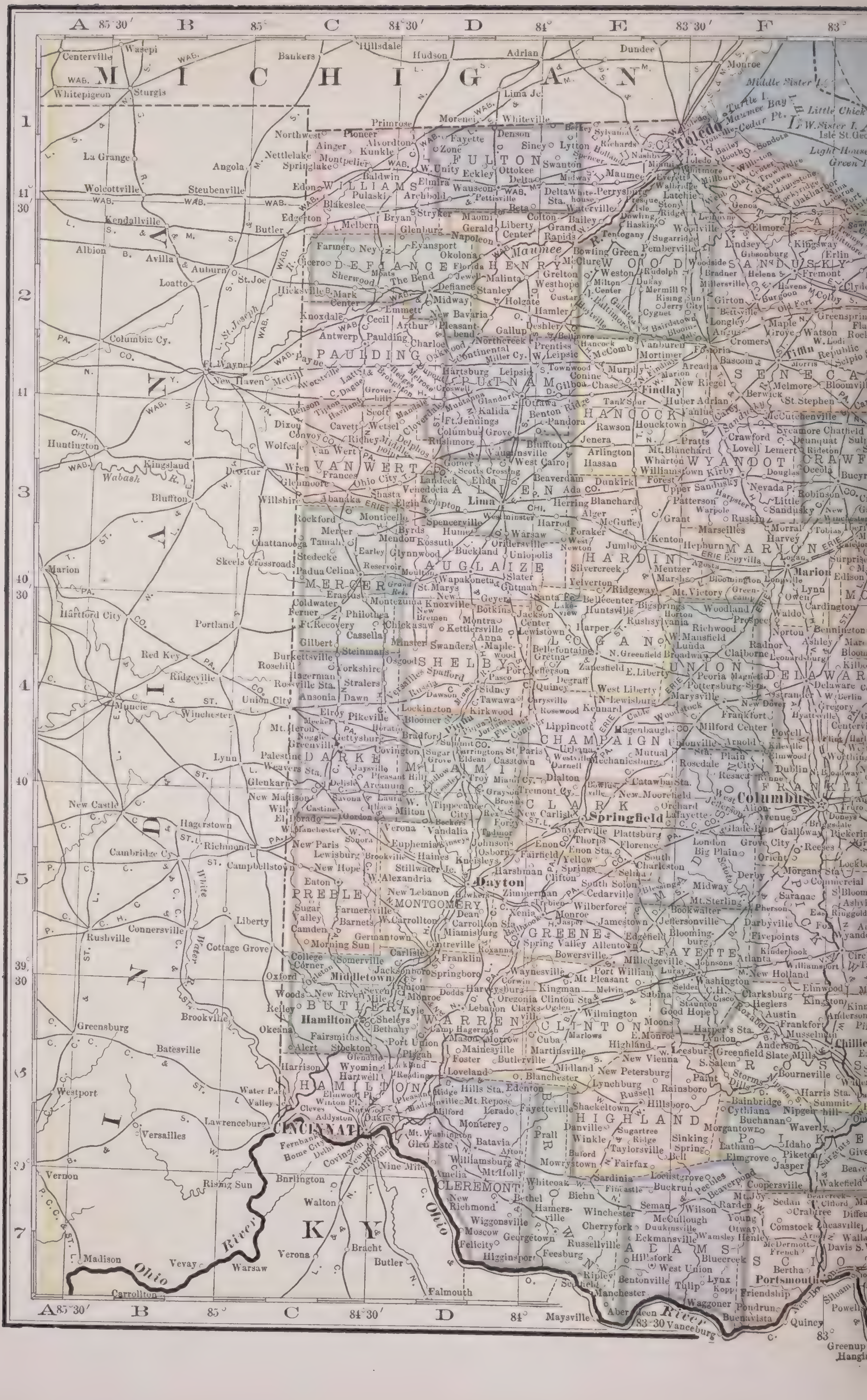
O'Higgins, Bernardo, a Chilean general and statesman, son of Ambrosio O'Higgins; born in Chillan, Aug. 20, 1778. He was educated in England; was a prominent leader of the Chilean patriots in 1810, and in 1813 was made commander of the army. In the conflict with Spain in 1814 the combined forces of O'Higgins and Carrera were defeated at Rancagua and they fled across the Andes. O'Higgins joined San Martin in the invasion of Chile and a few days after their victory at Chacabuco (Feb. 12, 1817) he was made supreme dictator of Chile. The independence of the country was formally proclaimed Feb. 12, 1818, and was decided by the victory of Maipo, April 5, 1818. Like that of his father, the rule of O'Higgins was an excellent one. He was forced to resign by a revolution, Jan. 28, 1823, and retired to Peru. He died in Lima, Peru, Oct. 24, 1842.

Ohio, a State in the North Central Division of the North American Union; bounded by Michigan, Lake Erie, Pennsylvania, West Virginia, Kentucky, and Indiana; admitted to the Union, Feb. 19, 1803; capital, Columbus; number of counties, 88; area, 40,760 square miles; pop. (1890) 3,672,316; (1900) 4,157,545; (1910) 4,767,121.

Topography.—The surface of the State is an undulating plain with a tranverse ridge crossing it in a N. E. and S. W. direction just N. of the center of the State. This ridge forms the watershed between those rivers belonging to the St. Lawrence, and those of the Ohio river systems. The highest altitude in the State is near Bellefontaine, in Logan county, 1,550 feet. The N. side of the watershed, though smaller, has a more gentle slope than the S. side. The lands in the N. W. were originally swampy. The Ohio river forms over half the E., and the entire S. boundary of the State, and though it has an average descent of eight inches to the mile, is navigable its entire distance along the State. Lake Erie forms over two-thirds the N. boundary and provides Ohio with several excellent harbors. The principal rivers flowing into the lake are the Cuyahoga, whose mouth forms the harbor of Cleveland; the Black, the Vermilion, the Ottawa, the Sandusky, emptying into Sandusky Bay, and the Maumee, emptying into Maumee Bay. All of these rivers have excellent harbors at their mouths. The Maumee river drains the larger portion of the N. of Ohio. The streams flowing into the Ohio are the Muskingum, emptying at Marietta; the Scioto, at Portsmouth; the Little Miami, 6 miles from Cincinnati; the Big Miami, 20 miles below Cincinnati, and the Hocking.

Geology.—The entire geological formation of Ohio consists of Palæozoic strata, having an average thickness of about 3,500 feet. The Carboniferous, Devonian, and Silurian systems form the surface rock of the State. The Quaternary or drift deposits, cover a large area of the State, consisting of a blue bowlder clay, covered by the Erie clay. The Carboniferous deposits cover one-third the surface, overlying the Devonian, which geologically forms the surface of the N. part of the State. The whole S. E. half of Ohio is underlaid with coal measures, showing seven distinct veins of superior coal, for gas making, or iron smelting. These coal measures have a practical working thickness of over 50 feet.

Mineralogy.—The mineralogical resources of Ohio are very extensive. The State ranks first in the United States in the production of petroleum, and clay products; third in coal and natural gas; and fourth in salt. Iron is found in several counties, and is adapted to fine class castings. Carbonate of lime, hydraulic cement, and quicklime are extensively manufactured. The sandstone near Cleveland is used extensively for building purposes in the N. States and Canada. In 1900 the principal mineral productions were petroleum, 22,362,730 barrels, valued at $24,091,601; portland cement, 534,215 barrels, valued at $667,769; rock cement, 35,029 barrels, valued at $17,514; salt, 1,425,283 barrels, valued at $696,326; coal, 18,988,115 short tons, valued at $19,292,426; coke, 72,116 short tons,



A
85°30′
B
85°
C
84°30′
D
84°
E
83°30′
F
83°
1
2
3
4
5
6
7
41° 30′
41
40° 30
40
39° 30
39°
MICHIGAN
INDIANA
KY
Ohio River
Wabash R.
Maumee R.
Middle Sister I.
Turtle I.
Maumee Bay
Cedar Pt.
Little Chick
W. Sister I.
Isle St. Geo
Light House
WILLIAMS
FULTON
LUCAS
DEFIANCE
HENRY
WOOD
OTTAWA
SANDUSKY
PAULDING
PUTNAM
HANCOCK
SENECA
VAN WERT
ALLEN
WYANDOT
CRAWF
MERCER
AUGLAIZE
HARDIN
MARION
LOGAN
UNION
DELAWARE
SHELBY
DARKE
MIAMI
CHAMPAIGN
CLARK
MADISON
FRANKLIN
PREBLE
MONTGOMERY
GREENE
FAYETTE
BUTLER
WARREN
CLINTON
HAMILTON
CLERMONT
BROWN
HIGHLAND
ROSS
PIKE
ADAMS
SCIOTO
PICKAWAY
Toledo
Findlay
Lima
Columbus
Springfield
Dayton
Hamilton
Middletown
CINCINNATI
Portsmouth
Fremont
Tiffin
Marion
Ft. Wayne
Muncie
Richmond
Hillsdale
Adrian
Monroe
Dundee
Hudson
Sturgis
Centerville
Wasepi
Whitepigeon
La Grange
Angola
Kendallville
Auburn
Huntington
Bluffton
Decatur
Portland
Hartford City
Winchester
Union City
New Castle
Connersville
Rushville
Greensburg
Batesville
Brookville
Lawrenceburg
Versailles
Vernon
Madison
Vevay
Warsaw
Carrollton
Covington
Newport
Walton
Verona
Falmouth
Maysville
Vanceburg
Greenup
Defiance
Napoleon
Bryan
Wauseon
Bowling Green
Ottawa
Paulding
Van Wert
Kenton
Celina
Wapakoneta
Sidney
Bellefontaine
Marysville
Delaware
Greenville
Piqua
Troy
Urbana
Eaton
Xenia
Lebanon
Wilmington
Washington C.H.
Hillsboro
Georgetown
Batavia
West Union
Chillicothe
Piketon
London
Circleville
Upper Sandusky
Bucyrus

OHIO
SCALE OF MILES
10 5 0 10 20 30 40 50
State Capital
County Seats
Size of type indicates relative importance of places
Hammond's 8 x 11 Map of Ohio
Copyright, 1908, by C.S. Hammond & Co., N.Y.
82 Longitude J West 81°30′ from K Greenwich 81° L 80°30′ M 80°
82 30′ H 82° J 81°30′ K L 80°30′ M 80° N
572 feet above mean sea level
LAKE ERIE
INTERNATIONAL BOUNDARY
To Detroit
To Buffalo
To Rondeau
Point Pelee
CLEVELAND
ASHTABULA
GEAUGA
CUYAHOGA
LORAIN
TRUMBULL
PORTAGE
SUMMIT
MEDINA
MAHONING
STARK
WAYNE
ASHLAND
COLUMBIANA
CARROLL
HOLMES
KNOX
TUSCARAWAS
COSHOCTON
HARRISON
JEFFERSON
GUERNSEY
MUSKINGUM
BELMONT
PERRY
MORGAN
MONROE
NOBLE
WASHINGTON
ATHENS
MEIGS
GALLIA
LAWRENCE
HOCKING
VINTON
Ashtabula
Youngstown
Akron
Canton
Massillon
Mansfield
Newark
Zanesville
Marietta
Steubenville
Bellaire
E. Liverpool
Pittsburg
Allegheny City
Parkersburg
Huntington
Gallipolis
Pomeroy
Athens
PENNSYLVANIA
WEST VIRGINIA
Ohio River
Kanawha R.
Little Kanawha R.
Allegheny R.
Monongahela R.

Ohio

valued at $194,042; mineral waters, 2,061,158 gallons, valued at $184,964; sandstone, valued at $1,683,980; limestone, $1,969,387; and clay products, $16,500,625.

Soil and Agriculture.—The soil is divided into three grades, limestone soils, clay of the uplands, and swamp lands in the N. W. The former two are well adapted to agriculture, all the fruits, cereals, and vegetables of the temperate zone thriving well. In 1900 the principal farm crops were corn, 106,890,188 bushels, valued at $36,342,664; wheat, 8,523,875 bushels, valued at $6,051,952; oats, 40,340,534 bushels, valued at $10,488,539; potatoes, 12,561,584 bushels, valued at $1,559,242; and hay, 1,652,797 tons, valued at $18,263,407. Stock raising and dairy farming are becoming leading industries, and Ohio ranks first in the United States in her number of sheep, and value of her wool production.

Commerce.—The imports of merchandise for the calendar year 1900 at the ports of Cuyahoga, Miami, Sandusky, Cincinnati, and Columbus, aggregated in value $3,907,561; and exports, $5,207,314.

Banking.—On Oct. 31, 1901, there were reported 300 National banks in operation, having $49,690,000 in capital, $27,645,985 in outstanding circulation, and $24,804,150 in United States bonds. There were also 198 State banks, with $18,323,310 capital, and $3,555,091 surplus; 92 private banks, with $2,108,988 capital, and $609,483 surplus; and 4 mutual savings banks, with $43,672,493 in deposits. The exchanges at the United States clearing houses at Cincinnati, Cleveland, Columbus, Dayton, Toledo, Canton, Springfield, and Akron, for the year ending Sept. 30, 1901, aggregated $2,100,585,534, an increase over those of the previous year of $455,625,246.

Education.—At the end of the school year 1899–1900, the children of school census age numbered 1,179,600; the enrollment in public schools, 829,160; and the average daily attendance, 616,365. There were 13,073 public school buildings, public school property valued at $44,017,179, and 23,017 teachers. The receipts for the previous year amounted to $13,393,244, and the expenditures, $13,335,211. For higher education there were 613 public high schools, 53 private secondary schools, 5 public and 11 private normal schools, 34 universities and colleges for men and for both sexes, and 4 women's colleges. Among the colleges are the University of Cincinnati, at Cincinnati; Western Reserve University, at Cleveland; Ohio State University, at Columbus; Ohio Wesleyan University, at Delaware; Oberlin College, at Oberlin; St. Xavier College, at Cincinnati; and Oxford and Western Colleges, at Oxford, and the Lake Erie College and Seminary, at Painesville.

Churches.—The strongest denominations in the State are the Roman Catholic; Methodist Episcopal; Presbyterian; Regular Baptist, North; Disciples of Christ; United Brethren; Lutheran, Independent Synods; Reformed; Congregational; German Evangelical Synod; and Christian. In 1889 there were 7,664 Evangelical Sunday-schools with 97,042 officers and teachers, and 679,788 scholars.

Postoffices and Periodicals.—In 1901 there were 3,405 postoffices of all grades, and 1,218 periodicals, of which 168 were daily, 5 tri-weekly, 40 semi-weekly, 793 weekly, 6 bi-weekly, 14 semi-monthly, 178 monthly, 4 bi-monthly, and 10 quarterly.

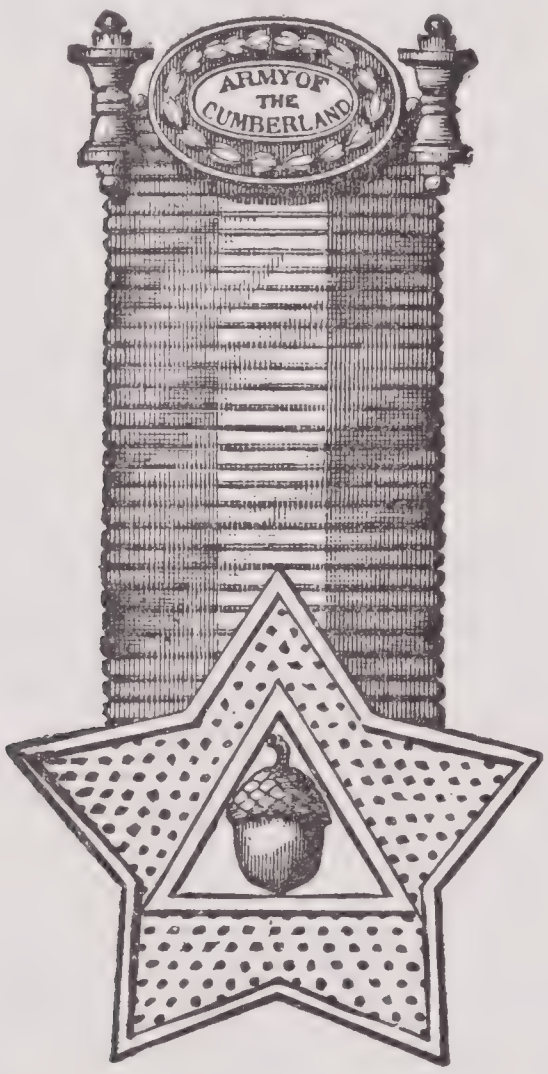
Railroads.—The total length of railroads within the State on Jan. 1, 1901, was 8,916 miles, of which 20 miles were constructed during the previous year.

Finances.—On Nov. 15, 1900, the State debt was divided as follows: Sinking fund loans, $500,000; war loan, $200,000; domestic loan, $1,665; total debt, $701,665. The total local debt, cities, counties, towns, villages, and school districts, amounted to $96,193,514. The assessed valuation in 1900 was: Real estate, $1,274,203,721; personal property, $559,849,507; total valuation, $1,834,053,228; State tax rate, $2.90 per $1,000.

State Government.—The governor is elected for a term of two years and receives a salary of $8,000 per annum. Legislative sessions are held biennially and limited in length to 60 days each. The Legislature has 29 members in the Senate, and 110 members in the House, each of whom receives $600 per annum and mileage. There are 21 Representatives in Congress. The State government in 1901 was Republican.

History.—The site of the present State of Ohio was first explored by La Salle in 1680. About 1750 the English laid claim to the region, and their effort to make good their claim brought on the French and Indian War. In 1763, the whole region was ceded by France to England, and after the Revolutionary War it became part of the territory of the United States. The Ohio Company, organized in New England in 1787, composed of men who had served in the Revolutionary War, purchased from the government a large tract N. of the Ohio, paying for it in Continental currency. The first permanent settlement was made at Marietta in 1788. Cincinnati was founded soon after, and the settlement of the S. section of the territory progressed rapidly. In 1791 the Indians became stirred up by the encroachments of the whites, and a war ensued, which at first proved disastrous to the United States troops, but was finally ended in victory by General Wayne, in 1794. In the treaty of peace that followed, the Indians ceded a large section of territory, in

which several new towns were quickly established. Ohio formed part of the Northwest Territory till 1800, when it was organized as a separate Territory, Chillicothe being made the seat of government. In 1802 a constitution was adopted for the "Eastern Division of the Territory N. W. of the Ohio," under the name of Ohio, and it was formally admitted into the Union on Feb. 19, 1803. Steamboat navigation on the Ohio began in 1812; excavation of the State canals began in 1825, and was completed in 1844; and, the first railroad, begun in 1837, was opened to traffic by 1842. Ohio took an active part in the Civil War, and since the war has given five Presidents to



BADGE OF THE ARMY OF CUMBERLAND.

the Union — Grant, Hayes, Garfield, Harrison, and McKinley, all born in this State.

Ohio, a river of the United States, called by the French explorers, after its Indian name, *la Belle Rivière* (The Beautiful River), next to the Missouri the largest affluent of the Mississippi. It is formed by the union of the Alleghany and Monongahela at Pittsburg, Pa., and flows W. S. W. 975 miles, with a breadth of 400 to 1,400 yards, draining, with its tributaries, an area of 214,000 square miles. In its course it separates the States of Ohio, Indiana, and Illinois from the States of West Virginia and Kentucky. The principal towns on its banks are Pittsburg, Wheeling, Cincinnati, Louisville (where there are rapids of 22 feet in a mile, with a steamboat canal), Evansville, New Albany, Madison, Portsmouth, Covington, and Cairo. The river's principal affluents are the Tennessee, Cumberland, Wabash, Kentucky, Great Kanawha, Green, Muskingum, and Scioto. It is usually navigable from Pittsburg.

Ohio, Army of the, a division of the Federal army in the Civil War; organized in 1861–1862 by General Buell; afterward came under the command of General Rosecrans and was called the Army of the Cumberland. A second department of the Ohio was formed, and was also in 1865 incorporated in the Army of the Cumberland.

Ohio, The, a first-class battleship of the United States navy. She is 40 feet longer than the "Oregon" and 2,000 tons greater in displacement; is 20 feet longer than the "Iowa" and 1,000 tons greater in displacement. The dimensions of the "Ohio" are: Length on the water-line, 388 feet; extreme breadth, 72.5 inches; mean draft, 23.6 inches; displacement, 12,500 tons; speed, 18 knots; horse power, 16,000; normal coal supply, 1,000 tons; total coal supply, 2,000 tons; crew, 35 officers, 478 men. The largest gun is a 12-inch rifle and her secondary battery has sixteen 6-inch rifles.

Ohio State University, a coeducational non-sectarian institution in Columbus, O.; chartered in 1870, opened in 1873; has endowment of over $900,000; grounds and buildings valued at $3,000,000; scientific apparatus, etc., $500,000; volumes in the library, about 90,000; ordinary income, $750,000; average number of faculty, 225; average students, including summer school, 3,050; graduates, over 3,000.

Ohio University, a coeducational non-sectarian institution in Athens, O.; founded in 1804; has grounds and buildings valued at over $925,000; endowment, $150,000; scientific apparatus, etc., $85,000; volumes in the library, about 30,000; ordinary income, $185,000; average number of faculty, 57; average students, 1,600; graduates, over 700.

Ohio Wesleyan University, a coeducational institution in Delaware, O.; founded in 1844 under the auspices of the Methodist Episcopal Church; has grounds and buildings valued at over $885,000; endowment, $425,000; scientific apparatus, etc., $145,000; volumes in the library, about 58,000; ordinary income, $145,000; average number of faculty, 125; average students, including summer school, 1,400; graduates since opening, over 4,000.

Ohlenschlager. See OEHLENSCHLÆGER.

Ohler. See OEHLER.

Ohm (öm), **Georg Simon,** a German physicist; born in Erlangen, Bavaria, March 16, 1787; became successively Professor of Physics at Cologne, director of the Polytechnic at Nuremberg, and Professor of Physics at the University of Munich. He was the discoverer of what is known as "Ohm's Law" in electricity, and among his scientific works were "The Electric Battery," "Outlines of Physics," etc. He died in Munich, July 7, 1853.

Ohm, a liquid measure containing 40 imperial gallons.

Ohm, or **Ohmad,** in electromagnetics, the unit of resistance. It is 10^9 C. G. S. units of resistance, and is the same as the value of one earth-quadrant per second.

Ohm's Law, in electricity, a law enunciated by Professor Ohm, in 1827, for determining the quantity of electromotive force in a voltaic battery. It is that the intensity of the current in a voltaic current is equal to the electromotive force divided by the resistance.

Ohnet, Georges, a French novelist; born in Paris, France, April 3, 1848; studied law, and after practising some time as an advocate took to journalism, and later to literature proper. Under the general title of "The Battles of Life" he published a series of novels dealing comprehensively with social questions. The first of this cycle was "Serge Panine" (1881), followed by "The Ironmaster" (1882), "Countess Sarah" (1883), "Lise Fleuron" (1884), "The Great Maalpit" (1885), "Will" (1888), "In Deep Abyss," etc.

Oil, in art, the fixed oils used in painting on canvas, etc., such as linseed, walnut, and poppy. They are expressed and purified in various ways, and rendered drying by the addition of the oxides of lead or zinc. Cold drawn linseed oil is the best for use, especially after being boiled upon charcoal to separate the mucilage and other impurities. These oils are the vehicles or media in which the pigments are ground and diluted for use; they should be pale in color, limpid, and transparent, and should dry quickly. The essential oils used in painting are those of turpentine for diluting the pigments ground in oil, and of spike or lavender for wax and enamel painting.

In botany, oils of various kinds are found in the form of minute drops in the cells of many, if not of nearly all plants. They are of two kinds, essential and fixed oils, the former being special secretions in glands, glandular hairs, and hairs on parts exposed to light. Fixed oils are found chiefly in the cells of tissues, and have a relation to, or, at times, seem to occur as substitutes for starch. Some fruits contain oil in their perisperms; spores of cryptogamic plants and pollen grains have it in abundance.

In chemistry, a term generally applied to all neutral fatty substances which are liquid at ordinary temperatures. The mineral oils, and many of the volatile oils of vegetable origin, are simply compounds of carbon and hydrogen, but the larger proportion of vegetable and animal oils contain oxygen in addition, while a few also contain nitrogen and sulphur, as in oil of mustard. The vegetable and animal oils containing oxygen are mostly glycerides of fatty acids, and are characterized by being insoluble in water, slightly soluble in alcohol, but readily soluble in ether.

Oil City, a city in Venango co., Pa.; at the junction of Oil creek and the Allegheny river and on the Erie, the Lake Shore and Michigan Southern, the Allegheny Valley, and the Western New York and Pennsylvania railroads; about 130 miles N. of Pittsburg. It received its name from the extensive petroleum oil wells and oil industries located here. The city has a public hospital, public library, electric street railroads, electric lights, high school, daily and weekly newspapers, and National, State, and private banks. Besides large oil refineries, it has pipe works, iron foundries, engine and boiler works, wagon works, etc., and an assessed property valuation of nearly $3,000,000. Pop. (1890) 10,932; (1900) 13,264; (1910) 15,657.

Oilcloth, a tarpaulin; painted canvas for floor covering. The latter description is prepared from cloth especially woven for the purpose, frequently of great width, and covered on each side by a peculiar series of processes with paint. Figures or patterns in oil colors are afterward printed on one side by means of wooden blocks. See LINOLEUM.

Oilcloth, Manufacture of. The manufacture of oilcloth is an industry which is carried on with the aid of machinery so simple that it is seldom out of order. The buildings in which the operations are performed are constructed on an entirely different plan from large machine shops, the tendency being to minimize the ever-present danger of fire by locating the different steps of the industry in as many buildings as possible and isolating them. Oilcloth consists of burlap, which is painted repeatedly with a body color and then printed with a pattern consisting of from 2 to 10 colors. The burlap, which comes from Scotland, is brought to the factory in bales containing from 12 to 15 bolts of 152 yards each. Burlap used is made in six widths, 38, 47, 56, 74, 75 and 93 inches wide, though for special use, as for stair oilcloth, it is made narrower. The bolts of burlap are sewed together, in order that a large roll may be obtained to be sized and dried.

Beyond the sizing machine is a blower and air heater, which furnishes an enormous volume of hot air to be used in drying the sized burlap. As the temperature in the drying-room is 220° F. no men work in it, but the course of the cloth may be watched through windows. As the burlap emerges, it is automatically marked into lengths and then passes over calender rolls heated by steam, which press and iron it. The burlap is then drawn from the calenders by tension rollers and is cut off into lengths and rolled up. These pieces of cloth are then taken where the body color is put on. The roll of sized and dry burlap is put on a reel, and it then passes over pads and under knives. The paint is thrown on the burlap by dipperfuls, the knife distributing it evenly. The paint on the cloth dries in the space of a day or so, and the cloth is then rolled up and taken to a rubbing machine. It consists of a pair of parallel bars which are actuated in opposite directions with the aid of gears and cranks. Each bar carries a number of pumice-stone blocks, which serve to smooth the surface as the painted burlap is drawn through it. In the most expensive oilcloth four coats are given to the face and two to the back; in the cheapest oilcloth one coat is given to the face and none to the back. The edges are trimmed before printing. Oilcloth may be printed both by hand and machine, hand work being used for the heaviest and best grades and for samples, but the machine work is faultless. The printing blocks are of three varieties, pin or line blocks, depending on whether the pattern is produced by incised lines or by separate wooden pins, and metal blocks. Pin blocks are made by taking a piece of maple and sawing it both longitudinally and transversely with a series of fine saw cuts which form small square pins; the ones not needed in the pattern are chipped out. In the line blocks parts of the continuous lines not needed are cut away. Blocks are required for each color, and some patterns require as many as 6 or 10 colors. The printing blocks are secured to crosspieces of frames which move vertically with the aid of cams. The blocks are inked by rollers which run in boxes, the box being filled with paint. Each roller inks one block, which prints one color. In operation, with the aid of a so-called crooked wheel, the painted burlap is moved forward and at the same time all of the printed blocks descend, each printing its own color. Thus, at the first block only one part of the pattern in one color will be printed, while at the last block the entire pattern of the oilcloth is completed. As the blocks rise, the ink roller runs under the blocks and inks them, rolls back from underneath, and the block descends again. On each pattern is a block called a masher, which is simply an uncut block with all pegs or lines left in place. This spreads and smooths the paint in descending. As the printing progresses, the piece is drawn into the drying-room. It requires from 3 to 20 days for the printed oilcloth to dry. The oilcloth is then rolled and dried again for a month or so.

Hand printing is used exclusively for samples, and very largely for the heaviest oilcloth. The principles involved do not differ from those in which the machine is used. The block, which is 18 inches square, has a handle and is linked on a pad, the paint being supplied and spread with the aid of a bristle brush. After all of the colors have been applied, and a masher used to spread the colors, the oilcloth is pulled forward and the next section is printed. After the finished product has become perfectly dry and hard, it is taken to a varnishing room. The varnishing machine consists of a metal trough which holds the varnish. When it is turned down the varnish runs out of spouts and is distributed evenly over the oilcloth, which is rapidly drawn between a metal and a printer's roller, the lattter spreading the varnish. Workmen with the aid of brushes further distribute the varnish.

Oil on Highways, Use of. The use of oil on the streets and highways in California is becoming more and more general. The system meets with favor as affording an outlet for a great portion of the oil now produced in large quantities, and at the same time as possessing real merit, inasmuch as by its use the condition of the roads is much improved and the comfort of the traveler greatly increased.

The city and county of Sacramento, have, after conclusive experiments, adopted the plan, and the results have proved most satisfactory. The oil was applied hot and cold, the first giving the best results. Heated to a temperature of 180° F. in a boiler adapted for the purpose, the oil was pumped into the sprinkler and then sprayed over the roads. The tanks, boilers, pumps and injector cost about $1,000. The experiment proved the decided economy over the water system, besides lessening the cost of maintenance of the roads, giving a hard, smooth surface and allowing increased loads with a decreased strain on horses. Sprinkled with oil, the roads are practically dustless, while the injury to rubber tires was found to be practically nothing. The first application requires one-third more oil than subsequent ones; two, in some cases one application a year, is all that is ever required.

The city of Catton, in Southern California, computes that sprinkling its streets with oil has reduced the expense from $1,200 a year to $745, a saving of 45 per cent.

In the county of Kern 100 barrels of oil to the mile on roadways 12 feet wide sufficed for the first application, and 60 barrels for the second, six months later, secured permanently good results with generally improved condition of the highways. A contract was let to one oil company by which a road was first harrowed superficially and heated oil applied, with a result that confirmed the success of the process. The entire cost was covered by the payment of $1 a barrel for the oil. In Los Angeles, a large producer of mineral oil, the custom is fixed and all its delightful drives are sprayed with oil. The cleanliness and perfection of condition of the streets of that city is remarked by Eastern tourists as a most enticing feature of the place. In San Francisco, where the streets are mostly paved with basalt blocks or asphalt, sprinkling with oil has not been tried as a civic measure, but the commissioners of Golden Gate Park, in defiance of public opposition, concluded to make an experiment on an extensive scale on the main driveway of the park. This thoroughfare is 4½ miles long and extends from one extremity of the park to the other, with an average width of 35 feet. Thousands of vehicles and a multitude of individuals pass over it every week. The roadway is scientifically constructed, and is as perfect an example of a dirt road as it is possible to make. The first application consumed 6,000 barrels of oil, costing about $1 a barrel, and the surface was thoroughly saturated. In soft spots the process was repeated. For a time the odor was objectionable, but this soon disappeared through the action of wind and sun. There was no damage to clothing, as anticipated. For a time the driveway was avoided by persons with wheels, but whatever inconvenience was temporarily caused by its means soon vanished. The surface is impacted and firm, giving the same character to the drive as if covered by asphalt, and the appearance of the park has greatly improved also. For eight months of the year the clouds of dust arising from the dirt roads settled on the foliage. Since the application of oil the dust no longer flies and the verdancy of the trees and plants is no longer obscured. The economy of oil over water for sprinkling is demonstrated. The commissioners estimate a saving of $500 a month on the one driveway alone, besides saving 70,000 gallons of water in each day. Two applications a year is all that is requisite. The cost of oil is now 87½ cents a barrel. The sprinkler commonly used differs in no respect from that in which water was distributed excepting in respect to a regulator which produces a fine spray of oil. An engine is sometimes attached to the tank where the oil is not supplied by gravity or when the tank is filled from the heating boiler.

Oil Well, a well sunk into an oil-bearing mineral bed, for the reception of the mineral oil or petroleum which filters or flows into it. Oil wells vary in depth from 100 to 1,000 feet, but the mode of sinking them is substantially similar. See PETROLEUM.

Oise, a department of France; separated from the English Channel by Seine-Inférieure; area, 2,261 square miles; pop. (1906) 410,049. The principal rivers are the Oise, a tributary of the Seine, 150 miles in length, with the Aisne and Therain, affluents of the Oise. The soil is in general fertile, and agriculture advanced. The products are the usual grain crops, with an immense quantity of vegetables, which are sent to the markets of the metropolis. There are extensive iron manufactures; porcelain, paper, chemicals, beet-root sugar, woolens, cottons, and lace (at Chantilly) are also made. Capital, Beauvais.

Oka, an important navigable river of Central Russia, the principal affluent of the Volga from the S., rises in the government of Orel, and flows in a generally N. E. direction, and joins the Volga at Nijni-Novgorod, after a course of 706 miles. Its basin comprises the richest and most fertile region of Russia.

Okeechobee Lake, a large shallow lake in Southern Florida; about 40 miles in length by 25 in breadth, and with a maximum depth of 12 feet. Its waters discharge through the Everglades, but there is no appreciable outlet stream. It contains a few islands, and a drainage company has been reclaiming land since 1881.

Oken, Lawrence, a Swiss naturalist; born in Bohlsbach, Baden, Aug. 1, 1779; studied medicine and natural history at Göttingen, and was afterward Professor of Medicine in the Universities of Jena and Zurich. The aim of all his writings might be summarily said to be an attempt at applying the principles of transcendental philosophy to the facts of natural history. He produced his first work in 1802, with the "Elements of Natural Philosophy, the Theory of the Senses, and the Classification of Animals Founded Thereon." Oken was the first to suggest that all animals are built up of vesicles or cells, in his work on generation, published in 1805. His remarkable essay "On the Signification of the Bones of the Skull" attracted little attention at the time of its publication, but was, nevertheless, the forerunner of the investigations of Carus, Geoffroy St. Hilaire, and Professor Owen, upon the laws of homology in the vertebrate skeleton. In 1847, his work called "Elements of Physio-Philosophy" was translated into English; and though, like the other efforts of this writer, it is beyond the grasp of the general reader,

it would seem to be of the deepest importance to the man of science. He died in Zurich, Aug. 11, 1847.

Okhotsk, Sea of, an extensive inlet of the North Pacific Ocean, on the E. coast of Russian Siberia, nearly enclosed by Kamchatka and the Kuriles and Sakhalin. It is little navigated. On its N. shore, at the mouth of the Okhota, is the small seaport of Okhotsk.

Oklahoma, a State of the South Central Division of the United States; bounded on the N. by Colorado and Kansas, on the E. by Missouri and Arkansas, on the S. by Texas, and on the W. by Texas and New Mexico. Its boundary on the S. is the Red river; the N. limit is the parallel of 37° N. lat.; the W. part reaches 103° W. lon.; extreme length E. and W. 467 miles; width N. and S., about 230 miles; number of counties, 75; capital, Guthrie; area, 70,430 square miles; pop. (1910) 1,657,155.

Topography.—The N. part of the State is rolling prairie. Much of the S. surface consists of hill ranges, and is largely covered with timber. The general slope of the State is S. E. from the base of the Rocky mountains, the altitude varying from about 5,000 feet in the N. W. to 350 feet in the S. E. The highest elevation is Sugar Loaf mountain (2,600 feet), near the E. border. Other elevations are the Wichita, the Ouachita, and the Arbuckle mountains, the San Bois hills, and the Ozark uplift. While the surface of the S. E. is rugged, that of the N. partakes of the character of the Great Plains, to which this portion belongs. Oklahoma is drained by numerous rivers. The Grand or Neosho, Verdigris, Cimarron, Poteau, and South Canadian rivers and the Salt Fork belong to the drainage system of the Arkansas. These, together with the Red, Washita, Kiamichi, and Boggy Blue rivers, are all important streams.

Minerals.—Oklahoma is rich in mineral resources. Its petroleum production reaches 50,000,000 barrels annually—about one-third of the total product of the country. Glen Pool, near Tulsa, has produced over 10,000,000 barrels in a single year. The supply of natural gas is unlimited. It gives fuel to nearly all of Oklahoma, and has been piped to neighboring States. According to recent government estimates there are 2,945,138,000 tons of coal in the Choctaw Nation alone, with a yearly output of about 3,000,000 tons. Besides these minerals there are vast quantities of granite, marble, and other building stones, asphalt, salt, gypsum, clay, and sand, considerable quantities of lead, zinc, iron, and copper, and traces of gold and silver.

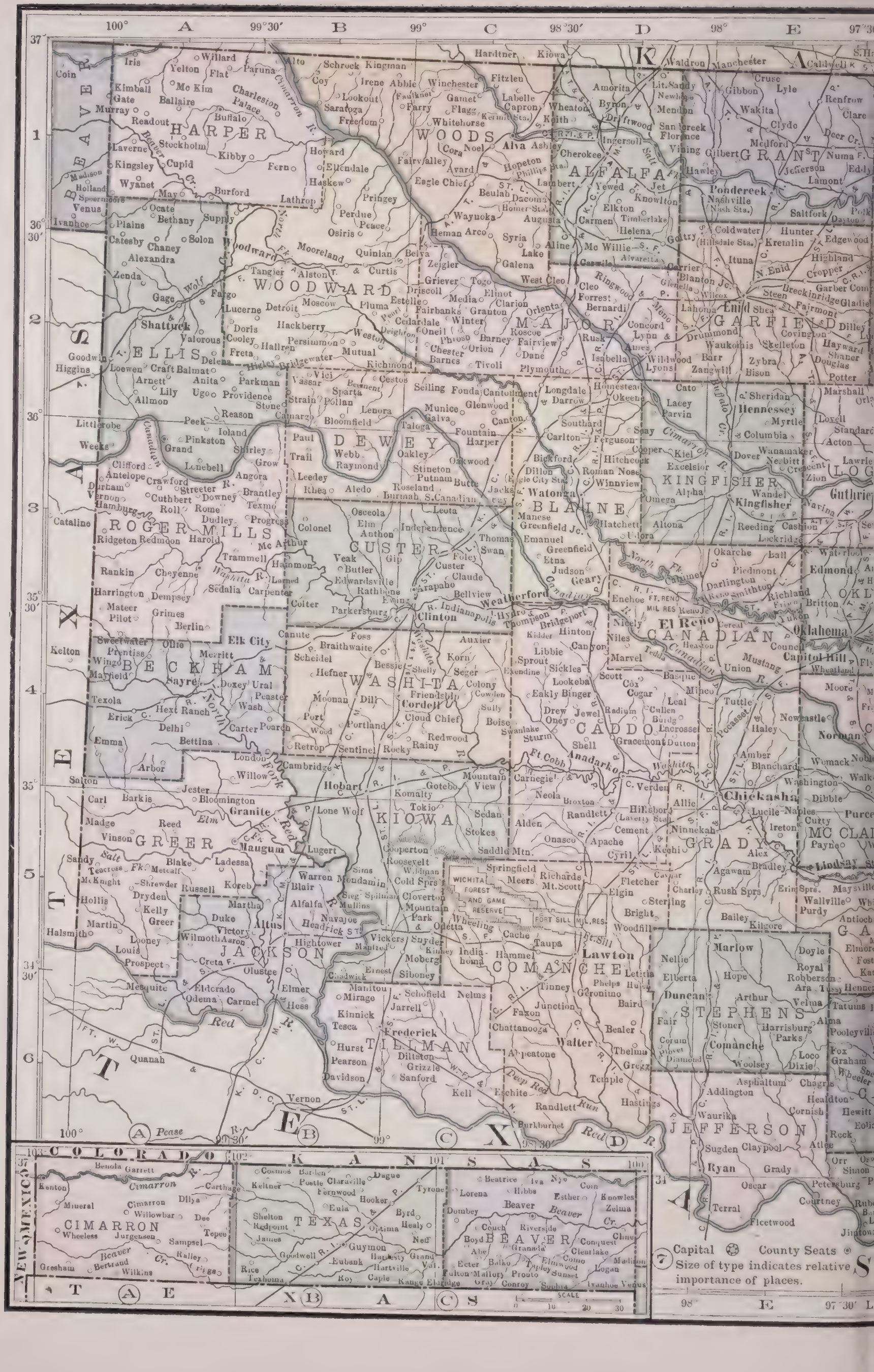
Agriculture and lumbering.—A large part of the soil of the State is tillable, much of it being very fertile, and the rainfall is sufficient for the cultivation of almost every kind of crop. Corn, cotton, wheat, oats, prairie hay, alfalfa, fruits, potatoes, etc., are very profitable to the farmer. Cattle, horses, mules, and hogs are marketed in great numbers, and dairying is becoming an extensive industry. The greater part of the S. portion of the State is covered with forests of pine, oak, elm, walnut, and hickory, and from these increasing quantities of lumber are annually cut. Much of the State is covered with prairie grass, and in the extreme W., sagebrush, cacti, and yucca are found.

Manufactures.—Through the abundant supply of cheap gas and coal, manufacturing interests have been developed to a remarkable extent. These are represented by a number of cement plants, numerous brick plants, gypsum plaster mills, 76 flouring mills, two pottery plants, zinc smelters, and several glass factories in the gas regions. Besides these there are sash and door factories, iron foundries, machine shops, planing mills, and other establishments located in all the larger cities.

Railroads.—Nearly 6,000 miles of railroads within the State furnish transportation facilities to all the chief sections. The principal lines are the Atchison, Topeka, and Santa Fé, the Chicago, Rock Island, and Pacific, the Missouri, Kansas, and Texas, and the St. Louis and San Francisco.

Banking.—From the report of the secretary of the State Banking Board the following statement is taken, showing results under the guarantee law for the first year of its operation: Individual deposits in National banks for call Dec. 3, 1907, $38,318,729.21; individual deposits in National banks for call Nov. 27, 1908, $36,280,346.23; total decrease in deposits, $2,038,382.98. Individual deposits in State banks for call Dec. 11, 1907, $17,215,535.44; individual deposits in State banks under guarantee law for call Nov. 27, 1908, $29,448,970.96; total increase in deposits, $12,233,435.52. Total amount State funds on deposit in National banks on Nov. 27, 1908, $804,785.71; total amount State funds on deposit in State banks on Nov. 27, 1908, $1,165,956.34. Total deposits in all banks December, 1907: National banks, $38,318,729.21; State banks, $17,215,535.44; total, $55,534,264.65. Total deposits in all banks December, 1908: National banks, $36,280,346.23; State banks, $29,448,970.96; total, $65,729,317.19; total increase, $10,195,052.54. As the $2,000,000 decrease in deposits in National banks was transferred to the State banks, the total increase in deposits in State banks was $12,233,435.52.

Education.—From an early period of its settlement the people of Oklahoma were earnestly devoted to the cause of education, and schools were established almost as rapidly as the country was occupied. Besides the University of Oklahoma, at Norman, established in 1892, the educational


100°
A
99°30′
B
99°
C
98°30′
D
98°
E
97°30′
37
36°30′
36
35°30′
35
34°30′
34
BEAVER
HARPER
WOODS
ALFALFA
GRANT
WOODWARD
MAJOR
GARFIELD
ELLIS
DEWEY
BLAINE
KINGFISHER
LOGAN
ROGER MILLS
CUSTER
CANADIAN
OKLAHOMA
BECKHAM
WASHITA
KIOWA
GREER
GRADY
MC CLAIN
JACKSON
COMANCHE
CADDO
TILLMAN
STEPHENS
JEFFERSON
TEXAS
COMANCHE
Capital
County Seats
Size of type indicates relative importance of places.
SCALE
0 10 20 30
COLORADO
KANSAS
NEW MEXICO
CIMARRON
TEXAS
BEAVER

OKLAHOMA
SCALE OF MILES
0 5 10 20 30 40 50
Hammond's 8 x 11 Map of Oklahoma
Copyright 1908, by
C.S. Hammond & Co., N.Y.
West 97° from Greenwich 96°30′ H 96° J 95°30′ K 95° L 94°30′
97° G 96°30′ H 96° J 95°30′ K 95° L 94°30′
37° 1 36° 30′ 2 36° 3 35° 30′ 4 35° 5 34° 30′ 6 34° 7
KANSAS
MISSOURI
ARKANSAS
OSAGE
WASHINGTON
NOWATA
CRAIG
OTTAWA
DELAWARE
ROGERS
MAYES
PAWNEE
PAYNE
TULSA
CREEK
WAGONER
CHEROKEE
ADAIR
LINCOLN
OKMULGEE
MUSKOGEE
SEQUOYAH
OKFUSKEE
McINTOSH
SEMINOLE
HUGHES
HASKELL
LE FLORE
LATIMER
PITTSBURG
PONTOTOC
COAL
JOHNSTON
ATOKA
PUSHMATAHA
McCURTAIN
CHOCTAW
MARSHALL
BRYAN
Arkansas R.
Cimarron R.
Canadian R.
Red R.
Caney R.
Verdigris R.
Grand R.
Illinois R.
Kiamitia R.
Little R.
Mountain Fk. R.
Bartlesville
Pawhuska
Nowata
Vinita
Miami
Claremore
Pryor Creek
Tulsa
Sapulpa
Bristow
Muskogee
Wagoner
Tahlequah
Okmulgee
Chandler
Shawnee
Okemah
Holdenville
Wewoka
McAlester
Stigler
Poteau
Ada
Tishomingo
Madill
Atoka
Coalgate
Hugo
Durant
Antlers
Idabel
Wilburton
Sallisaw
Eufaula
Marietta
Denison
Ft. Smith

Oklahoma

institutions include an agricultural and mechanical college at Stillwater, a colored agricultural and normal university at Langston, and normal schools at Edmond, Alva, and Weatherford. These have grown to be institutions of great efficiency and their work is widely recognized. In the E. part of the present State, during the Territorial period almost the only schools of much importance were the Indian schools and the city schools organized in each city under the Curtis Act (see *History*). For years there were thousands of boys and girls in the rural districts without opportunity to attend school at all. But since the obtaining of statehood schools have been organized, and in the cities especially the work of organization has been rapid and thorough. Highly trained teachers are secured from the best schools in the United States, and the cities have been exceedingly liberal in the erection of modern buildings with ample equipment. The work has been carefully graded, and besides the common subjects music, drawing, manual training, domestic science, etc., are taught, each under the direction of a special supervisor. The high schools are held to rank fairly with similar institutions and with colleges in the North and the East. County high schools are located in Logan and Woods counties. Education between the ages of 8 and 16 is compulsory. A uniform system of text-books has been provided for by the legislature. The enabling act providing for statehood gave to Oklahoma $5,000,000 for a school fund in lieu of school lands in the E. part. This amount, together with the 16th and 36th sections of land in each township, forms the common school fund for the State. In 1898 the schools of the tribes in the Indian Territory were largely taken over by the United States government, and they are still maintained for the education of Indian boys and girls.

Government.—The principal State officers are the governor, lieutenant-governor, secretary of state, treasurer, auditor, attorney-general, adjutant-general, commissioner of education, commissioner of insurance, and commissioner of labor. Their term of office is four years. Besides two senators, the State has five representatives in Congress. The legislature meets biennially. The constitution provides that this body shall consist of not more than 44 members in the senate and 109 in the house. The constitution is the most elaborate and in some of its provisions the most radical ever written for a State. It establishes a corporation commission with almost complete control over railroads and other transportation companies; provides that the power of initiative and referendum shall remain with the people; regulates the number of hours that shall constitute a day's labor for the State and on public works; provides that the defense of contributory negligence shall be a question of fact and shall be left to a jury; and contains many other provisions of a kind usually referred to legislation. Among the acts of the first legislature were laws covering the following subjects: Guarantee of bank deposits; separate railroad coaches and waiting-rooms for colored people; prevention of blacklisting by employers and employees; prevention of the piping of natural gas from the State; regulation of trusts; abolishment of bucket-shops and railroad passes; taxes on incomes, petroleum production, and inheritances. The constitution also prohibits the manufacture and sale of intoxicating liquors.

History.—Probably the first white man to see the country comprised in Oklahoma was Coronado, the Spanish explorer, in 1451. The Frenchmen Marquette, Joliet, and La Salle claimed it as a result of their discoveries and explorations in the Mississippi valley. France gave it to Spain in 1763, only to take it back again in 1800, by the secret treaty of San Ildefonso. The region was acquired by the United States in the Louisiana Purchase in 1803. Fort Smith (Ark.) was founded as a United States military post in 1817, securing access to the new frontier. The country was originally inhabited and claimed by Osage and Quapaw Indians, who ceded it to the United States. The United States government gave it to the Five Civilized Tribes living east of the Mississippi—the Cherokees, Chickasaws, Choctaws, Creeks, and Seminoles. These tribes later gave the W. part, which came to be Oklahoma Territory, to the United States for the Pottawatamies, Iowas, Osages, Sacs and Foxes, Pawnees, Cheyennes, Arapahoes, Otoes, Poncas, Wichitas, etc. The E. half, known as Indian Territory, and the W. half, known as Oklahoma, had a separate existence and separate government from that time until statehood was proclaimed.

On April 22, 1889, the central part of "Old Oklahoma" was opened to settlers, who made the "great rush" at noon on that day to secure homesteads. On March 2, 1890, Oklahoma was organized as a Territory, and on Aug. 27 the first Territorial legislature met at Guthrie. On Sept. 16, 1893, the second great rush for claims took place, when the government opened the Cherokee Strip along the N. part to settlement. Other parts were opened in 1891, 1895, 1901, and 1906, and the Territory grew rapidly. Indian Territory was occupied by the Five Civilized Tribes. The lands there are still largely in possession of the Indians, who now hold them in severalty. After the early migration of the Five Civilized Tribes, each set up its own tribal government, and those were perhaps the best Indian governments known in history. Each nation, as it was called, had its own council, consisting of an upper house and a

lower house, usually called a senate and a house of representatives. Each nation also had a governor, or chief, elected by the people, and a system of courts. Each nation had full charge of its own affairs till 1893, when the Dawes Commission, created by Congress, took control. In 1897 the judicial system of the United States was extended over the various tribes, and in the following year provision was made by the Curtis Act for allotment of the land in severalty, the organizing of city governments, maintaining of school systems in the towns by taxation of property, etc. In 1890 the country known as No Man's Land was attached to Oklahoma by act of Congress and was created into Beaver county. In 1896 Greer county, in the extreme S. W., was given to Oklahoma by decision of the Supreme Court, the county having been previously considered a part of Texas. From 1890 both Oklahoma and Indian Territory grew rapidly, and when they were admitted as a State a populous and enterprising commonwealth was added to the Union.

An enabling act passed by the Fifty-ninth Congress for admitting the Territory of Oklahoma and Indian Territory as the State of Oklahoma was approved June 16, 1906; a constitutional convention met at Guthrie Nov. 20, 1906, adjourned in April, 1907, and held a final session in the following July; the constitution as framed by the convention was ratified by the people Sept. 17, 1907; and on Nov. 16, 1907, President Roosevelt issued a proclamation admitting the State into the Union.

J. G. Masters.

Oklahoma City, a city and county seat of Oklahoma co., Okla.; on the N. Fork of the Canadian river, and on the Atchison, Topeka, and Santa Fé, the Chicago, Rock Island, and Pacific, and the St. Louis and San Francisco railroads; 31 miles S. of Guthrie. It is the seat of Epworth University (M. E.), has a Carnegie public library, and is the entrepôt of a rich agricultural country. There are manufactures of cotton-seed oil, flour, and machinery, and the wholesale interests are considerable. Pop. (1890) 4,151; (1900) 10,307; (1910) 64,205.

Oklahoma, University of, a coeducational State institution in Norman, Okla.; founded in 1892; has productive funds, $1,000,000; grounds and buildings valued at over $200,000; scientific apparatus, etc. $100,000; volumes in the library, 20,000; ordinary income, $120,000; faculty, 57; students, 650.

Okra, a plant, *Hibiscus esculentus.* See Hibiscus.

Okuma, Shigenobu, Count, a Japanese statesman; born in the province of Hizen, Kiusiu, in 1837. He was influential during the Japanese revolution of 1868, and through it rose to office. In 1869 he became secretary of finance and the interior, and from 1872 to 1881 was again finance minister. His efforts to push forward the revision of the treaties with foreign nations made him unpopular, and he resigned. Thereafter he continued to be a leader of the progressive party, and in 1896 entered the cabinet as minister for foreign affairs. He resigned in 1897, but in 1898, after the fall of Marquis Ito's ministry, he organized a new cabinet and for a few months held office as prime minister, with the portfolio of foreign affairs.

Olaf, or **St. Olaf,** one of the most celebrated of the Norwegian kings, great-great-grandson of Harald Haarfager, and son of Harald, chief of the district of Gränland; born about 995. He was a friend of the Normans, and fought as an ally of Ethelred's in England. He afterward established himself on the throne of Norway, and was a zealous supporter of Christianity. Canute the Great having landed in Norway with an army, Olaf fled to Russia, and in attempting to recover his dominions he was defeated and slain at the battle of Stiklestad (1030). Since 1164 he has been honored as the patron saint of Norway. The order of St. Olaf, a Norwegian order given in reward for services rendered to king and country or to art and science, was founded in 1847.

Oland. See Oeland.

Olbers, Heinrich Wilhelm Matthias, a German astronomer; born in Arbergen, Germany, Oct. 11, 1758. He calculated the orbit of the comet of 1779, which was found to be very accurate. In 1781 he had the honor of first rediscovering the planet Uranus, which had previously been supposed, even by Herschel himself, to be a comet, and which had been sought for in vain. He also discovered five comets in 1798, 1802, 1804, 1815, and 1821. Olbers also made some important researches on the possible lunar origin of meteoric stones, and invented a method for calculating the velocity of falling stars. His most important and lasting work was his treatise on the method of computing comet orbits, which also contained a chronological list of all known comets, with their elements, so far as they could be determined. He died in Bremen, March 2, 1840.

Old Abe, a noted eagle that went through the Civil War at the head of the 8th Wisconsin Regiment. In 1861 the young eagle was found by an Indian on the Flambeau river, near the line between Ashland and Price counties, in Wisconsin, and was sold to Daniel McCann of Eagle Point, for a bushel of corn. A few months later he was given to a military company which had just been organized by Capt. John E. Perkins, for the 8th Regiment. The eagle

was sworn in by putting around his neck red, white, and blue ribbons with a rosette of the same on his breast. The name "Old Abe" was given to him at Madison, in honor of President Lincoln. He soon became well known and men of Company C were called the Eau Claire Eagles, and the regiment, "The Eagles." "Old Abe" was with the regiment from the time it was mustered in and never left it. He was in every battle the regiment was in, some 36 in all, and was carried next to the colors. The Confederates tried to capture him, and he was wounded three times, but not seriously. He delighted in excitement, and during a battle would hover in the air, giving a warning cry as the enemy approached, and watching the conflict with interest. After the war he was presented to the State by the soldiers of Company C. In 1864–1865 he was taken to the Sanitary Fair at Chicago, where he aroused great enthusiasm, and a little pamphlet narrating his life, and his photographs were sold. These netted the soldiers $16,000. He was also present at the political convention in Peoria, Ill., in October, 1866, when the name of General Grant was proposed for President and joined in the applause by flapping his wings. He died at the age of 20 years, being overcome by smoke in a fire in the Capitol at Madison, Wis., where he was kept, March 26, 1881. He was stuffed and is now in the War Museum in Washington, D. C. He is the most famous bird in history and has posed for paintings to the most famous artists, been preserved in marble and bronze by sculptors, and has had numerous poems and songs written in his honor.

Old Bailey, an English court or sessions house in London, in which the sittings of the Central Criminal Court are held monthly for the trial of offenses within its jurisdiction. The judges of this court are the lord mayor, the lord chancellor, the judges, aldermen, recorder, and common serjeant of London. But of these the recorder, the serjeant, and the judge of the sheriff's court are in most cases the actually presiding judges. The judicial sittings here are of such antiquity that all record of their commencement has been lost. Crimes of all kinds, from treason to petty larceny, are tried, and the numbers in past times were enormous, but are now greatly reduced by the extended jurisdiction given to the quarter sessions, and the summary powers granted to magistrates. Here were tried in 1660, after the Restoration, the surviving judges of Charles I.; and Milton's "Iconoclasts" and "First Defense" were in the same year burned at the Old Bailey by the common hangman. The patriot Lord William Russell was tried here in 1683, Jack Sheppard in 1724, Jonathan Wild in 1725, the poet Savage in 1727, Dr. Dodd in 1777, Bellingham, the assassin of the statesman Perceval, in 1812, the Cato street conspirators in 1820. The Old Bailey dinners given by the sheriffs to the judges were long famous. However else varied, they always included beefsteaks and marrow puddings, and were served twice a day. The Old Bailey adjoins Newgate Prison, between Holborn Viaduct and Ludgate Hill. Prisoners awaiting trial at this court are transferred to Newgate for the sake of convenience while the sessions here are sitting.

Old Bay State, Massachusetts, whose shores are washed by Cape Cod Bay. Prior to the adoption of the United States Constitution Massachusetts was known as "the Colony of Massachusetts Bay."

Olbia. See OTCHAKOFF.

Old California. See LOWER CALIFORNIA.

Oldcastle, Sir John, Lord Cobham, an English reformer; born in the 14th century, in the reign of Edward III., and obtained his peerage by marrying the daughter of Lord Cobham. He excited the resentment of the clergy by his zealous adherence to the doctrines of Wyclif, whose works he collected, transcribed, and distributed among the people. Under Henry V. he was accused of heresy; but the king, with whom he was a favorite, delayed the prosecutions against him, and tried to convince him of his alleged errors, but in vain. He was then cited before the Archbishop of Canterbury (1413), condemned as a heretic, and committed to the Tower, whence he escaped into Wales. Four years afterward he was retaken and burned alive in St. Giles's Fields, in December, 1417. He wrote "Twelve Conclusions," addressed to the Parliament of England.

Old Catholics, the name assumed by a body of German priests and laymen who refused to accept the dogma of Papal Infallibility, and, in consequence of its definition, formed themselves into a separate body. It was essentially a university movement, for the German bishops who had left Rome to avoid voting — Hefele among the number — afterward submitted. Van Schulte, a professor at Prague, published a formal protest; then came the Nuremberg protest of "Catholic professors" (August, 1870). Father Hyacinthe's "Appeal to the Bishops" followed in "La Libertà" early in 1871, and (March 28) Dr. Döllinger set forth his reasons for withholding his assent "as a Christian, a theologian, an historical student, and a citizen." Döllinger and Friedrich were immediately excommunicated. In September following, a congress was held at Munich, when it was resolved to seek reunion with the Greeks. In 1872 a second congress was held at Cologne, at

which Dean Stanley was present, and sent an account to the London "Times," which aroused much interest all over the world. On August 11, 1873, Dr. Reinkens was consecrated at Rotterdam by Dr. Hey de Kamp, Jansenist Bishop of Deventer, and, in 1876, Dr. Reinkens consecrated Dr. Herzog. The first synod (1874) made confession and fasting voluntary; the second (1875) reduced the number of feasts, and admitted only such impediments to marriage as were recognized by the State; the third (1876) permitted priests to marry, but forbade them to officiate after marriage. This prohibition was annulled by the fifth synod (1878), and, in consequence, Friedrich, Reusch, and some others withdrew. Congregations of Old Catholics exist in Austria, Italy, Spain, Switzerland, France, and Mexico, but their numbers are small. In Germany they seem to be dwindling away, but the protest of Döllinger and his fellows will remain an important landmark in religious history.

Old Colony, a name sometimes given to the S. E. part of the State of Massachusetts.

Old Country, a term common in Australia and in the United States, usually applied to the British Isles.

Old Dominion, Virginia. In colonial days acts of Parliament relating to the Virginian settlements (which at that time included all the British dominions in North America) always designated them as the "Colony and Dominion of Virginia." In the maps of the time this colony was described as "Old Virginia," in contradistinction to the New England settlements, which were called "New Virginia."

Old Dongola. See DONGOLA, NEW.

Oldenburg, Grand-Duchy of, a state of North Germany, between lat. 52° 30′ and 53° 43′ N., lon. 7° 35′ and 8° 50′ E., having N. the North Sea, E. the territory of Bremen, S. and W. Hanover; area, 2,417 square miles. The surface is level, and so low on the coast as to render necessary the formation of dykes, as in Holland, to prevent inundations of the sea. The soil is rich on the banks of the rivers, but in other parts sandy or marshy. The principal rivers are the Weser, Hunte, Haase, Leda, and Jahde. Of the lakes, Drummersee is the principal. The productions include flax, hemp, hops, rape seed, corn and potatoes. Horses and cattle of superior breed, and sheep, are extensively reared. Its commerce is principally carried on in small vessels of from 20 to 40 tons, along the coast with Denmark, Holland, Hanover, etc. It is governed by a grand duke, the power of whom is limited by an hereditary constitution common to Oldenburg, and the principalities of Lubeck and Birkenfeld, which are represented in one joint chamber composed of 47 members, chosen by free voters. Each principality has, however, its own provincial council, the members of which are likewise elected by votes. The duchy of Oldenburg was formed in 1773 by Joseph II., of the counties of Oldenburg and Delmenhorst. It joined the Confederation of the Rhine in 1808, incorporated with the French empire by Napoleon I. in 1810, and was restored to the duke in 1814. Augustus first assumed the title of grand duke in 1829. Kniphausen was added to the grand-duchy in 1854. Oldenburg entered into an alliance with Hanover against Prussia in 1865, and after the defeat of the Austrians, submitted to Prussia. Pop. (1905), duchy, 353,789; Lübeck, 38,583; Birkenfeld, 46,484 —total, 438,856; Oldenburg (capital), 28,565.

Oldenburg, Henry, a native of Bremen; born in 1626; was consul for his native city in London during the period of the Long Parliament and the protectorship of Cromwell. Besides being tutor to Lord Henry O'Brien and Lord William Cavendish, he was elected one of the very first members of the Royal Society, and, as assistant-secretary, edited its "Transactions" from 1664 to 1677, maintaining an extensive correspondence with Spinoza, Leibnitz, Bayle, and many other learned men of the age. Milton also knew him, and addressed him in the "Epistolæ Familiares." He died near Greenwich, in August, 1678.

Old Glory, a popular name of the American flag; was first applied in 1831 by a Salem, Mass., skipper named William Driver, who was at that time captain of the brig "Charles Doggett." Captain Driver was a successful deep sea sailor, and at the time of bestowing the name "Old Glory" on the flag he was preparing to shape the brig's course to the Southern Pacific. Just before the brig left Salem, a young man at the head of a party of friends saluted Captain Driver on the deck of his vessel and presented him with a large and beautifully made American flag. It was sent aloft, and when flung to the breeze Captain Driver christened it "Old Glory." He took it to the South Pacific, and years after, when old age forced him to relinquish the sea, he treasured the flag as an old friend. In 1837 Captain Driver removed to Nashville, Tenn., and he died there in 1886. Previous to the outbreak of hostilities between the North and South "Old Glory" was flung to the breeze every day from the window of Captain Driver's Nashville house, but when the conflict began the old flag had to be secreted. It was kept out of sight till General Nelson's wing of the Union army appeared in Nashville, Feb. 27, 1862, when Captain Driver presented it to the general to be hoisted on the capitol. It was run

up, and Captain Driver himself did the hoisting. Its name and history soon became familiar to all the soldiers in General Nelson's command, and from Captain Driver's cherished flag the name "Old Glory" was extended by the boys in blue to every flag of the Union.

Old Guard, The, a celebrated body of troops in the Army of Napoleon I. It was distinguished for bravery, and at the battle of Waterloo made the final charge of the French army.

Oldham, a town of England, in Lancashire, 6 miles N. E. of Manchester. It is very irregularly built, and cannot boast much of its public buildings, though it has a handsome and commodious town hall, lyceum and science and art school, free library and museum, etc. The spinning and weaving of cotton are the staple industries of the town, and employ within it and in its vicinity about 250 mills; and there are several large machine shops, foundries, tanneries, roperies, silk factories, bleach works, etc.

Oldham, John, an English author; born in Shipton, in August, 1653; was educated at the school of Tedbury, and then at Oxford. He had many patrons, the last being the Earl of Kingston, in whose house he died. His works have been published in three volumes. He died in 1683.

Oldhamia, a fossil genus of Lower Cambrian age, from Bray Head, County Wicklow, Ireland, of which the true nature is altogether unknown. *O. antiqua,* the commonest species, consists of a central thread-like axis, from which spring bundles of short, radiating branches at regular intervals. The genus has been referred to the Sertularian Zoöphytes, to the Polyzoa, and, with most probability, by Salter, to the calcareous sea weeds.

Old Hickory, a nickname of Andrew Jackson, first given by his soldiers in 1813. It is supposed by some to have originated in the example Jackson set his soldiers, when short of rations, of feeding on hickory nuts; but Parton says "It was not an instantaneous inspiration, but a growth. First of all, the remark was made by some soldier who was struck with his commander's pedestrian powers, that the general was 'tough.' Next it was observed that he was as 'tough as hickory.' Then he was called 'Hickory.' Lastly, the affectionate adjective 'old' was prefixed, and the general thenceforth rejoiced in the completed nickname, usually the first-won honor of a great commander."

Old Ironsides, the name by which the United States frigate "CONSTITUTION" (*q. v.*) is best known.

Old Man of the Mountain, another name for Profile Mountain in the Franconia range, N. H. It consists of a huge rock about 1,000 feet in altitude, which, when viewed from the right position, has a marked likeness to a man's face.

Oldmixon, John, an English political writer; born in Bridgewater, England, in 1673. His principal works were: "A History of England" (2 vols.); "Life of Arthur Maynwaring"; and "Life of Queen Anne." He was distinguished for his hatred of the Stuart family. He died in 1742.

Old Mortality. See PATERSON, ROBERT.

Old Nick. See NICK.

Old North State, North Carolina.

Old Parr. See PARR, THOMAS.

Old Point Comfort. See HAMPTON ROADS.

O. P. Riots. See KEMBLE, JOHN PHILIP.

Old Red Sandstone. The old red sandstone, or Devonian system, may be considered as embracing the whole series of strata which lies between the Silurian and Carboniferous systems. Certain portions of the formation were first distinguished in Devonshire, from which it derives its second name. The lower margin of the system is characterized by strata containing the fossil remains of fishes, and forming a line of separation between it and the Silurian system. On its upper margin it is distinguished by the rarity of the vegetation which so remarkably distinguishes the overlying carboniferous rocks. The great bulk of the system consists of a succession of sandstones, alternating with subordinate layers of sandy shale, and beds of a concretionary limestone. The sandstones pass in fineness from close-grained fissile flags to thick beds of coarse conglomerate, and the shales from sandy, laminated clay, to soft flaky sandstone. Oxide of iron often tinges the whole of the system more or less with a color varying from a dull rusty gray to bright red, and from red to a fawn or cream-colored yellow. In the Devonian system, properly so called, the middle and upper portions exhibit an abundance of fossiliferous limestones and calcareous shales, or dark bituminous-looking schists. The Devonian formation is nowhere found so largely developed as in the United States. In the New York system of rocks it includes the following rocks:

Names.	Approximate thickness in New York.
Catskill group, or old red sandstone	2,000 feet.
Chemung	1,500 "
Portage, and Genesee	1,000 "
Hamilton	1,000 "
Marcellas	50 "
Upper Helderberg	50 "
Schoharie, and Cauda-galli	10 "
Oriskany sandstone	5 to 30 feet.

Old Style. See STYLE.

Old Town, a town in Penobscot co., Me., near the W. bank of the Penobscot

river, and on the European and North American, and the Piscataquis railroads; 12 miles N. N. E. of Bangor. It has extensive water power, and is principally supported by the lumber industry, having one of the largest lumber mills in the world. The assessed porperty valuation exceeds $1,000,000. Pop. (1890) 5,312; (1900) 5,763.

Old World, the Eastern Hemisphere, so named in popular parlance subsequent to the discovery of the New World, in 1492.

Oldys, William, an English biographer and antiquary; born July 14, 1696. In 1737 he succeeded to the care of Lord Oxford's (the Harleian) library, the catalogue of which was partly drawn up by him. He wrote: "Life of Sir Walter Raleigh"; "The British Librarian"; "The Universal Spectator"; 22 lives in the "Biographia Britannica." His most valuable and curious work is an annotated copy, now in the British Museum, of Langbaine's "Account of the Early Dramatick Poets." He died April 15, 1761.

COMMON OLEANDER.

Oleaceæ, or **Oleineæ,** in botany, oliveworts; an order of perigynous exogens, aliance Solanales. It consists of trees or shrubs, usually with dichotomous branches; opposite, generally simple, leaves; flowers in terminal or axillary racemes or panicles; a four cleft, gamopetalous corolla; two, rarely four, stamens; a two celled ovary, each cell with two pendulous seeds; style, one or none; stigma, bifid or undivided. Closely akin to Jaminaceæ. Natives chiefly of temperate climates. Divided into two tribes, Oleæ and Fraxineæ. Known genera, 24; species, 150.

Olean, a city in Cattaragus co., N. Y., on the Alleghany river and on the Western New York and Pennsylvania, the Erie, and the Central New York and Western railroads; 70 miles E. of Buffalo. It contains a large supply of natural gas, both for fuel and lighting; the Forman Public Library, electric street railroads, electric lights, National banks, and daily and weekly newspapers. It has extensive petroleum, hemlock, lumber, and tanning interests, and an assessed property valuation of over $3,500,000. Pop. (1900) 9,462; (1910) 14,743.

Oleander, in botany, *Nerium oleander,* the common, and *N. odorosum,* the sweet-scented oleander. They have lanceolate coriaceous leaves, with parallel veins and fine roseate flowers. The former is a native of India, now naturalized in many warm countries. A decoction of its leaves forms a wash used in the S. of Europe to destroy cutaneous vermin; the powdered wood and bark are used at Nice as the basis of a rat poison. Sweet scented oleander is wild in Central India. Scinde, Afghanistan, and the outer Himalayas to 5,500 feet. Often cultivated in India, etc. All parts of the plant, especially the root, are poisonous.

Olefiant Gas, the most abundant illuminating constituent in coal-gas. It may be obtained by the destructive distillation of coal, but more readily by the action of sulphuric acid on alcohol. It is a colorless gas with a faint odor, but little soluble in water or alcohol. It may be liquefied by cold and pressure. With air it forms a powerfully explosive mixture, which, on being burned, yields water and carbonic acid gas. When mixed with an equal volume of chlorine, and kept cool and in the dark, the two gases unite, with the production of drops of an oily liquid called Dutch liquid.

Oleic Acid, in chemistry, $C_{18}H_{34}O_2$, obtained by the saponification of olive oil. The acid is separated by forming a lead soap, which is dissolved in ether, and afterward decomposed by addition of hydrochloric acid. The oleic acid dissolves in the ether, from which it is obtained by evaporation. It forms dazzling white needles, which melt at 14°, and volatilize without decomposition. Sp. gr. = .898 at 19°. It is tasteless, inodorous, and insoluble in water, but very soluble in alcohol and ether.

Oleine, in chemistry, the principal ingredient in the fat oils which remain fluid at common temperatures. It is procured by separating the palmitin and stearine from a fat oil by cold and pressure, dissolving the liquid portion in ether, evaporating and digesting the residue in cold alcohol, which dissolves the oleine, and leaves palmitin and stearine undissolved. Oleine is colorless, inodorous, and tasteless. Its sp. gr. is about 0.9. It is insoluble in water,

but abundantly soluble in alcohol and in ether. It remains fluid at 32°.

Olenek, a river of Northern Siberia which rises under the polar circle, and enters the Arctic Ocean to the W. of the Lena delta; length, about 1,200 miles.

Olenus, a genus of *Trilobitee,* akin to Paradoxides. The glabella is conical, there are only 14 body rings, and the pygidium is well developed. Commences in the Upper Cambrian, and survives till the Upper Silurian.

Oleograph, a name given to an ordinary chromo lithograph which has been "roughed" after printing, mounted on canvas, and varnished so as to imitate an oil painting.

Oleomargarine, in chemistry the more oily part of beef fat, prepared extensively in this country by allowing the melted fat to cool slowly to 30°, when most of the stearin crystallizes out and is removed by pressure. Another brand of oleomargarine is prepared by adding nut oil to suet fat in such proportion as to reduce the melting point to that of butter fat. Both kinds are largely used in making up artificial butter and cheese. In the United States this article, when on sale as a substitute for butter, must be clearly marked with its true name.

Oleometer, or **Elaiometer,** an areometer or balance for ascertaining the densities of fixed oils. It consists of a very delicate thermometer tube, the bulb being large in proportion to the stem, so weighted and graduated as to adapt it to the densities of the leading fixed oils. On the scale is marked the principal oils of commerce, with their specific gravity opposite. The standard temperature of the oleometer is 59° F. Those in general use are Gobby's and Lefebre's oleometers, Fisher's oil balance, and Brix's areometer for lighter liquids.

Oléron, an island lying from 2 to 10 miles off the W. coast of France, and forming part of the department of Charente-Inférieure. It is 19 miles long by about 5 broad, and is unusually fertile. On Oléron are the port of Le Château, and the small towns of St. Pierre d'Oléron and St. Georges d'Oléron.

The Laws or Judgments of Oléron were a code of maritime law compiled at the instance of Eleanor of Guienne before she married Henry II. of England, modelled on the "Book of the Consulate of the Sea" (a maritime code regulating commerce in the Levant), but drawn from the decisions of the maritime court of Oléron, in the duchy of Guienne. It was intended for the use of mariners in the Atlantic waters, was introduced into England in the end of the 12th century and into Flanders in the 13th. The usages and decisions upon which it was based were those observed in the wine and oil trade between Guienne and the ports of England, Normandy, and Flanders. An English translation was published as "Rutter of the Sea."

Olfactory Nerves, in anatomy, the fifth pair of cerebral nerves ramifying on the Schneiderian membrane, producing the sense of smell, and also sensibility to the nose.

Olga, a woman of obscure birth, who became the wife of Igor, Grand-Duke of Russia, and after the death of her husband, in 945, governed the country for 10 years as regent. Having become a Christian, and contributed to the spread of the faith, she is regarded as a saint in the Greek Church. She died in 968.

Olibanum, or **Oliban,** incense, a gum resin, occurring in rounded, pale yellow grains, obtained from a Boswellia growing in Abyssinia. It contains 56 per cent. of resin soluble in alcohol, 30 per cent. of gum soluble in water, and from 4 to 8 per cent. of an aromatic oil.

Olifant River, a forked stream of Cape Colony, South Africa; rises in the mountains N. E. of Cape Town, and, after a N. W. course of 150 miles, enters the Atlantic. Area of drainage basin, 13,000 square miles. Another stream bearing the same name rises in the Transvaal, and goes E. to join the Limpopo.

Oligarchy, a form of government in which the supreme power is vested in the hands of a small exclusive class; the members of such a class or body.

Oligocene, in geology, a term employed by Beyrich to designate certain Tertiary beds of Germany (Mayence, etc.).

Oligoclase, in mineralogy, a mineral belonging to the felspar group of unisilicates. Crystallization, trichlinic, but rarely occurring in distinct crystals; twin crystals resemble those of albite. Hardness, 6–7; sp. gr. 2.56–2.72; luster, vitreous, somewhat greasy; color, various shades of gray, white; transparent to sub-translucent; fracture, conchoidal, sometimes uneven. Composition: Silica, 62.1; alumina, 23.7; soda (partly replaced by lime), 14.2 = 100. Dana recognizes four varieties: (1) Cleavable, crystallized or massive; (2) Compact massive, including much felsite; (3) Aventurine oligoclase, or sunstone; (4) Moonstone; most of which, however, is referable to orthoclase. A frequent constituent of eruptive and metamorphic rocks.

Oliphant, Laurence, an English writer, born in Cape Town, South Africa, in 1829. Of good family and position, he roamed over the earth, deeply interested in the mystic philosophy of the East; and while sometimes holding official positions, was essentially a dreamer who cared most for the

things of the spirit, and gave up brilliant prospects and the pleasures dearest to humanity in order to elevate his soul. He published a dozen books, including three novels; several works of a politico-military nature, such as "A Narrative of the Earl of Elgin's Mission to China and Japan" (1860); and various journalistic and philosophic books, like "Episodes in a Life of Adventure" (1887) and "Scientific Religion" (1888). He died in Twickenham, England, Dec. 23, 1888.

Oliphant, Margaret (Wilson), a Scotch novelist; born in Walyford, Scotland, in April, 1828; lived in Liverpool, London, Rome, and for nearly 30 years in Windsor, England. She was a most prolific authoress, publishing over 110 books, besides numerous articles and essays. She excelled in delineating character, and had a keen sense of humor. Among her most important works are: "Caleb Field" (1851); "Harry Muir" (1853); "The Quiet Heart" (1856); "Adam Graeme of Mossgray" (1857); "The Makers of Florence" (1874); "A Beleaguered City" (1880); "The Victorian Age of English Literature" (1892); "A Little Pilgrim in the Unseen" (1882); etc. She died in Wimbledon, England, June 25, 1897.

MARGARET OLIPHANT.

Olisipo. See LISBON.

Oliva, in zoölogy, olive; a genus of *Buccinidæ*. Shell cylindrical, polished; spire very short, suture channeled; aperture long, narrow, notched in front; columella callous, striated obliquely; body-whorl furrowed near base. No operculum in the typical species, *O. porphyria*. Large foot and mantle lobes; eyes near tips of tentacles. Known species 120, from subtropical coasts of America, West Africa, India, China, and the Pacific. In palæontology, 20 fossil species, commencing in the Eocene Tertiary.

Oliva, a village in Prussia, in the province of East Prussia, not far from Danzig. In a Cistercian abbey in this village a peace was concluded, May 3, 1660, which terminated the war between Sweden, Poland, the emperor, and Brandenburg.

Olivarez, Gasparo de Guzman, Count of, Duke of San Lucar, an Italian statesman; born in Rome, Italy, where his father

COUNT OF OLIVAREZ.

was ambassador, Jan. 6, 1587. He became the friend of Philip IV., his confidant in his amours, and afterward his prime minister, in which capacity he exercised almost unlimited power for 22 years. Olivarez showed ability for government; but his constant endeavor was to wring money from the country that he might carry on wars against Portugal, France, and the Netherlands. His attempts to rob the people of their time-honored privileges provoked insurrections in Catalonia and Andalusia, and roused the Portuguese to shake off the Spanish yoke in 1640. But the continued ill success of the arms of Spain at length thoroughly roused the nation, and the king was obliged to dismiss his favorite in 1643. He was ordered to retire to Toro (Zamora), and died there July 22, 1645.

Olive, in botany, *Olea europæa,* the leaves are oblong or lanceolate, smooth above but horny beneath; the small white flowers in axillary, erect recemes; the ellipsoidal fruits bluish-black, berry-like, and pendulous. It is rarely above 25 feet high, but is of slow growth, and reaches a great age. Two varieties are known, the Oleaster, not to be confounded with any of the modern order *Thymalaceæ*, and the cultivated variety. The former is spiny, and has worthless fruit; the many sub-varieties of the latter are unarmed and have large, oily fruits. The specific name *europæa* implies that Europe was its native continent, which is doubtful. Its original seat was probably Western Asia, and perhaps Europe as well. It was very early brought into cultivation, and in classic times was sacred to Minerva. It was very abundant in Palestine, and even yet there are fine olive plantations near Jerusalem, Nabulus

(formerly Schechem), etc. It is often mentioned in the Old Testament by the Hebrew name *zaith*, and in the New by that of *elaia*. Both are correctly translated olive. The Mount of Olives was named from it, and Gethsemane means an oil press. The tree has been introduced into and is cultivated in the countries bordering on the Mediterranean, and in some mountainous parts of India and Australia. Enormous quantities of olives are produced in Southern California, those from the vicinity of Santa Barbara being considered especially good in quality. The unripe fruits are pickled, and the ripe olives used for the manufacture of olive oil. In chemistry, when ripe, olives weigh about 30 grains each, and contain 25 per cent. of water, and 69 per cent. of fat. When scarcely formed they contain a considerable quantity of mannite, which disappears as the fruit ripens.

Olive, Princess, the title assumed in 1820 by a pretender, Mrs. Olivia Serres, who claimed to have been born at Warwick, England, April 3, 1772, the granddaughter of the Rev. Dr. Wilmot, her mother being his only daughter, her father Henry Frederick, Duke of Cumberland, the youngest brother of George III. In 1791 she had married John Thomas Serres, painter, but had separated from him in 1803; and between 1805 and 1819 she had published 10 trashy volumes of poetry and fiction. She resembled the royal family, and found some people ready to believe her to be really Princess of Cumberland and Duchess of Lancaster; but she died in poverty, within the "rules" of the King's Bench, in November, 1834. See RULES OF A PRISON.

Olive Oil, in chemistry, Florence oil, or salad oil, a non-drying oil, extracted from the fruit of the olive by pressure. It has a pale yellow color with a tinge of green, a mild and agreeable taste, is almost free from odor, and solidifies between 0° and 10°. It consists of the triglycerides of oleic, palmitic, and stearic acids. Sp. gr., .9144–.9176 at 15°. It is frequently adulterated with almond, nut, colza, cotton seed, and other oils. In pharmacy, it is used as a laxative; as an emollient ingredient in enemas; to envelop the poisonous particles in the stomach in cases of poisoning; to relieve pruritus in skin diseases; and to protect the surface from the air in scalds and burns.

Oliver, Charles Augustus, an American ophthalmologist; born in Cincinnati, O., Dec. 14, 1856; was graduated at the University of Pennsylvania in 1876; became surgeon to the Wills' Eye, and the Philadelphia Hospitals, and honorary and corresponding member of many scientific societies. His publications include "Correlation Theory of Color Perception; (Ophthalmic Methods in Recognition of Nerve Diseases" (1895); "Ocular Therapeutics" (1900); "Refraction" (1900); coauthor "Text Book of Ophthalmology"; coeditor "Systems of Diseases of the Eye"; etc.

Oliver Oldschool. See SARGENT, NATHAN.

Oliver, Paul Ambrose, an American military officer; born on shipboard in the English channel, July 18, 1830; was educated in Germany; settled in the United States, where he was engaged in business till the outbreak of the Civil War, when he entered the army as 2d lieutenant in the 12th New York Volunteers. He was in some of the hardest fighting of the war, and was brevetted Brigadier-General of volunteers, March 13, 1865. In 1870 he established a powder factory near Wilkesbarre, Pa., where he put into use machinery of his own invention to minimize the dangers of explosion. He became a member of the American Institute of Engineers, the Loyal Legion, and other organizations.

Olives, Mount of, or **Mount Olivet,** a ridge running N. and S. on the E. side of Jerusalem, its summit about half a mile from the city wall, and separated from it by the valley of the Kidron. It is composed of a chalky limestone, the rocks everywhere showing themselves. The olive trees that formerly covered it, and gave it its name, are now represented by a few trees and clumps of trees which ages of desolation have not eradicated. There are three prominent summits on the ridge; of these the southernmost, which is lower than the other two, is now known as the "Mount of Offence," originally the "Mount of Corruption," because Solomon defiled it by idolatrous worship. Over this ridge passes the road to Bethany, the most frequented road to Jericho and the Jordan. The central summit rises 200 feet above Jerusalem, and presents a fine view of the city, and indeed of the whole region, including the mountains of Ephraim on the N., the valley of the Jordan on the E., a part of the Dead Sea on the S. E., and, beyond it, Kerak in the mountains of Moab. Perhaps no spot on earth unites so fine a view, with so many memorials of the most solemn and important events. Over this hill Christ often climbed in his journeys to and from the holy city. Gethsemane lay at its foot on the W., and Bethany on its E. slope. From the summit, three days before his death, Christ beheld Jerusalem, and wept over it, recalling the long ages of his more than parental care, and grieving over its approaching ruin.

Olivetans, a religious order of the Roman Catholic Church, whose full title is the Congregation of Our Lady of Mount

Olivet. They are an offshoot of the Benedictine Order, and were founded in 1313 by Giovanni Tolomei, a native of Siena, and professor of philosophy in the university of that city, who believed himself to have been miraculously cured of blindness. The order was confirmed by Pope John XXII., and Tolomei was chosen the first general.

Olivet College, an educational institution in Olivet, Mich.; opened in 1859 under the auspices of the Congregational Church; has endowment, $325,000; grounds and buildings valued at over $300,000; scientific apparatus, etc., $50,000; ordinary income, $50,000; average number of faculty, 30; average student attendance, 265; number of graduates since opening, over 750.

Olive Thorne. See MILLER, HARRIET.

Olivier, Juste Daniel, a Swiss poet; born in Eysius, Canton of Vaud, Oct. 18, 1807. In 1830 he published his first volume of poems, "Poems Suisses." This was followed by "The Future" (1831); "Songs from Afar" (1833); and many others. He also wrote many works in prose. He spent most of the last years of his life in Paris. He died in Geneva, Jan. 7, 1876.

Olivine, called also CHRYSOLITE, a mineral, olive-green in color, occurring in lava, basalt, and certain meteorites. Analysis proves it to be a silicate of iron and magnesium.

Olla Podrida, a dish much in favor among all classes in Spain. It is composed of a mixture of all kinds of meat, cut up fine, and stewed with various kinds of vegetables; also an incongruous mixture; a miscellaneous collection of any kind; a medley.

Ollendorf's System, a method of learning languages, invented by H. G. Ollendorf (1803–1865), and designed for those who teach themselves. The grammars are meant to give the student a mastery of the conversational forms of the language, grammatical rules being few.

Ollivier, Olivier Emile, a French statesman; born in Marseilles, France, July 2, 1825, and, having studied law at Paris, began to practise as an advocate in that city. By clever pleading he established a reputation at the bar, and after 1864 acquired influence as a member of the Legislative Assembly. In 1865 the Viceroy of Egypt appointed him to a high juridical office in that country. But he still took an active interest in French politics, and in January, 1870, Napoleon III. charged him to form a constitutional ministry. Ollivier was an unsuspecting tool in the hands of the Imperialists. "With a light heart" he rushed his country into the war with Germany, himself to be overthrown, after the first battle, on Aug. 9. He withdrew to Italy. Ollivier wrote books on "Lamartine" (1874) and "Thiers" (1879), and "The Church and the State to the Council of the Vatican" (1879); "Principles and Conduct" (1875); "The Liberal Regime," etc.

Olmedo, José Joaquin, a South American poet; born in Guayaquil, Ecuador, May 20, 1781. His verses have been highly praised. One of his best poems is a "Song to Bolivar" (1826). His "Collected Works" (Valparaiso, 1848) Paris, 1853; and Mexico, 1862) have been widely circulated. He died Jan. 19, 1847.

Olmsted, Frederick Law, an American landscape architect; born in Hartford, Conn., April 26, 1822. He designed Central Park in New York, and the park systems of Boston, Chicago, Buffalo, and other cities, the United States Capitol grounds and terrace, the grounds of the World's Columbian Exposition in Chicago, etc. His publications include: "Walks and Talks of an American Farmer in England" (1852); "A Journey in the Seaboard Slave States" (1856); "A Journey in Texas" (1857); etc. He died Aug. 28, 1903.

Olmütz, a fortress of Moravia, Austria, on the March, 129 miles N. N. E. of Vienna. Notable are the 14th century cathedral (restored 1887); the church of St. Maurice (1472), whose organ has 48 stops and 2,342 pipes; the noble town hall, with a steeple 255 feet high; the archiepiscopal palace; and the lofty Trinity column on the Oberring. The former university (1581–1855) is reduced to a theological faculty, with over 200 students and a library of 75,000 volumes. The trade is more important than the manufactures. Olmütz, which in 1640 was superseded by Brünn as the capital of Moravia, suffered severely in both the Thirty and the Seven Years' wars. In 1848 Ferdinand I. signed his abdication here. Pop. (1900) 21,933.

Olmütz, Conference of, a conference held at Olmütz, a city of Moravia, Austria, Feb. 28–29, 1850, between Russia and Austria respecting the affairs of Germany and especially in reference to the revolts in Hesse and Schleswig-Holstein against their rulers, the Elector of Hesse and the King of Denmark. By the mediation of Russia, Schleswig-Holstein was given to Denmark, and the Elector of Hesse was reinstated.

Olney, Jesse, an American geographer; born in Union, Conn., Oct. 12, 1798. In 1828 he first published "A Geography and Atlas," which became a standard work for 30 years, and caused a revolution in the methods of teaching geography. He published a series of text-books (1831–1852), including a series of "Readers," a "Common School Arithmetic," a "History of the United States"; and a volume of poems, "Psalms of Life." He died in Stratford, Conn., July 31, 1872.

Olney, Richard, an American lawyer; born in Oxford, Mass., Sept. 15, 1835; was graduated at Brown University in 1856, and at Harvard Law School in 1859; practised law in Boston; was United States attorney-general in 1893–1895; and Secretary of State of the United States in 1895–1897; then resumed private practice.

Olonetz, a province of Russia; area, 49,355 square miles; pop. (1909) 422,200. The surface is shared in unequal proportions between the Baltic, White Sea, and Volga. The most marked natural feature of the government is its lakes (of which Onega is one), streams, and morasses. The climate is rigorous in the extreme. Timber constitutes almost the whole wealth of the government. The chief means of support of the inhabitants are forestry, hunting, and fishing. The capital is Petrozavodsk.

Olsson, Olof, a Swedish Lutheran clergyman and educator; born in Björtorp, March 31, 1841. He came to the United States in 1868, and was professor and president of Augustana College, Rock Island, Ill. He edited two Swedish journals, and published: "At the Cross"; "Greetings from Afar"; and "The Christian Hope." His books have been translated into Swedish and Norwegian. He died May 12, 1900.

Oltenitza, a town in Rumania, at the junction of the Arjish with the Danube, 37 miles S. E. of Bukharest. A battle was fought here Nov. 4, 1853, and also July 29, 1854, in both of which the Russians were defeated by the Turks.

Oltis. See LOT.

Olustee, or **Olustee Station,** a village of Baker co., Fla., about 20 miles E. of Lake City. Here in February, 1864, a Union force numbering about 5,000 men, under General Seymour, encountered a body of about 3,000 Confederates, under General Finnegan, and after a severe conflict of several hours, the Nationals were defeated, with a loss of over 2,000 men, besides artillery, ammunition and wagon trains. Confederate loss, about 1,000 men.

Olympia, a celebrated valley of Elis, in Greece, on the right bank of the Alpheus, and the seat of the Olympic games. The Sacred Grove (called the Altis) of Olympia, enclosed a level space about 4,000 feet long nearly 2,000 broad, containing both the spot appropriated to the games and the sanctuaries connected with them. It was finely wooded, and in its center stood a clump of sycamores. The Altis was crossed from W. to E. by a road called the "Pompic Way," along which all the processions passed. The Alpheus bounded it on the S., the Cladeus, a tributary of the former, on the W., and rocky but gently swelling hills on the N.; W. it looked toward the Ionian Sea. The most celebrated building was the Olympieium, or Olympium, dedicated to Olympian Zeus. It was designed by Libon of Elis in the 6th century B. C., and contained Phidias' colossal statue of the god.

Olympia, city, county-seat of Thurston co., capital of the State of Wash.; on Budd's Inlet, at the southern extremity of Puget Sound; at the mouth of the Deschutes river, and on the line of the N. Pacific R. R. Olympia has steamer connection by the Sound with Tacoma, Seattle, Victoria, B. C., and the Pacific. Settled in 1854, it was chartered in 1859, when Washington was admitted to the Union as a State. Its central position in the western half of the State, with its fine lines of communication, makes it accessible as the capital and important in the State's commerce. The great forests bring it lumber; it has a large trade in agricultural products, and a somewhat unique commerce in oysters, of which it ships large quantities. Three falls in the river—about 85 feet altogether—afford a noble water-power and the manufacturing is active, chiefly in lumber (saw and shingle mills), but also in salmon-canning, iron works, brewing, cooperage, cold storage plant, boot and shoe making, ice-making, wooden pipe works, etc.

The chief buildings are the State Capitol ($400,000), the State Library (of nearly 30,000 volumes), the Capital National Bank, St. Peter's Hospital (R. C.), divers business blocks, St. Amable Academy, Providence Academy, St. Martin's College (R. C.), County Court House, etc. The city has electric street railways, electric light plants, an adequate water supply, several banks, daily and weekly newspapers, etc.; its assessed property valuation being about $2,000,000. The two bridges (the one across Budd's Inlet being 2,000 feet long) add both to the appearance and convenience of the city. Pop. (1900), 3,863; (1910) 6,996.

Olympiad, a period of four years, being the interval from one celebration of the Olympic games to another, by which the ancient Greeks reckoned their time. The first Olympiad corresponds with the 776th year before the birth of Christ. The last was the 293rd (A. D. 393).

Olympias, the wife of Philip II., King of Macedonia, and mother of Alexander the Great. She was the daughter of Neoptolemus I., King of Epirus. She was a woman of great vigor and capacity, but was passionate, jealous, and ambitious. When Philip married Cleopatra, niece of Attalus, she left Macedonia, and she was believed to have instigated his assassination by Pausanias (337 B. C.). On the accession of Alexander she returned to Macedonia, and brought about the murder of Cleopatra and her daughter. Alexander treated her with respect, but he never allowed her to meddle with his political schemes. After his death

she obtained the support of Polysperchon, and in 317 the pair defeated and put to death Philip Arrhidæus, the weak-minded step-brother and successor of Alexander, together with his wife Eurydice. Her cruelties soon alienated the minds of the people, whereupon Cassander besieged her in Pydna, and on its surrender put her to death, 316 B. C.

Olympic Games. These games, so famous among the Greeks, said to have been instituted in honor of Jupiter by the Idæi Dactyli, 1453 B. C., or by Pelops, 1307 B. C., revived by Iphitus 884 B. C., were held at the beginning of every fifth year, on the banks of the Alpheus, near Olympia, in the Peloponnesus, now the Morea, to exercise the youth in five kinds of combats, the conquerors being highly honored. The prize contended for was a crown made of a kind of wild olive, appropriated to this use. The festival was abolished by Theodosius, A. D. 394. In 1896, after a lapse of more than 1,500 years, these games were revived at Athens. They began April 6 and continued for five consecutive days. The number of spectators was enormous. Athletes from various countries of the world competed for prizes, and some of the principal contests were won by Americans. The games consisted of foot racing, wrestling, fencing, swimming, etc. The king crowned the victors with olive branches. In July, 1900, the second series was held in Paris, France, and was a great success. Americans again won a large portion of the events.

The third meet was held in St. Louis, Mo., Aug. 29 to Sept. 3, 1904, while the fourth was held at Athens in April, 1906. America scored 75 1-16 points, the highest of any country entered in the contests. In July, 1908, the games were held in London, and in track and field sports American athletes outstripped all their competitors, scoring 114 2-3 points.

Olympiodorus, one of the latest of the Alexandrian Neoplatonists, flourished in the first half of the 6th century after Christ, during the reign of the Emperor Justinian. Regarding his life nothing is known. Of his writings we possess a "Life of Plato," with commentaries or scholia on the "Gorgias," "Philebus," "Phædo," and "Alcibiades I." In these he appears as an acute and vigorous thinker and as a man of great erudition. Another OLYMPIODORUS, of the Peripatetic school, flourished in Alexandria in the 5th century B. C., and was the teacher of Proclus. A third OLYMPIODORUS, from Thebes in Egypt, wrote in Greek a history of the Western Empire from A. D. 407 to 425, abridged by Photius.

Olympus, a celebrated mountain of Thessaly, on the border of Macedonia, 30 miles N. of Larissa; lat. 40° 4′ 32″ N., lon. 22° 25′ E. Its highest peak is 9,745 feet above the sea, and is covered with snow during two-thirds of the year. The E. side, which fronts the sea, is composed of a line of precipices, while in mingled growth oak, beech, chestnut, and other trees are scattered at its base, and higher up are immense forests of pine, giving it in parts a majestic and again a somber appearance; hence, the appellations of the ancient writers; as the "frowning Olympus," the "majestic Olympus," etc. It was regarded by the ancient Greeks as the abode of the gods; and the palace of Jupiter was supposed to be on the summit. The philosophers afterward transferred the abode of the gods, with the name Olympus, to the planetary spheres.

Omagh, the county town of Tyrone, Ireland, on the Strule, 34 miles S. of Londonderry. It grew up around an abbey founded in 792, but is first heard of as a fortress at the end of the fifteenth century, when it was forced to surrender to the English. In 1689 it was partially burned, and a fire in 1743 completed its destruction, but it has been well rebuilt, and is now a neat and prosperous town. Pop. (1901) 4,789.

Omaha, a city of Nebraska, the largest city in the State; county-seat of Douglas co. It is situated in the E. part of the State, on the W. bank of the Missouri river, 18 miles N. of its confluence with the Platte river and 600 miles from its confluence with the Mississippi, 54 miles N. E. of Lincoln, and 425 miles W. by S. of Chicago. It covers an area of nearly 24⅓ square miles, and had a population by census of 1910 of 124,096. South Omaha, an independent municipality, but commercially and industrially a part of the greater city, had a population by census of 1910 of 26,259. To the N. E. is East Omaha, a manufacturing suburb. Fort Omaha is located within the city proper, and 8 miles S. is Fort Crook, which is the headquarters of the military department of the Missouri. Council Bluffs, Iowa, is on the opposite side of the river, which is here spanned by three great bridges.

Topography, Parks, Buildings, and Institutions.—The city is built on a series of terraces sloping gradually from the river bank. The low river front is crowded with factories and railway tracks and stations, the broad plateau above is the seat of commercial activity, and the bluffs are crowned with elegant private residences and public institutions. The broad streets are laid out on the rectangular plan. The public parks —Fontenelle in the N. W., Kountze in the N. E., Hanscom in the S., Riverview in the S. E., Miller, Bemis, Curtis, Turner, Jefferson, and Elmwood parks—cover over 600 acres and are connected by a system of boulevards. Among the notable buildings are the Federal building, Romanesque in

Omaha

style, and housing the post office, courts, and other Federal offices; army headquarters building, the county court house, city hall, high school, the Coliseum, the Auditorium (a convention hall with 12,000 seats), the Board of Trade, Union passenger station, Burlington railroad station, Omaha Club house, the Paxton block, the Brandeis block, and the New York Life Insurance and Omaha "Bee" buildings. There are also several handsome edifices among the 136 churches, which include a Protestant Episcopal and a Roman Catholic cathedral, the city being the seat of bishops of these denominations. The charitable institutions include the County, St. Joseph's, Wise Memorial, Omaha General, Methodist, Presbyterian, and Clarkson Memorial hospitals, Immanuel Orphan Home, Roman Catholic Orphan Asylum, State School for the Deaf, and a day nursery. Educational institutions are numerous. Creighton University (R. C.), founded in 1879, consists of a college and schools of medicine, dentistry, and law, has a library of some 30,000 volumes, and is attended by over 600 students. Other professional and secondary schools are the College of Medicine of the University of Nebraska, Omaha School of Law, Omaha Dental College, Bellevue College Theological Seminary (Presb.), Brownell Hall (P. E.), and the Academy of the Sacred Heart, St. Catherine's Academy, and Mount St. Mary's Seminary (all three R. C.). The public schools, including the high schools, kindergartens, and night schools, had in 1905-06 an average attendance of 14,613 pupils and an enrollment of 18,915. The expenditure for the year was over $550,000. The public library contains 80,000 volumes and a collection of curios and art objects. Four daily newspapers are published and a considerable number of weeklies; among the latter are German, Danish, and Bohemian papers.

Industries.—The greatest manufacturing establishments in the city are the smelting works and the Union Pacific construction and repair shops. But in order to avoid disclosing individual operations, no statistics are published either of these industries or of the manufactures of agricultural implements, boots and shoes, electrical machinery, flour and grist, hardware, structural ironwork, tinware, etc. Other important industries are: Brick and tile, butter, of which $1,229,000 worth was made in 1904, carriages and wagons, clothing, food preparations, foundry and machine shop products, fur goods, furniture, malt liquors ($1,141,000 worth in 1904), lumber and planing mill products, saddlery and harness, soap, and printing and publishing ($2,183,000 worth in 1904, including newspapers and periodicals). The growth of Omaha's industries since 1880 is shown in the following table:

Year	Number of Establishments	Capital	Wage-Earners	Wages	Cost of Materials Used	Value of Products
1880	154	$1,336,000	1,688	$727,000	$2,527,000	$4,281,000
1890	675	18,320,000	8,223	4,864,000	29,260,000	42,339,000
1900	838	34,478,000	7,537	3,804,000	22,212,600	43,169,000

The special United States Census of Manufactures of 1905 was confined to industries carried on under the factory system, to the exclusion of neighborhood industries and hand trades. Compared with the corresponding figures for 1900, the results are shown in the following table:

Year	Number of Establishments	Capital	Wage-Earners	Wages	Cost of Materials Used	Value of Products
1900	307	$32,956,000	5,276	$2,603,000	$19,928,000	$38,074,000
1905	318	34,558,000	5,822	3,204,000	42,893,000	54,004,000
Per cent. increase	3.6	4.9	10.3	23.1	115.2	41.8

The factory industries of South Omaha were represented in the same census by 41 establishments, which employed $20,564,000 of capital and 5,662 wage-earners, who received $3,210,000 in wages, used materials valued at $59,193,000, and turned out a product valued at $67,415,000. Nearly the whole of this was represented by the slaughtering and meat packing industry, the third largest in the country, the product of which amounted to $65,531,000. East Omaha contains the Carter white lead works, one of the largest in the West.

Commerce and Transportation.—Omaha is a leading center of wholesale trade in the region to the W. of Chicago and St. Louis. It has an immense and still growing commerce in groceries, liquors, tobacco and cigars, drugs, fruits and vegetables, dry goods and millinery, boots and shoes, rubber goods, furniture and carpets, paints and glass, plumbing and steam-fitting supplies, hardware, agricultural implements, lumber, cement, etc. The total wholesale and jobbing trade increased in value from $47,000,000 in 1890 to $88,048,000 in 1907. The receipts of grain amounted in 1907 to 42,538,800 bushels, and the shipments to 43,787,000 bushels, mostly corn, oats, and wheat in the order given. The receipts of live stock (including South Omaha) amounted in the same year to 1,158,716 cattle and calves, 2,253,562 hogs, 2,038,777 sheep, and 43,800 horses and mules; and

the shipments were 1,547,054 of all kinds of animals. There are 5 National banks, besides State and savings banks and trust companies. The aggregate bank deposits increased from $17,586,000 in 1890 to $37,110,897 in 1907, and bank clearings increased during the same period from $255,558,000 to $567,515,788. The city is one of the foremost railway centers in the West, being entered by the Union Pacific, of which it is practically the eastern terminus, Missouri Pacific, Chicago and Northwestern, the Chicago, Rock Island, and Pacific, the Chicago, Milwaukee, and St. Paul, Chicago, Burlington, and Quincy, Illinois Central, Chicago Great Western and numerous other lines. A belt line connecting the various railways encircles the city. The interurban electric railway to Lincoln and adjacent towns was being completed in 1907, and the electric street lines have about 100 miles of track and carry some 40,000,000 passengers annually.

Administration.—The city is governed by a mayor, elected for a term of three years, and a unicameral council, consisting of 2 members from each of the 9 wards. The members of the boards of public works, health, fire and police, and the park commissioners are appointed by the mayor with the consent of the council. The members of the board of education are elected by popular vote. The annual municipal expenditure is about $2,000,000.

History and Population.—The name of the city is derived from the Omaha Indians, a tribe of the Dakota. In 1854 the natives surrendered their lands by treaty and the first permanent settlement was made. A city charter was obtained in 1857. Omaha was the capital of Nebraska till 1867, when statehood was obtained and Lincoln was made the capital. With the discovery of gold in Colorado in 1858, the city became the most northerly outfitting point for overland wagon trains, but its real growth began with the building of the Union Pacific railroad, which was completed in 1870. In 1898 the Trans-Mississippi and International Exposition (*q. v.*) was held here. Population, 1860, 1,861; 1870, 16,083; 1880, 30,518; 1890, 140,452; 1900, 102,555; 1906 (Fed. est.), 124,167. The census of 1890 is regarded as defective, and the number 66,536—the mean between 1880 and 1900—is preferred for that year by the Federal Census Bureau. In 1900 the population consisted of 54,093 males and 48,462 females, and included 3,443 negroes (3.4 per cent. of the total) and 23,552 foreign born (23.0 per cent.). The most numerous elements among the latter were 6,710 Scandinavians, 5,522 Germans, 2,927 Austro-Hungarians, 2,168 British, 2,164 Irish, 1,270 Canadians, and 997 Russians.

Revised by VICTOR ROSEWATER.

Omahas, a tribe of North American Indians living in E. Nebraska. They number about 1,200.

Oman, or **Muscat,** independent State at the S. E. end of Arabia, situated partly on the Persian Gulf, partly on the Indian Ocean; area, estimated at 82,000 square miles; pop. 500,000. The capital is Muscat (*q. v.*). The chief features of the country are stretches of barren sand or rock, mountains reaching the height of 10,000 feet; fertile valleys and plains, yielding abundance of grain, sugar, fruits, cotton, coffee, etc. The inhabitants are mostly Arabs, but there is a considerable mixture of Persians and Africans, etc. The government is a monarchy (the ruler being styled Imam), limited by a powerful aristocracy with hereditary privileges. Zanzibar and its dependencies formerly belonged to Oman, which is itself now virtually under a British protectorate.

Oman, Gulf of, an arm of the Arabian Sea, between Oman and the S. coast of Persia. It is connected with the Persian Gulf by the Strait of Ormuz.

Oman's Sea, the Persian Gulf.

Omar I., Caliph of the Mussulmans, the successor of Abu-Bekr, and father-in-law of Mohammed. He began his reign A. D. 634, and is conspicuous among the conquerors who chiefly contributed to the spread of Islamism. His generals, Khaled and Abu-Obediah, drove the Greeks out of Syria and Phœnicia; and the Caliph himself took possession of Jerusalem in 638, which city remained in the hands of the infidels till it was reconquered by Godfrey of Bouillon, at the end of the 11th century. Amru, one of his generals, defeated the troops of Heraclius, near Antioch, in 641. Memphis and Alexandria surrendered; all Egypt and a part of Libya were conquered from the Romans; and the famous library, which had been founded at Alexandria by Ptolemy Philadelphus, is said to have been burnt by the express order of Omar I. Having fixed his residence at Medina, he was there assassinated by a Persian slave, in the 10th year of his reign, A. D. 643. He refused to appoint a successor; and thus the caliphate became elective. The era of the Hegira was established in the time of this Caliph, who also introduced the system of standing armies, and a police force. Omar I. was highly distinguished for his impartial administration of justice.

Omar II., the eighth Caliph of the Ommiades, great grandson of the preceding, and succeeded Solyman in 717. He laid siege to Constantinople, but was forced to raise it, on account of a violent storm, which destroyed a great part of his fleet. He was poisoned in 720.

Omar Khayyam (khī-yäm′), a Persian poet and astronomer; born in Nishapur, Khorasan, probably near the middle of the eleventh century. The name Khayyam, meaning "tent-maker," was apparently derived from the trade of his father. His contemporaries set a high value on his scientific works, especially those in mathematics, but his modern fame rests on the "Rubaiyat," or collection of quatrains, consisting of some five hundred epigrammatic stanzas, written in a Lucretian or Voltairean vein. They are characterized by a vigorous and poetic imagination, keen wit, and biting satire. They exhibit contrasting moods, mingle notes of hard, materialistic scoffing and of intense pessimism with a tender sympathy for humanity, praise wine, love, and pleasure, yet remind the reader of time's fleetingness and of death's inevitable approach. Each rubai or quatrain is distinct in itself, and the manuscripts extant follow an alphabetical arrangement dependent upon the letter concluding the rhyme. A mosaic of about a hundred selected quatrains of the "Rubaiyat" was put together and translated into English verse by Edward Fitzgerald (*q. v.*), and has attained a unique place in literature; a critical text with translation was published by E. H. Whinfield in 1883, and a paraphrase by Richard Le Gallienne in 1897. Omar Khayyam is supposed to have died about 1123.

Omar (or **Omer**) **Pasha,** a Turkish general; born in Plasky, Austria-Hungary, Nov. 24, 1806. His real name was Michael Lattas. He was educated for the Austrian army, from which he deserted in 1828, fled to Bosnia, became a Mohammedan, and in 1834 obtained the post of writing-master in a military school at Constantinople, and was made instructor to Abdul-Medjid, heir apparent to the Ottoman throne, upon whose accession in 1839 Omar was raised to the rank of colonel. In 1842 he was appointed governor of the Lebanon, and subsequently distinguished himself by quelling revolts among Albanians, Kurds, and Bosnians. In 1853 he defeated the Russians at Oltenitza; in 1854 he defeated them at Silistria and entered Bucharest; the following year he repulsed them at Eupatoria, and unsuccessfully attempted the relief of Kars. In 1857 he was made governor of Bagdad, but he was dismissed in 1859. He repressed the Montenegrins in 1862, capturing Cetinje. From 1869 he was minister of war. He died in Constantinople, April 18, 1871.

Ombay, Maloewa, or **Maluwa,** an island between Celebes and the N. W. coast of Australia, Timor, from which it is separated by the Strait of Ombay. The hills are volcanic, and the coasts steep and difficult to approach. The inhabitants are dark brown, have thick lips, flat nose, and wooly hair; appearing to be of mixed Negro and Malay origin. They are armed with the bow, spear, and creese, and live on the produce of the chase, with fish, cocoanuts, rice, and honey. A portion of the island formerly belonged to the Portuguese, but since Aug. 6, 1851, it has entirely become a Netherlands possession. Pop. about 194,000.

Ombre, a game of cards borrowed from the Spaniards, and usually played by three persons, though sometimes by two and by five. The game is played with 40 cards (the eights, nines, and tens having been removed), and each player receives nine cards, three by three. The game is often referred to in English 18th-century literature.

O'Meara, Barry Edward, an English physician; born in Ireland in 1778. He was the confidential medical attendant of the Emperor Napoleon I. in his last days, and author of "A Voice from St. Helena." He was originally a surgeon in the British navy, and was on board the "Bellerophon" in that capacity, Aug. 7, 1815, when Napoleon went on board. Napoleon having observed Dr. O'Meara's skill and his knowledge of Italian, made overtures to him, on being transferred to the "Northumberland," to accompany him to St. Helena as his surgeon. Having obtained Admiral Keith's permission, Dr. O'Meara assented, and remained with the ex-emperor till July, 1818, when he was recalled and deprived of his rank, for having accused Sir Hudson Lowe before the Admiralty of cruel and arbitrary conduct. He was latterly an active partisan of O'Connell, at one of whose agitation meetings he is said to have caught the illness which terminated fatally in London, June 3, 1836.

Omega, the name for the Greek long *o*. It was the last letter in the Greek alphabet, as alpha was the first; as in the expression in Revelation (chap. i: 8), "I am Alpha and Omega, the beginning and the ending." Inscriptions on tombstones, public documents, etc., very often began with these two letters, meaning, "In the name of God."

Omen, a sign believed to prognosticate a future event. Omens have been common among most nations, but were chiefly received in the ruder ages, and among the more ignorant of a people. Even in the present day, in many parts of England and the United States, a superstitious belief in omens exists. The howling of a dog by night is believed to presage a death in the neighborhood. The screeching of the owl and the croaking of the raven have, both in ancient and modern times, been regarded as omens of some dire calamity. It is regarded as unlucky to see first one magpie and then more; but two denote marriage or merriment; three, a successful journey;

four, an unexpected piece of good news; five, that you will shortly be in a great company. To kill a magpie is to incur some terrible misfortune. When a person goes out on any important business, it is lucky to throw an old shoe after him. To present a knife, scissors, razor, or other sharp or cutting instrument to one's friend is unlucky, as they are apt to divide love and friendship. The falling of salt toward persons at table, the spilling of wine on their clothes, are evil omens. Breaking a looking glass betokens the death of the best friend of the person to whom it belonged. The itching of the nose implied that a stranger was coming; the burning of the cheeks, or tingling of the ears, that others were talking of us; if of the left cheek or ear, ill — the right, well. The way in which fires, candles, or lamps burned suggested sundry omens. Divers presages concerning the weather are taken from the habits of birds, bees, gnats, etc. A sow crossing the road before a person going on a journey, is believed to indicate a disappointment, if not a bodily accident to such person; but if the sow be attended by her litter of pigs, it denotes a successful journey. To stumble is regarded as unlucky, except in going up stairs, when it is considered lucky. Fishermen and sailors are particularly influenced by omens, which they fancy they discover in the most trivial circumstances. To lose a bucket, or to throw a cat overboard, is believed to be very unlucky. Whistling is supposed to raise the wind. Sneezing, an involuntary tremor in the mind or body, or other nervous affection, particularly spots on the body, are among the circumstances from which good or evil is presaged. By a regard to these things, many persons add very considerably to their proper share of human misery without any countervailing amount of good.

Ommiades, a dynasty founded in Arabia by Moawiyah, in 655 or 661. Merwan II., the 14th and last caliph of this race, was slain in a mosque on the banks of the Nile, Feb. 10, 750, when the Abbassides assumed the reins of power. Abderrahman, the only member of the Ommiades who escaped the massacre at Damascus, founded a caliphate in Spain, in 755. Eighteen caliphs reigned, Hinem III., who resigned in 1031, being the last.

Omnibus, a Latin word signifying "for all," and now applied in several languages to the well-known vehicle used for the conveyance of passengers at a cheap rate. The first conveyances of the kind were those which came into use in Paris (March, 1662) in consequence of an edict of Louis XIV., but they soon fell into disuse, and were not again reintroduced till 1827. A Mr. Shillibur started the first omnibus in London in 1829, and they were introduced into New York in 1830, and Amsterdam in 1839.

Omophagic Rites, in comparative mythology, rites in which human flesh was eaten. The term as an act of worship or devotion covers all religious ceremonies of which cannibalism forms or formed a part. It is specifically applied to the Orphic rites, in which the myth of the passion of Zagreus was commemorated by the sacrifice of a man, who was dismembered, and eaten. These rites were celebrated triennially at Chios and Tenedos, and from these terrible feasts Dionysus obtained the appellation of eater of raw flesh. Omophagic rites were introduced into Italy about the end of the 3rd century B. C., and in 189 B. C., the Senate, warned of their nature by a freedman who had been initiated, and who was marked out as a victim, issued the decree "Concerning the Bacchanilian Rites," which banished the Orphic mysteries from Italy. The raw flesh of a ram or an ox was afterward substituted for human flesh.

Omphale, a queen of Lydia. She married Tmolus, who, at his death, left her mistress of his kingdom. She purchased Hercules, who had been sold as a slave for the recovery of his senses, after the murder of Eurytus. Omphale soon restored her slave to liberty, and the hero became enamored of his mistress. The queen favored his passion, and had a son by him. Hercules is represented by the poets as so desperately enamored of the queen, that, to conciliate her esteem, he spun by her side among her women, while she covered herself with the lion's skin, and armed herself with the club of the hero, often striking him with her sandals for the uncouth manner which he held the distaff.

OMPHALE.

Omri, a general of the army of Elah, King of Israel, who, being at the siege of Gibbethon, and hearing that his master Elah was assassinated by Zimri, who had usurped his kingdom, raised the siege, and being elected king by his army, marched against Zimri, attacked him at Tirzah, and forced him to burn himself and all his family in the palace in which he had shut himself up. After his death, half of Israel acknowleaged Omri for king; the other half adhered to Tibni, son of Ginath, which division continued four years. When Tibni

was dead, the people united in acknowledging Omri as King of all Israel, and he reigned 12 years. Omri built the city of Samaria, which became the capital of the kingdom of tne 12 tribes. It appears under the name of Beth-Omri, on the stone tablets exhumed by Layard from the ruins of Nineveh.

Omsk, chief town of the Russian province of Akmolinsk, at the confluence of the Om with the Irtish, 1,800 miles E. of Moscow. It was built in 1716 as a defense against the Kirghiz; but is now of no importance as a fortress. It is the seat of administration for the Steppe provinces of Western Asia. It has a military academy, a Greek and a Roman Catholic cathedral, a museum, governor's palace, etc., and a declining trade with the Kirghiz in cattle, hides, furs, and tea. Pop. (1897) 37,470.

Oña, Pedro de (ōn'ya), a Chilean poet; born in Confines, Araucania, about 1560. His great work "Conquered Chile" (1596) consisted of 19 cantos. It is said to be one of the finest of epic poems. A second edition appeared in 1605, and one in 1849. He also wrote a poem "The Lima Earthquake of the Year 1609"; several sonnets; and a heroic poem, "Ignacio de Cantabria" (1639). He died in Lima about 1620.

Onager, an ancient military engine for hurling stones out of a cup shaped receptacle, so called from its resemblance to the action of the wild ass in kicking out with his hind legs. In zoölogy, *Equus onager*, the wild ass of the Asiatic deserts, of which there are several varieties. The wild ass of Assyria was considered specifically distinct by Geoffroy Saint-Hilaire, and by him named *E. hemippus*, but the two forms "seem to be very nearly akin."

Onagraceæ, or **Onagrarieæ,** in botany, onagrads; an order of epigynous exogens, alliance Myrtales. It consists of herbs or shrubs, with alternate or opposite, simple, entire, or toothed leaves; and red, purple, white, blue, or yellow axillary or terminal flowers. Calyx superior, tubular; the limb four-lobed; æstivation valvate; petals generally equal in number to the division of the calyx, inserted into the throat; stamens one, five, or eight, inserted into the calyx; ovary two to four cells, generally surrounded by a disk; fruit baccate or capsular, with two to four cells, many seeded. Found in America, India, and Europe; rarer in Africa. Tribes six — Jussiæeæ, Epilobeæ, Montineæ, Circeæ, and Gaureæ. Known genera 22, species 300.

Ondegardo, Polo, a Spanish historian; born in Spain, about 1500. From manuscripts written by him and preserved in the archives of Simancas and the Escorial, Prescott obtained information which he used in his "History of the Conquest of Peru." He died in Peru, about 1570.

Onega, Lake, in the N. of Russia, after Ladoga, to the N. E. of which it lies, the largest lake in Europe; 50 miles in greatest breadth, 146 miles in length, and 1,000 feet in depth in parts; area, 3,764 square miles. It is fed by numerous rivers; but its only outlet is the river Swir, which flows S. W. into Lake Ladoga. The N. end is studded with islands and deeply indented with bays. The shores in other parts are flat and low and regular. Though the water is ice bound generally for 156 days in the year, the lake is the scene of busy traffic in other seasons. Communication is promoted by a canal cut parallel to the S. shore. Fish abound. Mirages are frequent at times. Surveys were completed in 1890 for a canal 145 miles long to connect Lake Onega with the White Sea.

Onega, a river in Russia, which, issuing from Lake Latcha, government of Olonetz, flows first N. E., then N. W., and after a course of about 270 miles, falls into the White Sea at the S. E. extremity of the Gulf of Onega.

Oneida, a town in Madison co., N. Y.; on Oneida creek, and on the New York, Ontario, and Western, the New York Central and Hudson River, and the West Shore railroads; 26 miles E. of Syracuse. Here are a high school, waterworks, street railroad system, electric light plant, National and State banks, and several weekly newspapers. The town has a number of flouring mills, breweries, planing mill, steam knitting mill, foundry and manufactories of steam engines, and carriages. Pop. (1890) 6,083; (1900) 6,364; (1910) 8,317.

Oneida, a lake occupying portions of Oneida, Madison, Onondaga, and Oswego cos., N. Y. It covers an area of about 100 miles, abounds in fish of an excellent quality, receives many small streams, and empties its surplus waters into the Osage river by Oneida river.

Oneida Community, a religious communistic society, otherwise known as PERFECTIONISTS (*q. v.*).

Oneidas, once a North American Indian tribe inhabiting Central New York. A remnant in Wisconsin are well advanced in civilization.

O'Neil, Charles, an American naval officer; born in England in 1842; entered the United States navy as master's mate in 1861; served on the "Cumberland" at the capture of Forts Hatteras and Clarke in August, 1861; and in the engagement with the Confederate iron-clad "Merrimac," March 8, 1862; was in both attacks on Fort Fisher; promoted captain, July 21, 1897;

became chief of the naval bureau of ordnance in June, 1897; and was promoted rear-admiral, April 22, 1901.

O'Neill, Eliza, an Irish actress; born in Ireland, in 1791. Her father was the manager of a small traveling company in which she made her first appearance as the Duke of York, in "Richard III." She was then only 12 years old. In 1814 she made her début at Covent Garden and subsequently played frequently in England. She was an emotional actress and well fitted for tragedy rôles, of which her principal ones were Juliet, Belvidera, Mrs. Haller, and Mrs. Beverly. She made a large fortune and was married in 1819 to Mr. (afterward Sir) William Becher. She died in Ireland, Oct. 29, 1872.

Oneonta, a village in Otsego co., N. Y.; on the Susquehanna river, and on the Delaware and Hudson railroad; 60 miles N. E. of Binghamton. It contains a State Normal School, a State Armory, public library, National banks, and a number of daily and weekly newspapers. It has shirt factories, cigar, piano, sash and door factories, grain elevators, knitting mill, foundries, planing mills, and the machine shops of the Delaware and Hudson railroad, and an assessed property valuation of over $2,000,000. Pop. (1900) 7,147; (1910) 9,491.

Onion, in botany, horticulture, etc., *allium cepa,* and the genus *Allium.* The onion, which has a coated bulbous root and large fistular leaves, has been cultivated from a very early age (Num. xi: 51). It is generally sown in rich, loamy, and rather moist soil in March; afterward it is thinned and weeded, and the soil stirred. It is ready to be taken up in September. It may be kept through the winter. A variety of it is called the potato, or underground onion. It multiplies in bulbs below the ground. Also various plants of other genera, more or less resembling the common onion.

Onkelos, the author of the celebrated Targum or Chaldee paraphrase of the Pentateuch which bears his name, is asserted by the Babylonian Talmud to have lived in the time of the celebrated teacher Gamaliel, but is supposed from internal evidence to be not earlier than the 2d and not later than the 3d century. His version is so faithful, and accords so exactly with the Hebrew text, that it continued till the beginning of the 16th century to be chanted in the synagogue alternately with the Hebrew and to the same notes.

Onomacritus, a religious poet of ancient Greece, lived at Athens in the time of the Pisistratidæ. He exercised great influence on the development of the Orphic mysteries, and collected the prophecies or oracles of Musæus, but was banished by Hipparchus for falsifying them. He followed the Pisistratidæ into Persia, and was by them induced to repeat to Xerxes all the ancient sayings that seemed to favor his invasion of Greece. He helped to arrange the Homeric poems, and is suspected of having introduced interpolations into the text of them.

Onomasticon, a Greek term, properly meaning a list of names or words, denotes particularly a dictionary or encyclopædia in which individual subjects or things are mentioned and explained under their own names or head. The oldest work under this name still extant is that of Pollux, executed in the 2d century B. C., in the Greek tongue.

Onomatopœia, or **Onomatopeia,** name-making; the formation of words in imitation of the sounds made by the things signified; as, buzz, hiss, peewit, etc. It is held by some philologists that all language had its origin in onomatopœia, words formed by this principle being the most natural, and readily suggesting the actions or objects producing the sounds which the words are intended to represent.

Onondagas, a tribe of North American Indians living chiefly in New York. At one time they laid claim to all the country from Onondaga Lake to Lake Ontario on the N., and to the Susquehanna river on the S. At the close of the Revolutionary War some settled on Grand river, Ontario, and the remainder in New York. The total number at present is about 900.

Onondaga, Lake, a small lake in Central New York, near Syracuse; outlet, Seneca river.

Ontario, a province of the Dominion of Canada, bounded on the N. by James bay and the district of Keewatin, on the S. by the St. Lawrence river, the Great Lakes (except Lake Michigan) and their connecting rivers, and the United States, on the E. and N. E. by Quebec, and on the W. by Manitoba. Total area, 260,862 square miles, of which 40,354 square miles are under water. The water area is exclusive of the Canadian portions of the Great Lakes.

Physical Features.—The surface does not present any striking configurations, being moderately undulating. The most elevated portion is the Height of Land, of the Laurentian Highlands, which reaches an altitude of 1,200 feet and constitutes the watershed between the rivers flowing into James bay on the N., and the Ottawa river on the E. Another less elevated portion extends from Georgian bay southeasterly to the E. end of Lake Ontario. Least in height is the Escarpment, which runs from the Blue mountains, chiefly in Grey co. on the S.

Ontario

shore of Georgian bay, S. and E. until it reaches Niagara falls. Geologically, the province consists chiefly of crystalline rocks of the Archæan and Palæozoic divisions, the former predominating in the central and northern, the latter in the southern parts. The most important minerals are found in the region of Huronian rocks extending from Georgian bay and Lake Huron along the N. shore of Lake Superior and through the Rainy river district to Manitoba. The chief lakes, after the Great Lakes, are the Lake of the Woods, Rainy Lake, and Lakes Nipigon, Abittibi, Nipissing, Muskoka, and Simcoe, with numerous smaller lakes. The principal rivers are the St. Lawrence, which forms part of the boundary between Ontario and the State of New York; the Ottawa, the Albany, the Abittibi, and the Niagara, with its world-famed falls and rapids.

Soil and Climate.—The soil of southern Ontario, and especially of the S. W. part of the peninsula, is fertile and well cultivated. The surface is composed principally of black, clay, and sandy loams. Along the N. coast of Lake Superior, and in part of the region N. of Georgian bay, the soil is rocky and barren; but this is by no means true of northern Ontario in general. Considerable areas formerly believed to be unfit for cultivation have in recent years been discovered to be capable of sustaining a large agricultural population. Northern, or New Ontario, as it is often called, has been in recent years opened up by railways, and its timber, minerals, and fertile areas are attracting many capitalists and settlers.

The climate of the province is generally hot in summer and cold in winter. The Ontario peninsula, especially in the S. W. part, is so modified by the surrounding Great Lakes that it is admirably suited for fruit-growing and the cultivation of corn, tobacco, etc. Notwithstanding the summer heat and winter cold, the dry atmosphere imparts a bracing and healthful tone. In the N. and N. W. parts the winter season is longer. Severe winter storms are comparatively rare, and blizzards are unknown. The average winter temperature varies from about 24° F. in the center of the peninsula to 7° at Fort William in the N. W., and the summer temperature from 65° to 58° in the same places.

Minerals and Mining.—The principal metallic minerals are nickel, silver, copper, iron, cobalt, gold, platinum, and lead; the principal non-metallic minerals and products are Portland cement, brick, petroleum, salt, natural gas, building stone, corundum, feldspar, graphite, gypsum, iron pyrites, mica, salt, etc. Nickel occurs in conjunction with copper in the famous deposits of the Sudbury district; silver is found in abundance in the silver-cobalt-arsenic deposits at Cobalt (*q. v.*). Copper is obtained from the Sudbury nickel ores and from the copper district N. of Lake Huron. Iron ore is mined in the Michipicoten district on the N. shore of Lake Superior, and in the counties of Hastings and Renfrew. Cobalt is found in the district of that name, in Algoma district, and in Hastings co. Gold is mined in the Algoma and Rainy river districts, and in eastern Ontario. Platinum is obtained from treatment of the nickel and copper deposits at Sudbury; and lead is found in Hastings co. Building materials, including stone, lime, brick, and cement, are plentiful. Corundum, a harder mineral than any other except the diamond, is mined in the counties of Renfrew and Hastings. Salt is produced from the brine wells of the N. W. counties of the Ontario peninsula; petroleum and natural gas from the S. W. counties. Arsenic is contained in the Cobalt ores. There are extensive areas of peat bog, fit for fuel. Clay and its manufactures are an important part of the mineral industry, the value of the output of brick in 1905 having been $2,445,500. Some of the ores mined in Ontario are not yet fully treated therein, but have to be sent abroad; thus some of the Cobalt ores are shipped to New Jersey, and others to Wales. A part of the iron and steel output is from imported ore. The total mineral production for 1905 amounted in value to $17,809,226, an increase of 54 per cent. over 1904. The values of the chief mineral products, besides clay and its manufacture, above mentioned, were: silver, $1,372,877; nickel, $3,354,934; Portland cement, $1,783,451; pig iron, $3,909,527; steel, $3,321,884; petroleum, $898,545; salt, $356,783; and copper, $688,993. In 1906 the nickel product had increased to $3,836,419, and the copper to $998,548.

Forests.—The forest area is estimated at 102,118 square miles, of which 18,669 square miles are under license. It is under the control of a department of the provincial government. Several large tracts, such as Algonquin park and the Temagami, Mississaga, Sibley, Lake Nipigon, and other reserves, are set aside for the protection of the timber and water supply; and a bureau of forestry attends to tree-planting and the protection of the forests against fire. In the S. W. part of the peninsula, the greater part of the forest has been cleared; but W. of Hamilton there are considerable areas of maple, oak, elm, hemlock, basswood, beech, walnut, butternut, cherry, etc. In the N. and N. W., or New Ontario, estimated to contain 141,000 square miles, are vast forests of spruce, white pine, and tamarack, the first-named contributing to the pulp industry. In 1901 the value of the forest products (timber, logs, wood, etc.) was $21,351,898.

Ontario

Fish and Furs.—The most valuable varieties of fish are the trout, whitefish, pickerel, herring, pike, and sturgeon, in the order named. The value of the catch for 1906 amounted to $1,734,865. The fishing industry of the Great Lakes is largely controlled by American companies. The chief fur-bearing animals are the mink, otter, marten, and skunk. The value of furs produced in 1901 was $112,467.

Agriculture and Live Stock.—Farming is the most important occupation, and is successfully carried on in the fertile lands of the peninsula. There are several agricultural areas: the "Great Clay Belt," extending from Lake Temiscaming westward along the route of the National Transcontinental or Grand Trunk Pacific railway, and estimated to contain about 16,000,000 acres of cultivable land; the fertile and beautiful valley of Rainy river; and a tract of about 1,000,000 acres N. W. of Lake Temiscaming. There are believed to be other fertile areas which exploration and survey have not yet definitely ascertained. Ontario's principal crops are wheat, oats, barley, and corn. According to final official estimates of the 1906 crop, there were in that year 18,841,774 bushels of fall wheat, 3,267,000 bushels of spring wheat, 25,253,011 bushels of barley, 108,341,455 bushels of oats, 23,988,682 bushels of corn, 1,792,903 bushels of buckwheat, and 1,327,582 bushels of rye. The yield per acre was: fall wheat, 23.9 bushels; spring wheat, 19; oats, 39.9; barley, 33.4; corn, 82.9; buckwheat, 16.8; rye, 16.6. Besides these there were 15,020,299 bushels of potatoes, 57,060,151 bushels of turnips, 7,388,987 bushels of peas, and 32,863,192 bushels of mangel-wurzel.

The live stock and dairy industries are very important. Western Ontario is noted for its excellent breeds of horses and cattle, and the production of cheese and butter is a chief source of supply for the British market. In 1906 there were 688,147 horses, 2,963,618 cattle, 1,304,809 sheep, 1,819,778 swine, and 10,254,834 turkeys, geese, ducks, and other fowls. The wool clip numbered 684,808 fleeces, amounting to 4,543,981 pounds. There were 196,387 colonies of bees reported.

In 1905 there were 1,198 cheese factories in operation, producing 164,866,223 pounds of cheese, valued at $17,417,757. The creameries numbered 241, producing 10,142,289 pounds of butter, valued at $2,131,554.

In 1905 Ontario had 24,184,540 acres of assessed land, of which 13,931,437 acres, or 57.6 per cent., were cleared, 5,594,673 acres were woodland, 1,811,992 acres were slashland, and 2,846,438 were swamp, marsh, or waste. The hay and clover crop in 1906 was 4,862,830 tons, and the apple crop was 35,006,991 bushels from 6,898,810 trees. In 1906 there were 352,306 acres in orchards and gardens, 12,785 acres in vineyards, 6,902 acres in flax, 6,087 acres in tobacco, 43,560 acres in rape, and 1,732 acres in hops.

Manufactures and Commerce.—Since the Dominion census of 1901 there has been a notable development of manufactures. Ontario lacks coal, but the development of water power and its conversion into electrical energy on the Ottawa and other rivers have greatly increased manufacturing facilities. The electric power produced from Niagara falls, on the Canadian side, and transmitted to some of the leading business centers, is an important auxiliary to manufacturing industry. According to the Dominion census of 1906 the value of the manufactured output of Ontario in 1905 was $281,500,018, as compared with $185,828,523 in 1900, an increase in five years of 51.48 per cent. The leading articles of manufacture are lumber and its products, agricultural implements, iron and steel, railway cars and locomotives, stationary engines, electrical appliances, malt liquors, cotton and woolen goods, carriages and wagons, automobiles, stoves, leather, furniture, woodenware, paper, soap, jewelry, hardware, etc.

The chief exports are wheat and other grains, fruit, animals and their products (cheese, butter, etc.), timber and lumber, minerals, etc. The chief imports are coal, breadstuffs, etc.

Railways, Canals, and Shipping.—The Grand Trunk and Canadian Pacific railways, which, with their branches and controlled lines, supply the peninsular part of the province with abundant transportation facilities, extend into the N. and N. W. parts. The Canadian Pacific railway connects eastern Canada with the N. W. provinces and the Pacific coast. The Grand Trunk Pacific, whose E. terminus is in Moncton, N. B., will extend from that city to a point on the boundary line between Ontario and Quebec, S. of and near Lake Abittibi, thence westerly through Ontario to the N. of Lake Nipigon and to Winnipeg. The Canadian Northern, a transcontinental system, acquired the Canadian Northern Ontario railway, previously known as the James Bay railway, extending from Toronto to Parry sound and Sudbury, and connected with the main line, which was in course of construction in 1907. The Ontario government has built, owns, and operates the Temiscaming and Northern Ontario railway. The province contains more than one-third of the railway mileage of Canada. Up to June 30, 1905, the Ontario government had aided steam railways in the province to the extent of $14,630,420 in bonuses, and the municipalities had in like manner contributed $10,069,844. These railways are

Ontario

connected with all the trunk lines of the United States. See CANADA—*Railways.*

Ontario possesses the Welland canal, 26¾ miles long, uniting Lakes Erie and Ontario and overcoming the obstruction of Niagara falls; the St. Mary's canal on the Canadian side at Sault Ste. Marie, connecting Lakes Huron and Superior; the Trent Valley canal, uniting Georgian bay and Lake Ontario, which was nearing completion in 1907; the Rideau canal, which connects Ottawa and Kingston; the Cornwall canal, overcoming the Long Sault rapids of the St. Lawrence; and the Williamsburg canals, overcoming the Galoups and the Rapide Plat rapids of that river. More important, perhaps, than any of these in its probable effect upon commerce is the projected Georgian Bay canal, a great waterway designed to attract the trade of the upper lakes, diverting it across the province by way of French river, Lake Nipissing, and the Ottawa river, to Montreal. Surveys were completed by the Dominion government, and in June, 1907, the contract of construction was let to R. W. Perks, M.P., a well-known English engineer. The cost is to be about $105,000,000. The canals of the St. Lawrence will admit vessels drawing 14 feet of water up through the Welland canal; but the St. Mary's canal will admit vessels of 20 feet draught. The Georgian Bay canal will admit vessels of 21 feet draught. See CANADA—*Canals.*

Government and Finance.—The affairs of the province are administered by a lieutenant-governor, and a legislative assembly of 98 members, elected for four years on manhood suffrage. The lieutenant-governor is appointed by the governor-general in council, holds office for four years, and is assisted by an executive council of eight members responsible to the legislature. (See CANADA, section on *Government;* also CANADA, CONFEDERATION IN.) The judicial system consists of a Supreme Court of Judicature, comprising a Court of Appeal and a High Court of Justice. The latter is composed of King's Bench, Chancery, Common Pleas, and Exchequer divisions. There are also county and division courts. The judges are appointed by the governor-general in council, but paid out of provincial funds. They hold their positions during good behavior, and are only removable on the joint address of the two houses of Parliament. Police magistrates and justices of the peace are appointed by the provincial government.

The provincial treasurer, who is a member of the executive council, makes an annual financial statement or budget, in which the receipts and expenditures of the past year and the estimated receipts and expenditures for the coming year are discussed. During the year ending Dec. 31, 1906, the total receipts were $7,149,478, of which the principal items were: the Dominion subsidy, $1,339,287; revenue from woods and forests, $1,900,914; succession duties, $1,015,713; and licenses, $579,207. The total expenditure for that year was $6,720,179, of which the principal items were: Education, $1,270,921; public institutions, $957,347; administration of justice, $544,826; agriculture, $432,296; civil government, $428,280; charges on crown lands, $476,660; public buildings, $368,846; agriculture, $432,296; and hospitals and charities, $334,169.

Education and Religion.—The system of public education is free, and, for children between 8 and 14 years of age, compulsory. It is under the general control of the provincial minister of education, and the approval of the executive council, of which he is a member, is necessary for the validity of his official acts; local boards of school trustees attend to various local requirements, such as the building of schoolhouses, appointment of teachers, etc. There exists a system of separate schools, also under the control of the minister of education. These schools were the result of the agitation for the protection of the educational rights of the Roman Catholic minority in the province of Upper Canada, whose support was necessary to the entrance of that province (New Ontario) into confederation in 1867. The fact that both Roman Catholics and Protestants (where the latter choose to take advantage of the privilege) may under certain conditions have separate schools does not seriously diminish the general support which the people of the province give to the public school. This is proved by the fact that only a comparatively small percentage of the total school population attends separate schools.

Higher education is well provided for by universities and normal and model schools. The principal university is the University of Toronto (which now has teaching as well as degree-conferring functions), of which University College, Toronto, was the nucleus, and with which are federated Victoria College (Methodist) and Trinity College (Anglican). The following institutions are affiliated to Toronto University: Knox College (Presbyterian theological); Wycliffe College (Anglican theological); St. Michael's College (Roman Catholic); Huron College, London (Anglican theological); and colleges of dental surgery, agriculture, pharmacy, music, etc. Other universities are Queen's University, Kingston, second in importance only to the University of Toronto; McMaster University (Toronto), Western University (London), and Ottawa University (Roman Catholic), Ottawa. The normal college at Hamilton was abolished, and

in its place a department of pedagogy in Toronto University has been planned. There are normal schools at Toronto, Ottawa, and London. See CANADA—*Education.*

According to the census of 1901 Methodists in Ontario numbered 666,388; Presbyterians, 477,386; Roman Catholics, 390,304; Anglicans, 367,937; Baptists, 116,281; Lutherans, 48,052; and Congregationalists, 12,208. There is no established church. See CANADA—*Religion.*

Population and History.—According to the census of 1910 the population was 2,687,861. Of these about 21,000 were Indians. Ontario (then Upper Canada) was settled by the United Empire Loyalists, who emigrated from the United States after the Revolutionary War. There are also large numbers of descendants of Scotch, Irish, and English immigrants. Descendants of the Scotch element have been particularly prominent in politics and finance. The principal cities and towns are: Toronto, the capital; Ottawa, capital of the Dominion; Hamilton, London, Kingston, Brantford, and Peterboro (*qq. v.*).

Ontario originally formed part of French Canada, and was included in the territory ceded by France to Britain by the Treaty of Paris in 1763. There were very few settlers in Upper Canada, which had been created by the imperial Constitutional Act of 1791, until the United Empire Loyalists above mentioned settled in the Niagara peninsula and on the shores of the bay of Quinte. Their hardships were severe, and the population at first increased slowly; but in the War of 1812 it was sufficiently numerous to contribute an efficient militia to aid in the defense of the province. Between 1812 and 1837 there was a popular struggle against an oligarchical combination named the "Family Compact," composed of Tory office-holders. The principle at stake was responsible government, or the accountability of provincial ministers to the majority in the assembly. This was the cause of the rebellion of 1837, which failed, and responsible government was not won until the legislative union of Upper and Lower Canada in 1841. This left still unsettled a number of questions which produced a series of political deadlocks. The agitations that followed hastened the movement for confederation, into which Upper Canada entered as one of the four original members, taking the name of Ontario.

Consult: Dent, "The Last Forty Years" (1881), "The Story of the Upper Canadian Rebellion" (1885); Lindsey, "Life and Times of William Lyon Mackenzie" (1862); McIlwraith, "Birds of Ontario" (1887); McMullen, "History of Canada" (1868); Selwyn and Dawson, "Descriptive Sketch of the Physical Geography and Geology of Canada" (1884).

Ontario Agricultural College, located at Guelph, the county-seat of Wellington co., Ontario, Canada, is one of the most important educational institutions in the Dominion. It was founded in 1874 and began its work that year with 28 students, under the care of six officers. During the next four years it made slow progress under a succession of principals, but when, in 1879, the presidency was assumed by Dr. James Mills, the college entered upon a period of rapid growth, and its prosperity has continued to the present time. It has one of the best experimental farms in the world, embracing more than 500 acres. All its departments are well equipped and efficiently conducted. Adjacent to the college and allied with it, under the charge of the same president, are the Macdonald Institute and Consolidated Rural School, erected and equipped by Sir William Macdonald, of Montreal, at a cost of about $250,000. The Agricultural College is devoted to the education of young men in all the branches of advanced agriculture, including research work scientifically pursued. The Macdonald Institute provides young women with facilities for the study of domestic science, to which it adds nature studies, manual training, etc. Similar instruction is given in the Consolidated Rural School to boys and girls from the country within a radius of six miles, the pupils being provided with conveyance to and from the school. The attendance of students at these institutions during each year numbers about 1,000, and it is estimated that the number of visitors in the course of a year reaches 100,000. In 1904 Dr. Mills resigned and was succeeded by President G. C. Creelman.

Ontario, Lake, the smallest and most E. of the five great lakes of North America, in the St. Lawrence basin, partly belonging to Canada and partly to the State of New York. It is of an elongated, oval shape, 172 miles in length, by a maximum breadth (in the center) of 60 miles; covering an area of about 5,400 square miles. Its surface level is about 334 feet below that of Lake Erie, and 231 feet above the tide level of the St. Lawrence. Its depth is said to average 490 feet; but in some places it is upwards of 600 feet in depth, and it is navigable throughout its whole extent for vessels of the largest size. The St. Lawrence (under the name of the Niagara river) enters it near its S. W. and leaves it at its N. E. extremity, where it is much encumbered with small islands. Lake Ontario has many good harbors; and as it never freezes, except at the sides, where the water is shallow, its navigation is not interrupted like that of Lake Erie. It is, however, subject to violent storms and heavy swells. Toronto, Kingston, Newcastle, and Niagara are the principal towns on the British side; and Oswego, Genesee, and

Sackett's Harbor on the American bank. This lake receives numerous rivers, including the Trent and Humber on its N., and the Black, Genesee, and Oswego from its S. shores. It communicates by the Genesee river and Oswego canal with the Erie canal, and, consequently, with the Hudson river and New York city; the Niagara river and the Welland canal, at its S. W. extremity, unite it with Lake Erie, and the Rideau canal connects it with the Ottawa at Ottawa city. Numerous sailing vessels and steamers of large size navigate this lake, which is the center of an extensive commerce.

Ontogenesis, in biology, the history of the individual development of an organized being, as distinguished from phylogenesis, or the history of genealogical development, and from biogenesis, or life development generally.

Ontological Argument, or **Ontological Proof,** in philosophy, an argument for, or proof of the existence of God, derived from the very idea which man has of God — the greatest object or being that can be conceived. This conception exists in the intellect of all such as have the idea of God, and in the intellect of the atheist as well, for he understands what is expressed by "the absolutely greatest." But the greatest cannot be in the intellect alone, for then it would be possible to conceive something still greater, which should exist not only in the intellect, but in external reality. Hence the greatest must exist at the same time in the intellect and in the sphere of objective reality. God, therefore, is not simply conceived by man; he also really exists. The ontological argument was thus formulated by Anselm (1033–1109), and was revived in the 17th century by Descartes.

Ontologism, a form of Platonic mysticism, the chief tenet of which is that the human intellect has an immediate cognition of God as its proper object, and the principle of all its cognitions. The writings of Professor Ubaghs of Louvian, a prominent Ontologist, were censured by the Inquisition in 1866, and since then ontologism has ceased to have any practical influence on Roman metaphysical teaching.

Onyx, a semi-pellucid gem with variously colored zones or veins. Any stone exhibiting layers of two or more colors strongly contrasted is called an onyx, as banded jasper, chalcedony, etc., but more particularly the latter when it is marked with white and stratified with opaque and translucent lines. The ancients valued it very highly, and used it much for cameos, many of the finest cameos in existence being of onyx.

Onyx Marble, a very beautiful translucent limestone of stalagmitic formation discovered by the French in the province of Oran, Algeria, and first brought into general notice at the London exhibition of 1862. It is used for the manufacture of ornamental articles.

Oolite, in petrology, a variety of limestone, composed of grains, like the roe of a fish, each of which has usually a small fragment of some organism or a grain of a mineral as a nucleus, around which concentric layers of calcareous matter have accumulated. In geology and palæontology, the term is not now generally petrological, but is chiefly chronological, being applied to a certain considerable portion of the Secondary period and to the strata then deposited. During the Oölitic period Europe was largely covered by the sea, hot enough to be studded in places with coral reefs and contain certain cephalopods like Ammonites and Belemnites. At intervals muddy sediment so clouded the water as to kill the coral animals. This series of events was repeated more than once. Islands in the sea had a vegetation of cycads, ferns, coniferæ, etc. Reptiles abounded, birds had apparently come into being, and mammals of the marsupial type. Some trap rocks in the Morea, in the Apennines, etc., seem to have proceeded from volcanoes active at this time, and some granites in the Alps appear contemporaneous. Some of the oölitic limestones are excellent for building.

Oori, Limpopo, or **Crocodile River,** a river of S. E. Africa, has its sources in the heart of the Transvaal, between Pretoria and Potchefstrom, describes a huge curve to the N. and joins the Indian Ocean a little N. of Delagoa Bay. Its course exceeds 800 miles, and it has numerous tributaries, the most important being the Olifant from the right. The Limpopo has been ascended 50 miles by steamboat; but its upper reaches are obstructed by rapids and falls.

Oost, Jacob van, the Elder, one of the best Flemish painters; born in Bruges in 1600. After laying the ground of his artistic education in his native land, he proceeded to Rome, and there became the pupil chiefly of Annibale Caracci. In his youth he was so successful a copyist of Rubens and Vandyck that his copies still deceive connoisseurs. He died in 1671.

Oost, Jacob van, the Younger, son of the preceding; born in 1637, studied at Paris and Rome, lived more than 40 years at Lille, and died in Bruges in 1713. His style is more marked, and his pencil is freer than that of his father.

Ootacamund, or **Utakamand,** the chief town in the Neilgherry Hills, the principal sanatorium of the Madras presidency, and the summer headquarters of the governor

of Madras. It stands on a plateau, in an amphitheater surrounded by hills, 7,228 feet above the sea, 350 miles from Madras city, and 24 from the nearest railway station on the Madras line. There are a public library (1859), the Lawrence Asylum (1858) for the children of British soldiers, and botanical gardens. The mean annual temperature is 58° F. Pop. 12,335.

Ootrum, a soft, white, silky, and strong Indian fiber, regarded as a promising substitute for flax, derived from the stem of *Dæmia extensa,* a plant of the natural order *Asclepiadaceæ,* abundant in many parts of Hindustan.

Ooze, in geology, a stratum consisting of minute calcareous and siliceous tests derived from various foraminifers, etc., the wreckage of land, with volcanic ash here and there, found on ocean beds. It was discovered in the Atlantic, where it exists between 5,000 and 15,000 feet in depth, whence it is often called Atlantic ooze; but it occurs also in the Pacific, and probably in the ocean everywhere. The chief foraminifer constituting the ooze is Globigerina. The ooze is an appropriate habitation for sea lilies, sponges, etc. It is identical with the material of which chalk is composed, and its deposition has gone on uninterruptedly from Cretaceous times till now. In tanning, a solution of tannin obtained by infusing or boiling oak bark, sumac, catechu, or other tannin-yielding vegetable; the liquor of a tan-vat.

Opacite, in mineralogy, a name proposed for certain black opaque scales or grains found in many rocks, which are incapable of identification by means of the microscope.

Opah, the king fish, *Lampris luna,* a large and beautiful fish, native of the Eastern seas, and weighing from 140 to 150 pounds. The body is of an oval form; the mouth small, without teeth; the dorsal, pectoral, and ventral fins very long, and falciform; and the shape of the tail lunate. The opah, whose colors are particularly rich and showy, is held sacred by the Japanese, who regard it as the peculiar emblem of happiness.

Opal, a precious stone of various colors, which comes under the class of pellucid gems. It consists of silica with about 10 per cent. of water, and is very brittle. It is characterized by its iridescent reflection of light. It is found in many parts of Europe, especially in Hungary, in the East Indies, etc. The substance in which it is generally found is a ferruginous sandstone. There are many varieties or species, the chief of which are: (*a*) precious or noble opal, which exhibits brilliant and changeable reflections of green, blue, yellow, and red; (*b*) fire opal, which simply affords a red reflection; (*c*) common opal, whose colors are white, green, yellow, and red, but without the play of colors; (*d*) semi-opal, the varieties of which are more opaque than common opal; (*e*) hydrophane, which assumes a transparency only when thrown into water; (*f*) hyalite, which occurs in small globular and botryoidal forms, with a vitreous luster; (*g*) menilite, which occurs in irregular or reniform masses, and is opaque or slightly translucent. Formerly the opal was believed to possess magical virtues; thus it was believed to confer invisibility when wrapped in a bay leaf.

Open Baptist, Baptists who admit to the Sacrament of the Lord's Supper Christians of other denominations who have not been baptized by immersion.

Open Bill (*Anastomus lamelligerus*), an African bird of the stork family, so named from the odd formation of the beak, which at the anterior end exhibits a gap between the mandibles as if part of them were worn away though they meet at the points. Their chief food is mollusks, and perhaps this formation of bill has something to do with the opening of the shells. Another species inhabits the East Indies.

Opera, a musical drama, that is, a dramatic composition set to music and sung on the stage, accompanied with musical instruments and enriched by the accessories of costumes, scenery, dancing, etc. The component parts of an opera are recitatives, solos, duets, trios, quartettes, choruses, etc., and they are usually preceded by an instrumental overture. The lighter kind of opera in Germany and England, as well as the French *opéra comique,* is of a mixed kind — partly spoken, partly sung. The chief varieties of opera are the grand opera or opera seria, the name given to that kind which is confined to music and singing, of which the recitativo is a principal feature; the romantic opera, or opera drammatica of the Italians, embracing an admixture of the grave and lively; the comic opera, or opera buffa; as well as many intermediate varieties. Though the Greek dramas were operatic in character, the opera proper is of modern date and of Italian origin, and would seem to have developed naturally from the miracle play of the Middle Ages, the first operas dating from the 16th century. About the close of that century the poet Rinuccini wrote a drama on the classical story of Daphne, which was set to music by Peri, the most celebrated musician of the age. The orchestra of this first opera consisted of four instruments, namely, a harpsichord, a harp, a viol di gamba, and a lute. There was no attempt at airs, and the recitative was merely a kind of measured intonation. Monteverde, a Milanese musician, improved the recitative by giving it more flow and expression; he set the opera of "Ariadne," by Rinuccini, for the court of Mantua; and

in the opera of "Giasone" (Jason), set by Cavalli and Cicognini, for the Venetians (1649), occur the first airs connected in sentiment and spirit with the dialogue. The first regular serious opera was performed at Naples in 1615, and was entitled "Love Not Bound by Law." The first opera buffa is said to have been represented at Venice in 1624, where also the first stage for operas were erected in 1637. In 1646 the opera was transplanted to France by Cardinal Mazarin, about the same time to Germany, and somewhat later to England. In France there arose Lulli; in Germany, Keiser; in Italy, Scarlatti; and in England, Purcell, who are the chief operatic composers of the second half of the 17th century. The chief Italian operatic composers include, besides those already mentioned, Piccini, Jomelli, Cimarosa, Paisiello, in the 18th century, and Cherubini, Rossini, Bellini, Donizetti, Verdi, etc., in the 19th. Among the French composers are Grétry, Monsigny, Rousseau, Méhul, belonging to the 18th century, Boieldieu, Auber, Halévy, Herold, A. Thomas, and Gounod to the 19th. The chief recent composers of French comic operas are Offenbach, Lecoq, Hervé, Bizet, and Massinet. Among English composers of operas may be mentioned Arne and Shield in the 18th century; and of recent times Balfe, Wallace, Macfarren, Sullivan, Mackenzie, Thomas, Stanford, and De Koven and Herbert in the United States. It is the German composers, however, who have raised opera to the highest pitch of perfection, the list including such names as Handel, Gluck, and Mozart in the 18th century, Beethoven, Weber, Flotow, etc., in the 19th. Meyerbeer, though German by birth, is to be classed rather with the French composers. In the recent school of German operatic composition, at the head of which stands Richard Wagner, the vocal music of the piece is deprived of the prominent place formerly assigned to it, and is made subordinate to the other three elements of an opera — text, instrumentation, and scenic decoration.

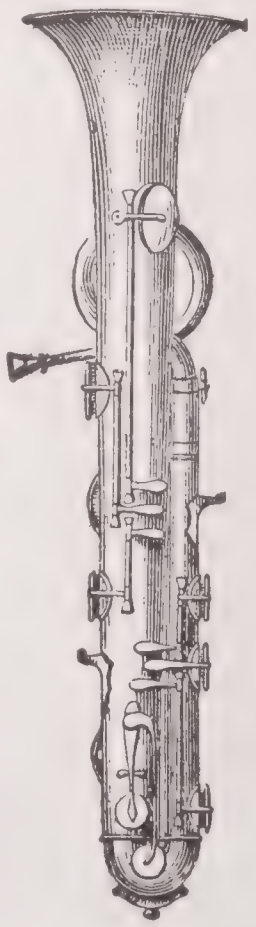
Opera Bouffe, a farcical form of opera buffa in which the characters, subject matter, and music is intended to burlesque the more serious style of opera. Offenbach was the creator as well as the chief master in this art. The comic operas of Gilbert and Sulivan, both in the character of the music and the libretti, stand by themselves.

Opera Glass, a binocular telescope of the kind invented by Galileo. It has a plano-concave or double concave eye glass, so that the image is not inverted and little light is lost, thus securing great distinctness.

Operculum, in anatomy, the group of convolutions in the cerebrum between the two divisions of the fissure of Sylvius. In botany, a lid, as of the pitcher in Nepenthes, and the lid closing the urn, theca, or sporangium in mosses. In ichthology, one of a chain of broad flat bones forming the gill cover in osseous fishes. In zoölogy, in many of the Gasteropoda, a calcareous, horny, or fibrous plate, secreted by the metapodium, and serving to close the orifice of the shell when the animal is retracted. The periwinkle is a familiar example. The term is also applied to a lid which closes the shell of the sessile cirripedes of Balanus and Verruca, and of the lids of certain eggs.

Operti, Albert (Jasper Ludwig Roccabigliera), an Italian artist; born in Turin, Italy, March 17, 1852; was educated in Great Britain; graduated at the Portsmouth Naval School, England, entered the British naval marine service, but resigned in 1868. He studied art and sculpture; became scenic artist for several New York theaters; made two voyages to the Arctic regions with Lieut. Robert E. Peary, and took first casts of North Greenland Eskimos ever made, for the American Museum of Natural History, New York. He painted a number of historical pictures, among them "Farthest North"; "Rescue of the Greeley Party"; "The Schwatka Search"; "Finding DeLong in the Lena Delta."

Ophicleide, a wind instrument of metal, invented to supersede the serpent in the orchestra and in military bands. It consists of a wide conical tube, terminating in a bell like that of a horn, having 10 vantages with keys, and a mouthpiece like that of the serpent. There are two sorts of ophicleides, alto and bass. The bass ophicleide is written on the F-clef, and its compass is three octaves and one note, from B on the third space below the bass staff to C on the third space of the treble staff. They are in two keys, C and B-flat. The alto ophicleide has a compass similar in extent to that of the bass instrument, but starting from a note one octave higher. This instrument is not so satisfactory as its bass fellow, and is therefore but rarely heard. The double-bass ophicleides are in F and E-flat, a fifth below the bass ophicleides in C and B-flat. The amount of breath required to play the double-bass ophicleides will probably prevent its general adoption.



OPHICLEIDE.

Ophidia, in zoölogy, snakes; an order of the class Reptilia, which is placed by Professor Huxley in his division Sauropsida. The body is always cylindrical and

without a bony exoskeleton. Vertebræ procœlous, with rudimentary transverse processes. They have no sternum, pectoral arch, forelimbs, or sacrum; nor as a rule, are traces of hinder limbs present, though they occasionally occur, *e. g.*, in Python. Hooked conical teeth are always present, anchylosed with the jaw. The order is preeminently tropical, the species rapidly diminishing as the distance from the equator increases, and wholly ceasing before the Arctic or Antarctic Circle is reached. The classification is not fixed. According to Wallace, the order contains 25 families. There is another and natural division into three sub-orders: (1) *Thanatophidia* (venomous snakes), with two groups, *Proteroglyphia* and *Solenoglyphia;* (2) *Colubriformes* (Innocuous colubriform snakes); and (3) *Typhlopidæ* (blind snakes). In palæontology, first found in the Eocene of Sheppey, others from Miocene of Germany, and in some Tertiary beds in the United States. Most of these appear to have belonged to the *Pythonidæ.* Poison-fangs have been found in some of the later Tertiary deposits, and a colubrine snake from the Upper Miocene of the S. of France.

Ophiocephalus, walking fish; the typical genus of the family *Ophiocephalidæ. O. striatus* is universally distributed over India. The male constructs a nest, in which the ova are deposited.

Ophioglossaceæ, adders' tongues; an order of Acrogens, alliance Filicales. The vernation is straight, the capsules, which are in spikes or panicles, formed on the margin of a contracted leaf, are large, coriaceous, two valved, without a ring, or areola. Distribution, the Asiatic islands, the West Indies, etc. Known genera three or four. Number of species undetermined.

Ophir, an ancient country celebrated for gold. The ships of Solomon and of Hiram, King of Tyre, brought 450 talents of gold to Jerusalem, 1000 B. C. (I Kings ix: 26–28, x: 11, and II Chron. viii: 17, 18, and ix: 10 and 21.) Jehoshaphat built ships at Tarshish to go to Ophir for gold, about 913 B. C. (I Kings xxii: 48, and II Chron. xx: 36, 37). Gold from Ophir is also mentioned Job xxii: 24, and xxvii: 16; Psalms xlv: 9; and Isaiah xiii: 12. Its position has not been ascertained, and Arabia, India, and Africa are contended for by different authorities. Josephus considers Malacca to be Ophir, and Sir Emerson Tennent supports this view. Purchas says Ceylon. But the discoveries made in 1868 of gold deposits on the E. coast of Africa, and the remains of the ancient workings, give additional force to the ideas entertained by many that thereabouts was the locality of Ophir.

Ophite, green porphyry or serpentine, a metamorphic rock of a dusky-green color of different shades, sprinkled with spots of a lighter green. It is a hydrous silicate of magnesia with alumina and iron. Called also ophiolite.

Ophite, a sect of serpent worshipers which seems to have arisen prior to the Christian Church, but which was little known till the 2d century, when Christian as well as Jewish Ophites arose. They mingled Gnosticism with their Christian belief. When they celebrated the Lord's Supper, they allowed a serpent to crawl around and over the bread. At the close of the ordinance, the worshipers killed the serpent, and then sung a hymn of adoration to the Supreme Being, whom the serpent in Paradise, whom they identified with Christ, had made known to men. Called also Serpentarians.

Ophiuchus, in astronomy, Serpentarius, the Serpent-bearer, a constellation of the Northern Hemisphere. One of the ancient asterisms, having Hercules on the N., Scorpio on the S., and Serpens on the W. It has about 80 stars visible to the naked eye, the chief being Ras Alague.

Ophiuroidea, an order of the Echinodermata, comprising star fishes known as brittle stars and sand stars. These animals have long slender-jointed arms, which may either be branched or simple.

Ophthalmia, in pathology, a term used to indicate the structural changes produced by proliferation and catarrhal inflammation, going on to the formation of pus in the mucous membrane of the eye, exhibiting various forms, catarrhal, pustular, purulent (in the new-born infant), gonorrhœal, strumous, or scrofulous, and chronic. The chief symptoms are redness of the eye, chemosis, or swelling, discharge of fluid and pus, intolerance of light, and frequently, in severe cases, spasmodic closure of the eyelids. When the cornea is involved, destruction of the eye and permanent loss of sight — as in diphtheria and smallpox, or from sand, etc., as among the troops and natives in Egypt especially — is a common result. Treatment of the discharge by caustics and astringents is imperatively called for.

Ophthalmometer, an instrument of the nature of compasses for measuring the capacity of the chambers of the eye in anatomical experiments. Also an instrument invented by Helmholtz for ascertaining the true distance at which an object shall be viewed for the accommodation of each eye. It consists of two planes of glass at right angles to each other, and a sight-tube through which they and an object beyond them are viewed. By rotating the glasses on their common axis till the two images formed by reflection from their back surfaces coincide, the proper point of vision is ascertained.

Ophthalmoscope, an instrument invented by Helmholtz, and described by him in

1851. It is used for the examination of the inner structure of the eyeball, and is composed of a small round mirror with a central perforation, which reflects the light of a lamp placed at the side of the eye. When the mirror only is used, the method is known as direct; when a convex lens is between the eye and the mirror it is indirect.

Opie, John, an English painter; the son of a carpenter; born near Truro, Cornwall, April 9, 1761. Having shown a precocious aptness in portrait painting, he was taken to London in his 19th year by Dr. Wolcot (Peter Pindar), and there he acquired notoriety as the "Cornish Wonder." When his portrait painting ceased to be fashionable he devoted himself to historical and Scriptural subjects with such success that he became a Royal Academician in 1788, and was elected Professor of Painting to the Royal Academy in 1805. He was the author of a biography of Sir Joshua Reynolds in Pilkington's "Dictionary of Painters," and his four lectures on painting, with a memoir, were published by his wife. He died in London, April 9, 1807.

Opinicus, an imaginary animal borne as a charge, having the head and wings of a griffin or eagle, a short tail like that of a camel, and the body of a lion. It is sometimes represented without wings.

Opinion of Counsel, the advice given by a barrister or advocate in answer to questions put with regard to a "case" or "memorial" prepared by an attorney or solicitor.

Opisthobranchiata, in zoölogy, an order of Gasteropoda. Shell rudimentary or wanting; branchiæ arborescent or fasciculated, more or less completely exposed on the back and sides toward the rear of the body. It contains two sections, Tectibranchiata and Nudibranchiata.

Opitz, or Opitius, Martin, a German poet; born in Bouzlau, Silesia, Dec. 23, 1597. He studied at Frankfort-on-the-Oder and at Heidelberg, and having afterward visited Holland he went in 1621 to the court of the Duke of Liegnitz, whence in about a year he removed to become Professor of Philosophy and Classical Literature at the University of Weissenburg (now Karlstadt). Becoming distinguished for his talents, he went in 1625 to Vienna, where the Emperor Ferdinand II. bestowed on him the poetical crown and letters of nobility, when he assumed the title of Von Boberfeld. Among his works are a poem on Mount Vesuvius, Silvæ, Epigrams, etc., but he is more important for the influence of his teaching regarding corrections in poetic style than for his own poems. He died in Danzic, Aug. 20, 1639.

MARTIN OPITZ.

Opium, in chemistry, the dried juice obtained from *Papaver somniferum*, extensively cultivated in Asia Minor, Egypt, and India. An incision is made in the unripe capsules, the juice is left to dry over night, and then removed with a blunt knife. Opium is a complex substance, containing morphine (3–15 per cent.), the most important alkaloid, narcotine, codeïne, narceïne, thebaïne, papaverine, meconic acid, meconin, resin, and fat, together with other substances, the composition of which is not clearly established. In pharmacy, in small doses it produces brief excitement, and then acts as a soporific. In large doses the sleep becomes coma, and death ensues. It is given to allay pain and spasm.

Opium, Tincture of. See LAUDANUM.

Opium Traffic, in China, India, Turkey, and other parts of the East, and, to a small extent, in the West, opium is used as a narcotic drug. The great source whence China has always derived its opium has been India, where, since 1793, the drug has been a government monopoly, the cultivators, in Behar, Benares, and Malwa being paid at a fixed rate for their crops for exportation to China. The trade, which was conducted in clippers, was contraband, the Chinese government having in 1796 prohibited the importation of opium, and issued various subsequent proclamations on the subject, of the same tenor as the first. Nevertheless, by the connivance of the Chinese local officers, the importation about trebled in the 20 years between 1816–1817 and 1836–1837, in the two latter years being 20,049 chests, valued at more than $10,000,000. In March, 1839, the Chinese authorities, without warning given, enforced the law, forbade all foreigners to quit Canton, and ordered them to deliver up the opium in their possession, which was burnt. War with Great Britain resulted, which ended in the defeat of the Chinese, who were obliged to pay indemnity for the opium. In 1906 the Chinese Government decreed that the cultivation of the poppy and the use of the drug should cease in 10 years; and the British Government agreed that importations from India should decrease annually from 1908 and cease entirely after 1918.

Oplandt, Fort, a defensive work built by the Dutch in 1631, near the site of the present city of Lewes, Del.

Opodeldoc, a kind of plaster, said to have been invented by Mindererus, and used for external injuries. Also a saponaceous camphorated liniment, a solution of soap in ardent spirits, with camphor and essential oils, soap liniment.

Opopanax, or **Opoponax,** in botany, a genus of *Umbelliferæ*, family *Peucedanidæ*. *O. chironum* is a plant six or seven feet high, resembling a parsnip, and inhabiting the Levant. In chemistry, the resinous juice obtained from the roots of the *Pastinaca opoponax*. It occurs in irregular lumps of a yellowish-red color, with a bitter, acrid taste and peculiar odor. Pelletier found it to contain resin 42 per cent., gum 33.4, ligneous matter 9.8, starch 4.2, and malic acid 2.8. The resin melts at 100°. In pharmacy, a stimulant and antispasmodic used like the other gum resins in pharmacy.

Oporto, an important city and seaport of Portugal, on the Douro, 2 miles from its mouth, 174 miles N. E. of Lisbon. Situated on a steep declivity on the right bank of the river, the appearance of Oporto from the sea is picturesque and imposing; but this general and pleasing distant appearance, however, is materially altered on a closer inspection, when the actual narrow, crooked, and dirty character of the streets and lanes, constituting a large part of the town, are investigated by a progress over the city. Oporto possesses many churches and convents, but no monument worthy of a special notice. There are four colleges, an academy of navigation and commerce, a school of medicine and surgery, and other literary and scientific institutions. Manufactures include silk, cotton, woolen and linen fabrics, ropes, tobacco, soap; also, shipbuilding. The harbor within the bar across the mouth of the Douro can only be entered by large vessels at high water. Owing to her situation, Oporto is the emporium for a large portion of Portugal, and has an extensive commerce. The principal export is a red wine called Port, produced on the banks of the Douro. The climate is generally damp and foggy; in winter the cold is very severe, but in summer the winds from the E., S., and W. moderate the intensity of the heat. Oporto occupies the site of the ancient Portus Cale, from which the name Portugal is derived. It was taken and sacked by the French in 1805. Pop. (1900) 167,955.

Opossum, in zoölogy, the popular name for the pouched mammals which have a geographical range from the United States to Patagonia. They vary from the size of a mouse to that of a large cat, and have long noses, ears, and (generally) naked prehensile tails. The Virginian opossum (*Didelphys virginiana*), common over all temperate America, is the best-known of the family, and is found even in towns, where it acts as a scavenger by night. The crab-eating opossum inhabits Central and tropical South America. Lord Derby's opossum,

WATER OPOSSUM.

like some others which have been placed in a separate group, has no pouches in which to carry its young; they commonly ride on their mother's back, twining their prehensile tails round hers. The Murine opossum, no larger than a common mouse, is bright red, and ranges from Central Mexico to the S. of Brazil. The most remarkable of the group, the three-striped opossum from Brazil, is reddish-gray, with three deep black bands down the back.

Opossum Shrimp, the popular name of several species of *Mysis*, a genus of small crustaceans. They receive their name from the females carrying their eggs and young in a pouch between the thoracic legs.

Oppein, a town of Prussian Silesia, on the Oder, 51 miles S. E. of Breslau. Since 1816, when it was erected into a seat of government for Upper Silesia, the town has been much beautified both with new edifices and with parks and gardens. Its church of St. Adalbert was founded in 995; and there is an old castle on an island in the Oder. The manufactures include pottery, cigars, cement, beer, leather, etc., and there is a considerable trade in grain and cattle. Pop. (1900) 30,112.

Oppert, Julius, a French Assyriologist and Orientalist; born in Hamburg, July 9, 1825, of Jewish parents. He was an expert on the decipherment of cuneiform inscriptions, and published: "Assyrian Studies" (1859–1864); "Sanskrit Grammar" (1859); "History of the Empire of Chaldea and Assyria from the Monuments" (1866); "The People and Language of the Medes" (1879). He died Aug. 21, 1905.

Oppolzer, Theodor, Baron von, an Austrian astronomer; born in Prague, Austria, Oct. 26, 1841; son of Jonathan von Oppolzer, the celebrated philologist. He began teaching in the University of Vienna in 1866, and nine years later was appointed to the chair of astronomy and geodesy, a position which he held among the faculty

till his death. In 1873 he established a private astronomical observatory, in which he did much professional work for the government. His most important work was his treatise, in two large octavo volumes, on the methods of computing orbits. At the time of his death Oppolzer was preparing to attack the more difficult problem of the lunar theory. He died Dec. 26, 1886.

Opportunism, the act or practise of making the most of opportunities; specifically, in politics, the practice of turning circumstances to the advantages of one's party, even at the sacrifice of party principles.

Opposition, in astronomy, the situation of two heavenly bodies when they are diametrically opposed to each other, or when their longitudes differ by 180°. Thus there is always an opposition of sun and moon at every full moon; also the moon, or a planet, is said to be in opposition to the sun when it passes the meridian at midnight. Signified by the symbol ☍ of the opposition of Jupiter to the sun. In logic, opposition of judgments is the relation between any two which have the same matter, but a different form, the same subject and predicate, but a different quantity, quality or relation. There are five kinds of opposition, viz., contradictory, contrary, inconsistent, subaltern, and subcontrary. In rhetoric, a figure whereby two things are joined which seem imcompatible.

Opposition, in politics, the party that, under a constitutional government, are opposed to the existing administration, and who would probably come into power on its displacement. Though at an early period in English history rival political parties existed, yet a regular opposition, in the modern sense of the word, may be said to date from the accession of the house of Hanover.

Ops, the Roman female divinity of plenty and fertility. She was regarded as the wife of Saturn, and, accordingly, as the protectress of everything connected with agriculture.

Optative, in grammar, that form of the verb in which wish or desire is expressed, existing in the Greek and some other languages, its force being conveyed in English by such circumlocutions, as "may I," "would that he," etc.

Optic, Oliver. See ADAMS, WILLIAM TAYLOR.

Optical Illusion. An object appears large or small, near or distant, according as the rays from its opposite borders meeting at the eye form a large or a small angle; when the angle is large, the object is either large or near; when small, the object must be small or distant. Experience alone enables us to decide whether an object of large apparent size is so on account of its real size, or of its proximity; and our decision is arrived at by a comparison of the object in position with other common objects, such as trees, houses, etc., which may chance to be near it, and of which we have by experience come to form a correct idea. The same is, of course, true of apparently small objects. But when all means for comparison are removed our judgment is at fault. Similarly, we erroneously infer spherical solids at a distance to be flat disks; and, by reason of irradiation in the eye, the sun appears larger than it would if illumined by a fainter light, and a man in a white habit seems larger than he would if he wore a dark dress. Illusions are also produced by external causes.

The persistence of impressions on the retina for about one-sixth of a second after the object which produced the impression has been removed produces another class of illusions. Common examples of this are the illuminated circle formed by the rapid revolution of an ignited carbon point, piece of red-hot iron, or other luminous body, and the fiery curve produced by a red-hot shot projected from a cannon. Another form of illusion is produced to a person who is seated in a vehicle in motion; and it is very deceptive when the motion is so equable as not to be felt by the person himself. The illusion is most complete when the attention is riveted on an object several yards off; this object then appears to be a center round which all the other objects revolve, those between the observer and the object moving backward, and those beyond the object moving forward. This illusion occurs on a large scale in the apparent motion of the heavenly bodies. Other illusions arise from a disordered state of the organs of vision: *e. g.* the seeing of things double or movable, or of a color different from the true one; the appearance as of insects, crawling over a body at which the eye is directed, etc.

Optic Nerve, in anatomy, the nerve of sight, proceeding from the optic lobes or *corpora quadrigemina* to the eye, terminating in an expansion called the retina. The inner portion of the fibers of the two optic nerves decussates at the commissure, passing to the opposite eye, while the outer portion continues its course to the eye of the same side, which has been supposed to assist in the production of single vision, although it is more probable that the latter is the result of a mental act. The closest relations exist between the optic nerve, its disk, the retina, and the choroid, as regards the cerebral and intraocular circulation, particularly seen in the course of cerebro-spinal disease.

Optics, in physics, optics was defined by Sir David Brewster as that branch of knowledge which treats of the properties of light and of vision as performed by the human eye. He divided his treatise on the subject into four parts: 1. On the reflection and refraction of light: (1) Catoptrics, (2) Dioptrics. 2. Physical optics. 3. On the application of optical principles of the explanation of natural phenomena. 4. Of optical instruments. The more modern division of the science is into: 1. Sources of light; 2. Transmission, velocity, and intensity of light; 3. Reflection of light — mirrors; 4. Single refraction — lenses; 5. Dispersion and achromatism; 6. Optical instrument; 7. The eye considered as an optical instrument; 8. Phosphorescence and fluorescence; and 9. Double refraction, interference, and polarization.

Optigraph, in optics, a form of camera used for the purpose of copying landscapes. The rays from the object to be drawn are reflected from a plane mirror through the object glass of the instrument to a speculum, and thence through an eye glass to the eye. Between the eye and the speculum is a piece of parallel faced glass with a small dot in its center, exactly in the focus of the eye glass. By moving the pencil, the dot seen in the field of the telescope is passed over the outlines of the object, which are at the same time traced on the paper by the pencil.

Optimism, in philosophy, the name given to the view propounded in the "Théodicée" of Leibnitz that this world, as the work of God, must be the best among all possible worlds; for, were a better world possible than that which actually exists, God's wisdom must have known, His goodness must have willed, and His omnipotence must have created it. Leibnitz maintained that, if there was to be a world, it must consist of finite beings; this is the justification of finiteness and liability to suffering, or metaphysical evil; that physical evil, or pain, is salutary as punishment, or means of tuition; and that God could not remove moral evil, or wrong, without removing the power of self determination, and, therewith, the possibility of morality itself. J. S. Mill points out that Leibnitz did not maintain that this is the best of all conceivable, but of all possible, worlds, so that his doctrine might be held by a "limited" Theist. In general, the tendency to take the most hopeful view of matters in general; the belief that the world is growing better.

Optograhy, in optics, the temporary retention in certain cases of an image, that of the last person or thing seen, on the retina of the eye when a man or a beast dies. Kuhn found such an image in the eye of an ox an hour after its death. It has been thought that possibly the image of a murderer might be found on the retina of the victim's eye, which would be a great aid to justice.

Optometer, an instrument for measuring the extent of the limits of distinct vision in different individuals, and consequently for determining the focal lengths of lenses necessary to correct imperfections of the eye.

Opuntia, in botany, Indian fig; the typical genus of the family *Opuntidæ.* The stem consists of flat joints broader above than below, at length becoming cylindrical and continuous. All the species were originally American. *O. vulgaris* is indigenous in tropical America, Bermuda, etc., whence it has been introduced into Southern Europe; its fruit imparts a red tinge to the urine of those who eat it. *O. tuna* furnishes a rich carmine pigment, used in Naples as a watercolor. *O. dillenii* is used in the Deccan as a hedge plant about cantonments. Cochineal insects brought to India flourished on it, and it yields a coarse fiber used in paper making.

Opus Operantis, in Roman theology, the phrase (= the work of the worker) is used to signify that the effect of a particular rite or act of devotion is directly due, not to the rite (*opus*) itself, but to the dispositions of the person who is the subject of the rite or who practises the devotion. This is the Protestant view of the efficacy of the sacraments, as opposed to the Roman and High Anglican view.

Opus Operatum, in Roman theology, the expression opus operatum (= the work done) was used by mediæval theologians to signify that grace was conferred by the sacrament itself, and adopted by the Council of Trent, which, in the eighth canon of the seventh session, anathematizes any one who shall say that the sacraments do not confer grace *ex opere operato* (by outward works or deeds). The necessary dispositions on the part of the recipient are *conditiones sine qua non* (indispensable conditions), and, according to the Roman view, the grace conferred is due, not to these necessary dispositions, but to the sacrament as received with these necessary dispositions.

Orache, a genus of plants of the natural order *Chenopodiaceæ,* having male and female flowers on the same plant. The species are numerous and widely spread over the maritime or saline parts of the earth, scarcely any species except the common orache (*Atriplex patula*) being ever found inland or away from saline influence. Five species, including the garden orache (*Atriplex hortensis*), are natives of Great Britain. Though formerly much cultivated in Great Britain, orache is now displaced as a pot herb by spinach (*Spinacia oleracea*),

a species of a closely allied genus. All the species have similar qualities, and may be used as spinach.

Oracle, in anthropology, oracles are of high antiquity. They existed among the Egyptians (Herod. v: 89, viii: 82), and the poetry of the Greeks and the Romans is full of allusion to them. The Hebrews might lawfully, by the high priest, consult the Urim and Thummim (Num. xxvii: 21), but they also illicitly sought responses from teraphim (Judges xvii: 5), and from the gods of surrounding nations (II Kings i: 2, 3, 6, 16). The responses were supposed to be given by a supernatural afflatus, either through a person, as at Delphi and Cumæ, or through some object, as in the rustling of the sacred grove at Dodona. But in every case there is present the idea of a power more than human taking possession of a person or thing, and making that person or thing the vehicle of the response. Tylor holds that the belief in oracles was a consequence of animism, and, after giving instances of the survival of the belief among races of low culture, says, "Could a South Sea Islander have gone to Delphi to watch the convulsive struggles of the Pythia, and listen to her raving, shrieking utterances, he would have needed no explanation whatever of a rite so absolutely in conformity with his own savage philosophy."

ORANG OUTANG.

Oran, a seaport of Algeria, stands on the Gulf of Oran, 261 miles W. by S. of Algiers, and 130 S. of Cartagena in Spain. It stretches up the foot of a hill, is defended by detached forts, has a thoroughly French appearance, having been mainly built since 1790, when the old Spanish town was destroyed by an earthquake, and possesses a Roman Catholic cathedral (1839), a grand mosque, a large military hospital, a college, a seminary, and two citadels or castles. The harbor is protected on the N. and E. by moles constructed in 1887 at a cost of $1,400,000; alfa, iron ore, and cereals are the chief of the exports. Oran was built by the Moors. During the second half of the 15th century it was a highly prosperous commercial town, and was celebrated for its cloth and arms and fine public buildings. But it was taken by the Spaniards in 1509 and made a penal settlement. It was captured by the Turks in 1708, but retaken by the Spaniards in 1732. In 1790 it was destroyed by an earthquake, and shortly after was altogether abandoned by the Spaniards, the Turks occupying it again in 1792. The French took possession of the town in 1831. Pop. (1906) 106,517.

Orang Outang, in zoölogy, *Simia satyrus,* the Mias of the Dyaks; also known as the "wild man of the wood." It is a dull, slothful animal, but possessed of great strength. These animals are now confined to the swampy forests of Sumatra and Borneo. Their height has been variously stated, but we have not the least reliable evidence of the existence of orangs in Borneo more than four feet two inches high. The legs are very short, the arms as disproportionately long, reaching to the ankle when the animal is placed in an erect position. The hair is long, ruddy-brown, with a decidedly red tinge, face dark, eyes and nose small, jaws prognathous, the hair falling over the forehead and backward over the neck; it is long on the limbs, with a downward direction on the upper, and an upward on the lower arm. There are neither cheek pouches nor natesal callosities, nor a tail, and the hips are covered with hair. The males have a longish beard, and they sometimes develop warty protuberances on each side of the face. The resemblance to man in appearance is greatest in the females and in young animals. The head of a baby orang is not very different from that of an average child; but in the adult the muzzle is as well-marked a feature as in the Carnivora. The orang is aboreal, and forms a sort of nest or shelter among the trees. It never walks erect, unless when using its hands to support itself by branches overhead, or when attacked.

Orange, properly *Citrus aurantium,* the sweet orange. The leaves are ovate, oblong, acute, slightly serrulated; petiole more or less winged; the pulp is sweet. It is a native of India, and by some botanists is believed to be only a variety of the citron (*C. medica*). It was introduced into the S. of Europe about the 12th century, having been brought into Arabia about three centuries earlier. It lives about 600 years. Among the many varieties are the China orange, which is the common orange of the markets; the blood, or Malta orange; the St. Michael's orange; the noble, or mandarin orange, etc. A single tree in St. Michael's has yielded 20,000 oranges fit for packing. The orange contains malic acid; the rind is bitter and aromatic; the fruit itself is said to be disinfectant. Orange leaves are sometimes prescribed for hysteric females, instead of tea. Orange poultice has been recommended in India in skin diseases. Sometimes there is a monstrous separation of the carpels, producing what is popularly called a horned orange. There are various allied species, specially the bitter, or Seville orange, *C. bigaradia,* largely imported for the manufacture of candied orange peel, etc. It, too, has run into several varieties. Another species is the Bergamot. Sir Joseph Hooker makes all these varieties of *C. aurantium.* Of the late years much attention has been paid to orange culture in the United States. In Florida and Southern California vast orange plantations are providing immense crops of many varieties of the orange.

Orange, or **Gariep,** the largest river of South Africa, rises in the Kathlamba Mountains, in the E. of Basutoland, and flows W., with an inclination to the N., to the Atlantic Ocean. It describes numerous wide curves in its course of 1,000 miles, and separates Cape Colony, on the S., from the Orange Free State, Griqualand West, Bechuanaland, and Great Namaqualand, on the N. Area of basin, 325,000 square miles. Its principal tributaries are the Caledon and the Vaal, both joining it from the right. Its volume varies greatly between the dry season, when it is not navigable, and the rainy season, when it overflows its banks in the upper parts of its course. Its mouth is, moreover, obstructed by a bar.

Orange, a city in Essex co., N. J.; on the Lackawanna railroad; 4 miles N. W. of Newark. It is built on the lower slopes of the Watchung Mountain, and in its vicinity are Eagle Rock, 650 feet above tidewater, Hemlock Falls, a wild mountain attraction, and Llewellyn Park, which comprises 750 acres, and contains many costly residences. Here are the Orange Memorial Hospital, House of the Good Shepherd, a Masonic temple, Orphan Home, a public library, a Mendelssohn Union, National banks, daily and weekly newspapers. It has extensive hat manufactories, and other industries of importance, and an assessed proper-

ty valuation of nearly $10,500,000. Pop. (1900) 24,191; (1910) 29,630.

Orange, anciently Arausio, a city and commune of France, 18 miles N. of Avignon, on left bank of the Aigue, tributary of the Rhone. There are two great monuments of the Roman period, a triumphal arch (72 feet high), the finest in France, and the ruins of a theater, 340 feet long; the only modern building of interest is the cathedral. For five centuries (till 1531) Orange was an independent principality ruled by its own sovereigns, the estates and title passing to the Count of Nassau, and thus to William III., afterward King of Great Britain. In 1713 Orange was for certain equivalents conceded to France by the King of Prussia, though the title of prince has descended by the younger Nassau line to the kings and stadtholders of Holland. The district is very productive; manufactures silks, woolens, and fruits.

Orange, Fort, an old fort built by the Dutch in 1623, on the site of the present city of Albany, N. Y.

Orange, Prince of. See WILLIAM THE SILENT, PRINCE OF ORANGE: WILLIAM III., KING OF ENGLAND: MAURICE.

Orange Culture in the United States. The only States in which orange culture has been carried on to any extent are Florida, Louisiana, and California, though the fruit is grown along the Atlantic and Gulf coasts from the Rio Grande to the sea islands of South Carolina. The oranges of Florida are considered among the finest in the world, especially those grown along the Indian river. Most of the large groves in this State have been planted within the last 30 years and the acreage has steadily increased. A species of sour or bitter orange grows wild in Florida, the fruit of which is used for marmalade and candied orange peel. It is sometimes cultivated as an ornamental tree, but is of chief value as a hardy stock on which the different varieties of sweet oranges can be grafted. While orange trees can be grown from the seed, they are always improved by grafting. The orange groves in Florida have suffered greatly in recent years by heavy frosts. In 1886 occurred the coldest weather since 1835, and the thermometer sank to 15° at Jacksonville, causing the loss of many trees. In December, 1894 the thermometer registered 14° below at Jacksonville. The crop was unusually large, and at least 3,000,000 boxes were still unpicked on the trees, the greater part of which was an entire loss. The frost also killed the tender shoots and branches and all the leaves fell off, leaving the trees unprotected for the second cold wave which swept over them in February, 1895, and completely destroyed whole groves. The estimated crop in Florida in 1894 was 5,000,000 boxes. The orange was first cultivated in California at the Catholic missions in the latter part of the 18th century. From 1865 to 1875 many orchards were set out, the celebrated Riverside orange-growing settlement being founded in 1871. The navel orange, which is one of the finest produced in California, came from Bahia, Brazil, and was sent to the Riverside colony by the Department of Agriculture in 1876. Oranges can be raised in almost all parts of California, but while they are subject to frosts they are the prey of diseases and insects which have caused much trouble. While orange cultivation has so rapidly increased in the United States, the supply does not yet equal the demand, and in 1895 the imports amounted to $1,997,226.

Orangeman, a member of an association of Irish Protestants, chiefly in Ulster, but with affiliated lodges in various parts of the United States, Great Britain and her colonies. They have passwords and grips, and there is an initiatory ceremony. They became an organized body in 1795, but the system existed much earlier. They claim to do honor to the memory of William III. Orangemen in Ulster wear the flowers of the orange-lily on July 1 and 12, the anniversaries of the Boyne (1690) and Aughrim (1691), and they also celebrate Nov. 5, on which day the Prince of Orange landed in Torbay (1688).

Orange Free State, a former Boer republic; later a British colony; and, since May 31, 1910, a province in the South African Union; bounded by the provinces of Cape Colony on the S. and S. W., the Transvaal on the N., and Natal on the E.; area, 50,392 square miles; pop. (1904) 387,315, of whom 142,679 were Europeans; capital, Bloemfontein. Lying 5,000 feet above the sea-level, the country, chiefly vast undulating plains, is cold in winter, with violent thunder storms and long droughts in summer. It is, however, very healthful, and favorable to European constitutions. Agriculturing and pasturing are the chief occupations, and wool, hides, and ostrich feathers the principal exports. Diamonds and other precious stones have been found in paying quantities, rich coal mines exist, and the province is said to have other mineral wealth. Gold was discovered in 1887. The Dutch Reformed Church is the dominant religion, and a Dutch dialect the language of the country. The country may now be reached by railway from Port Elizabeth.

The province was founded 1835-1836 by Dutch settlers from Cape Colony, annexed by Great Britain in 1848 in order to put a stop to the Boer outrages on natives but in 1854 it was recognized as an independent State.

The great discovery of diamonds on the banks of the Vaal river, in May, 1870, led to conflicting claims by the Orange Free State and the Transvaal Republic but in October, 1871, the British annexed the disputed territory (See KIMBERLY). In the summer of 1899, the relations becoming strained between the South African Republic and the British government, the Orange Free State declared its intention of supporting the latter in the event of war (See SOUTH AFRICAN REPUBLIC). After the defeat of the Boer forces, a military governor was appointed over the Orange Free State (March, 1900). Its annexation to the British empire was formally proclaimed at Bloemfontein, May 28. On Sept. 5, Lord Roberts issued a proclamation defining the policy of the British government in regard to the conquered State. See BOERS.

Oratorians, or **Congregation of the Oratory,** a society for the exercise of devotion with religious study, was founded in Italy by St. Philip Neri (July 21, 1515–May 26, 1595), in 1550, and called the Order of the Holy Trinity. It received the public approval of Gregory XIII. in 1577. It took the name of Congregation of the Priests of the Oratory of Jesus, and the rule framed by the Fathers was approved by Paul V., Feb. 21, 1612. The name is derived from the chapel or oratory built by Neri at Florence. The French society of Fathers of the Oratory of the Holy Jesus was instituted by Peter de Berulle in 1613. Dr. Newman introduced the Congregation into England in 1847.

Oratorio, a kind of musical drama, consisting of airs, recitations, duets, trios, choruses, etc. The text is usually derived from some Scriptural subject; as, for instance, that of the "Messiah," of the "Creation," and of "Elijah." The origin of the oratorio is somewhat obscure. The most probable account is that which attributes its intention to St. Philip Neri, who, in 1540, organized, at the new chapel at Rome, certain musical performances, consisting of poems on sacred subjects, sung by first-rate singers, accompanied by the best instrumentalists, for the purpose of attracting large congregations, and of creating a zeal for religion. Though a somewhat profane method of affecting so sacred a purpose, it was entirely successful, and these performances, which at first were only poems in four parts, were, in less than half a century after the death of Neri, in 1593, developed into those splendid compositions called by moderns oratorios. Italy, though the birthplace of the oratorio, has produced very few of any note. The Germans, on the contrary, excel in this species of composition; as a proof of this, it is only necessary to mention the names of Bach, Haydn, Beethoven, Mozart, and, greatest of all, Handel.

Oratory. Real oratory is one of heaven's gifts which a man may well pray for. The gift of speaking — of being able to make people listen to what you say; of inspiring men with ideals and convincing them of truth — surely than this no more superb work a man can have. The writer hides his face — though not his heart — behind his book. The orator must show his face, and if he be an orator in very deed, his will be a greater triumph than that of the writer, even though it be a more ephemeral one. It is easy to open the soul on paper, but to speak the truth elegantly, forcefully, convincingly, before an audience of one's fellow men requires at all times ability and self-control, and, in many cases, courage of a higher order.

The orator must speak from a full mind. He must know thoroughly the subject he is discussing; and not only that subject, but the collateral topics which would enliven it, or illustrate it, or make it clearer. Then comes the absolute necessity of lucidity. A man of even less information, with the ability to state his views so that the ordinary understanding immediately comprehends his thought, will distance in debate a very much better equipped antagonist. The orator must have a natural gift. But most people of quick minds and ripe culture can become good speakers. There is, however, a great difference between good speakers, and that Gladstone and Bright Englishmen I should say that Lord Rosebery and the Duke of Devonshire are good speakers, and that Gladstone and Bright were orators. There is a personal magnetism about an orator which cannot be defined. It is something in the voice or manner which establishes a connection between the audience and the speaker. The best example of that I have ever seen in America was Wendell Phillips, and in England, Gladstone.

An orator who is quickly sensitive to the moods of his audience, and whose moods are reflected in his voice, manner, and expression, can safely indulge in, or will necessarily be moved to, emotions and passions which have a tremendous effect on his audience. A speaker gets into trouble when he attempts to make use of those elements which are the property of the orator only, for he is apt to overdo or underdo them, and be laughed off the platform or into his seat. His pathos becomes bathos; and his eloquence, grandiloquence.

Henry Ward Beecher was a great orator, with the excellences and the defects of a man who is simply an orator and not a practical man of affairs. He moved his audiences to laughter or tears as those emotions moved himself.

Perhaps the greatest triumph of a public speaker in our generation was Mr. Beecher's tour through England at the time of the Civil War. At Liverpool and Manchester, especially, his audiences were mobs and were restrained with difficulty from tearing him to pieces and for hours refused to give him a hearing. As soon as he secured a hearing of 15 minutes his enemies were more anxious to hear him through than to put him down.

I have heard one of England's greatest speakers describe his own impressions as a youth in the audience at Manchester. He said as he entered the hall he saw a crowd of people enraged beyond anything he deemed possible, and apparently endeavoring to get at and to kill the speaker. It was half an hour before Mr. Beecher could be heard. A hearing was secured by the leading men of Manchester on the platform begging an opportunity and protecting the speaker.

At the end of five minutes the passion of the crowd broke out once more, and it was 30 minutes before Mr. Beecher could start again. At the end of two hours the converted audience had become his enthusiastic admirers and wanted to carry him about the streets of their city. In this magnificent triumph of the American divine there was that irresistible trinity of elements — the truth, the word, and the man.

The young speaker should form his style by writing with great care. He should cultivate his memory in every possible way. He should speak without notes, as practice. He should cultivate, if possible, the power of thinking upon his feet. The mere speaker is handicapped by his manuscript, and is generally lost when away from it, or when forced to leave it by a good debater on the other side.

But if a young man has in him the elements of oratory, to a greater or less extent he can with severe practice acquire the habit of thinking out the speech he has to deliver, so that without notes he can express himself with felicity and force, and if interrupted, or if in debate questions are thrown at him which compel a change of his order of battle, he can adapt himself to the occasion. Such a speaker can neither be put down nor discouraged.

Especially in America is humor and a good fund of anecdotes essential to the public speaker. President Lincoln once said to me — and he was one of the greatest popular orators this nation ever produced — "I am severely criticized because I tell stories and crack jokes. They say it detracts from the dignity of my office and injures my influence. But I have found in my career that plain people are more easily influenced and convinced through the medium of a broad and humorous illustration than in any other way, and what the hypercritical, calculating few think I do not care."

Much is said in these days to the effect that oratory is no longer effective or useful. But it is the experience of political leaders of all denominations that the orator never had a larger field or could exercise more influence than today. The vast number of newspapers and periodicals which are offered to the public so cheaply have caused a diffuseness of mind. They have watered the brain so that thought is in a measure fluid. To this must be added the intense concentration on earning a living and making a career, necessitated by the frightful competition of our modern life. But the speaker has the power — if behind him is a reputation and a character which give force to his utterances — to solidify in the mind of audience — for his cause — this fluid and popular thought. There is no accomplishment which any man can have which will so quickly make for him a career and secure recognition as the ability to speak acceptably.

Eloquence is the master element in politics — the most interesting and absorbing game that human beings play. It is the universal and beneficent agent of civilization and religion. At the bar it is the first dependence of the State and the last hope of the accused. Without its graces no public celebration is complete. For its inspiriting purposes it places science, statistics, poetry, history, and art under contribution.

While a really great orator is as rare as a really great artist or poet, yet the art of effective public speaking, with all its possibilities for individual and general good, is a natural gift to many men, requiring only practice and self-control on their part for its development. It is strange, then, that this art of public speaking is not more cultivated.

CHAUNCEY M. DEPEW.

Orcades. See ORKNEY ISLANDS.

Orcagna, Andrea, a corruption of L'Arcagnola, one of the greatest of the early Italian painters; born in Florence, Italy, about 1316; combined in his works the severity and grandeur of Giotto, which the softness and tenderness of Simone and the Lorenzetti. He was great also as a sculptor and architect. Few of his frescoes have escaped the ravages of time and the restorer, so that they have now little attractions except for art students. His greatest works were, the frescoes in the choir of Santa Maria Novella, hopelessly damaged soon after their completion; frescoes of the "Last Judgment," "Paradise," and "Hell," in the Strozzi chapel; altar piece in the same chapel, executed in 1357; and as sculptor and architect, the tabernacle of the church of Or San Micheli, completed in 1359. Orcagna executed a Mosaic for the cathedral of Ovieto in the following

year. The great frescoes, of "The Triumph of Death," "The Last Judgment, and "Hell," in the Campo Santo of Pisa, are attributed to him by Vasari, whose assertion

ANDREA ORCAGNA.

is stoutly controverted on internal evidence by recent critics. He died in Florence, in or before 1376.

Orchard, an inclosure devoted to the culture of fruit trees, especially the apple, the pear, the plum, the peach, and the cherry. The most suitable position for an orchard is a declivity lying well exposed to the sun and sheltered from the colder winds, but yet not too much shut in. The soil should vary according to the kind of fruit cultivated, and it is generally allowed to produce only grass besides the fruit trees. Fruit cultivation is carried on most extensively on the continent of Europe and the United States; but in Great Britain the area of orchards is comparatively limited, though the flavor of the fruit produced is of the very best. The chief fruit-growing States are New York, Ohio, Michigan, Illinois, Pennsylvania, Delaware, New Jersey, Maryland, Indiana and California.

Orchard House, a glass roofed shed designed for the cultivation of fruits to greater advantage than in the open air. The fruit trees in it are not allowed to attain any great size. They are planted in pots which have a large hole in the bottom, and through this the smaller roots pass to take nourishment from a specially prepared soil below. These roots are cut off after the fruit is gathered, and the trees then rest during the winter.

Orchard of Denmark, the island of Falster, in the Baltic Sea, so named from its great fertility in fruit.

Orchardson, William Quiller, a Scottish genre painter; born in Edinburgh, in 1835, where subsequently he studied under Scott Lauder at the Trustees' Academy; became A. R. A. in 1868, R. A. in 1877, and received a Medal of Honor at the Paris Exposition, in 1878. Best known among his highly popular pictures are "The Challenge" (1865); "The Duke's Antechamber" (1869); "Casus Belli" (1870); "The Protector" (1871); "The Bill of Sale" (1875); "The Queen of the Swords" (1877); "A Social Eddy" (1878); "Hard Hit" (1879); "On Board H. M. S. 'Bellerophon,' July 23, 1815" (1880; bought by the Chantrey Bequest); "Mariage de Convenance" (1884); "After" (1886); "The Salon of Madame Récamier" (1885); "The First Cloud" (1887); and "The Young Duke" (1889). Knighted in 1907.

Orchestra, or **Orchester,** in Greek and Roman theaters, the semi-circular area, included by the straight line which bounded the stage in front of the first row of the ascending steps. In the Greek theater this space was always occupied by the chorus. In Roman comedy there was no chorus; and in Roman tragedies, both the chorus and the musicians were placed upon the stage itself, the whole of the orchestra being reserved for the senators. In modern theaters, etc.: (1) The place where the band, or band and chorus, are placed in modern concert-rooms, theaters, etc. (2) The collection of instruments of varied compass and quality of tone which constitutes a full band. There are no orchestral scores earlier than the latter part of the 16th century, so all statements as to concerted instrumental music before that time are wholly conjectural.

Orchids, plants of the natural order *Orchidcæ,* or *Orchidaceæ,* distinguished from all other orders in the same alliance by their irregular gynandrous flowers and parietal placentæ. The essential peculiarities of the order are due to the consolidation of the stamens and pistil into one body called the column; to the suppression of all the anthers but one in all the genera except those comprising the tribe *Cypripediæ,* in which there are two anthers; to a peculiar condition of the pollen and the structure of the anthers containing it; and to the remarkable forms and development generally assumed by the lip (*labellum*)—one of the inner members of the perianth which often plays an important mechanical part in the fertilizing of orchids. The species are perennial herbaceous plants or shrubs of terrestrial habit in the temperate and colder parts of the world, but in warmer countries become epiphytal, adhering to the stems and limbs of trees, or fixing themselves on rocks by their strong fasciculate roots without penetrating the structure of these or having any direct connection with the soil. Hence they have been popularly named air plants, as those which assume the epiphytal habit derive the greater part of their nutriment from the atmosphere. Their roots are fibrous or fasciculate or fleshy and tuber-like, the latter being peculiar to the ter-

Orchids

restrial species. Their stems are annual, herbaceous, perennial, and woody, and very often pseudo-bulbous. Their leaves are flat or round, equitant, and generally sheathing, often leathery, and having parallel nerves. The flowers are irregular, extremely variable in form, often beautifully colored and deliciously fragrant, and are either solitary or in spikes, racemes, or panicles. They are composed of six usually petal-like segments: the three outer ones are called sepals, and two of the inner ones, which are usually alike in form and color, are called petals; the third inner one, which differs in shape and also generally in direction from the others, is the lip. Opposite to the lip in the axis of the flower is the column, bearing the anther or anthers with the pistil variously situated relatively to each other. The finest features of these plants are represented in the genera *Cypripedium*, or Lady's Slipper (*q. v.*), and *Odontoglossum* (*q. v.*).

Orchids are remarkable for the unusual figure of their irregular flowers, which are so various in form that there is scarcely a common reptile or insect to which some of them have not been likened.

Orchids are found in almost all parts of the world, except in extremely dry climates and on the borders of the frozen regions. In Great Britain are found sixteen genera and nearly forty species. In Europe, the temperate parts of Asia, in North America, and the Cape of Good Hope they are common inhabitants of groves, marshes, and meadows; and in these regions they are invariably terrestrial in habit. In the hot damp parts of the West and East Indies, in Madagascar, and other islands in the same region, in the moist forests of Brazil, the warm parts of Central America, and in Western Mexico they abound in the greatest profusion, no longer dependent on the soil for their nutriment, but clinging to the trunks and branches of trees, to stones and crags, where they vegetate among ferns and other shade-loving plants, or occupy by themselves exclusively the places that they affect. The family is very numerous, including more than 400 genera, classed in five tribes with many sub-tribes, while the species number 6,000 or more. Of exotic species Linnæus (1707-78) knew only about twelve. At least 3,000 species are now cultivated, and countless hybrids and varieties have been produced. The beauty and fragrance of the flowers, the singularity and almost endless variety of form which they exhibit, their interesting structure botanically, and the rarity of many of the choicest species, place orchids among the most remarkable of the families of the vegetable kingdom. For scientific facts regarding the fertilization of orchids it is well to consult the work on that subject by Charles Darwin, who shows that nearly all these plants depend upon insects to remove their pollen masses and thus to fertilize them.

Since the middle of the nineteenth century the cultivation of orchids in America, in Great Britain, and on the European continent, has been an increasing pursuit with wealthy amateurs. The possession of a rare or unique species or variety is an ambition that can seldom be attained except by persons of large means. At times syndicates have been formed for the purpose of collecting and importing orchids from all countries in which rare or otherwise valuable species were known to exist, and nurserymen and private cultivators have sent experts in orchid-collecting to such countries at great expense with the same object in view. Thus there has been a considerable commerce in orchids, involving the annual expenditure of large sums of money.

The cultivation of orchids is accounted a difficult branch of the gardener's art. When the value of an extensive collection of rare kinds is considered, their successful management is at least a responsible undertaking. To be successful in their treatment the cultivator should above all things be well informed regarding the conditions under which each species grows in its native habitat. The prevailing temperature and other atmospheric conditions during the periods of growth and of rest, and the amount of shade or of light to which they are exposed at those seasons, must be known to and comprehended by the cultivator before he can adapt his means to the end in view. Houses or compartments of houses are usually set apart for the accommodation of species that are natives of the more hot and humid regions of the world, such as tropical East India, Madagascar, and Brazil, and a similar arrangement is made for those from Mexico and Central America. The management of the atmosphere of these houses is then based on such knowledge as the cultivator possesses regarding the temperature and moisture, light and shade, that prevail in the countries the several species are natives of. The plants of truly epiphytal habit are usually cultivated on wooden blocks, with or without moss about their roots for the retention of moisture. All classes are also grown in pots or lattice-baskets, in rough fibrous peat and sphagnum moss largely intermixed with charcoal and porous crocks, to secure abundant drainage. Only the terrestrial species are grown in soil proper, and very few of such require the accommodation of special houses.

The propagation of orchids is effected by division of the root-stocks, by separating the pseudo-bulbs in some cases, by cuttings in species of *Dendrobium* and some others with similar forms of growth, and by seed in all cases when it can be obtained, a possibility

that rarely occurs with cultivated plants except they have been artificially fertilized. Increased interest in orchids has been aroused by the success that has attended the efforts of hybridists to unite the desirable features of the flowers of any two species in one form. The pioneers in this branch of orchid culture began to show successful results about the year 1860, since when many hybrid orchids have been brought under cultivation. At that period the culture of orchids, which for nearly half a century had been followed in England, began to spread in the United States. Of the 75 or more American species—most of them terrestrial—it is not difficult to grow the great majority in gardens, due attention being given to shade and other necessary conditions.

Besides Darwin's work above mentioned, the following authorities may be consulted: Lindley, "Folia Orchidacea" (1852); Moore, "Illustrations of Orchidaceous Plants" (1857); Williams, "The Orchid-Grower's Manual" (1885); Sander, "Reichenbachia, Orchids Illustrated and Described" (1886); Rand, "A Complete Manual of Orchid Culture" (1888); White, "Book of Orchids" (1902); Bailey, "Cyclopedia of American Horticulture" (1904).

Orchil. See ARCHILL.

Orchomenus, an ancient city of Bœotia; situated at the N. W. corner of Lake Copais. It extended from the marshy edges of the lake up the face of a steep rock hill, on which stood the acropolis. It sent thirty ships to the Trojan War, and at a later date became a member of the Bœotian confederacy. Its government was thoroughly aristocratic, and after the Peloponnesian War the jealous democratic Thebans destroyed it by fire, and sold its inhabitants as slaves. It was rebuilt in the reign of Philip of Macedon, but never recovered its position. It was famous for its musical festival in honor of the Graces, who were specially worshiped in the city. In 1880 and 1886 Schliemann excavated there an old treasury or royal tomb.

Orcin, in chemistry, $C_7H_8O_2$, orcinol. Exists ready formed in several lichens, and is prepared artificially from orsellic acid by boiling with water for 30 or 40 minutes, $C_8H_8O_4 = C_7H_8O_2$ (orcin) $+ CO_2$. On evaporation the orcin crystallizes in the form of colorless, six sided, monoclinic prisms, which are soluble in water, alcohol, and ether, have a nauseous sweet taste, and melt at 58°. Orcin gradually turns red on exposure to the air. It forms substitution products with chlorine, bromine, and iodine. It yields rhombic crystals.

Ord, Edward Otho Cresap, an American soldier; born in Cumberland, Md., Oct. 18, 1818; was graduated at West Point in 1839; served in the Seminole War till 1842; then till 1861 was on frontier duty. In September, 1861, he was commissioned brigadier-general of volunteers. He defeated Gen. J. E. B. Stuart at Dranesville, Va., Dec. 20, 1861. As major-general he commanded the 13th Army Corps at the capture of Vicksburg and of Jackson (1863). In July, 1864, he was given command of the 8th Army Corps, Army of the James, and he took command of that army in January, 1865, participating in the capture of Petersburg and taking a leading part in the operations that ended in the surrender of Lee. In 1866 he was commissioned brigadier-general in the regular army. He was retired in 1880, and in 1881 was made major-general. He died in Havana, July 22, 1883.

Ordeal, the *judicium Dei* of mediæval writers; the practice of referring disputed questions (especially those touching the criminality of a suspected person) to supernatural decision, in the belief that the Deity would work a miracle rather than the innocent should suffer or the guilty escape punishment. It existed among the Jews. A wife accused of adultery was required to drink "the bitter water that causeth a curse" (Num. v. 12-31), and a strangely similar institution exists at the present day among the negroes of the Gold Coast of Africa; and ordeal in some form or other is still practised by races of low culture, and by individuals of low culture among races standing in the forefront of civilization. In the Middle Ages in Europe ordeal was sanctioned both by civil and the ecclesiastical authorities, and was chiefly of three kinds: 1. By fire—a survival from the early classic times, in which the accused had to walk barefoot and blindfolded over red-hot plowshares, or to take up and carry a piece of red-hot iron a certain distance. This method was allowed only to persons of high rank. 2. By water, for persons of the middle and lower classes. This was of two kinds. The accused had to take a stone out of boiling water, and if, after a certain time, his arm presented no marks of injury, he was adjudged innocent. In the second case—a common method when witchcraft was alleged—the accused, bound hand and foot, was thrown into a river or pond, and it was believed that a guilty person would float without effort, and that an innocent person would infallibly sink. 3. Wager of battle. Besides these three principal methods there were three others in less general use: A supposed murderer was required to touch the body of the murdered man, and was pronounced guilty if blood flowed from the wounds; the ordeal of the eucharist, in which divine judgment was supposed to follow unworthy reception of the sacrament; and the Corsned (*q. v.*).

Ordeal Bean. See CALABAR BEAN.

Ordeal Root, the root of a species of *Strychnos*, used in trials by ordeal by native tribes of Western Africa. Such ordeals are described by travelers as being extremely horrible.

Ordeal Tree, in botany: Of Guinea, *Erythrophlœum guineense;* of Madagascar, *Cerbera tanguin.* The fruit, which is poisonous, is given in some kind of broth to the accused person. If he recover, he is deemed innocent; if he die, this is to be held to prove his guilt. On May 9, 1830, the then reigning Queen of Madagascar administered the ordeal to about 30 men, some noblemen and others of the common people, who were accused of sorcery. The former recovered, the latter died. Certain women, subjected to the same ordeal in April, all recovered.

Order, in archæology, the different modes of architectural treatment adopted by the ancients in constructing their public edifices and buildings of the higher class. They are usually separated into five, principally distinguished from each other by the proportions of their columns and the kind of capitals employed, but also by the relative proportions and decorative parts of their entablatures, as well as other minor features. They are known as the Doric, Ionic, Corinthian, Tuscan and Composite. In ecclesiastical affairs, in the Roman Church, "a Sacrament of the New Law by which spiritual power is given, and grace conferred for the performance of sacred duties." The Council of Trent (sess. xxiii.) asserted, and anathematized those who denied (1) That there was a real priesthood in the New Law; (2) that, besides the priesthood, there were grades of orders; (3) that Order was a Sacrament instituted by Christ; (4) that the Holy Ghost was given and a character conferred at ordination; (5) that unction was properly used in ordination; (6) that there was a divinely appointed hierachy in the Roman Church; (7) that bishops were superior in power to priests, and were the ministers of Confirmation and Order; and (8) that bishops appointed by the Roman Pontiffs were true and legitimate bishops. The doctrine of Apostolical Succession is a necessary deduction from the view that Order is a Sacrament. Orders in the Roman Church are divided into two classes: Sacred, or Major, and Minor Orders. Some theologians regard the episcopate as the completion and extension of the priesthood, while others consider it a separate order. In the East the number of orders has varied at different times, but in the Greek, Coptic, and Nestorian Churches the orders recognized are those of bishop, priest, deacon, subdeacon, and reader. Anglicans acknowledge three: bishops, priests, and deacons. The validity of Anglican Orders is denied by the Roman Church. English clerics entering that church, and wishing to become priests, must be ordained by a Roman bishop. In geometry, rank or class. In analysis, magnitudes are classed into orders, depending upon the degree of their equations. All algebraic magnitudes whose equations are of the first degree are of the first order; those whose equations are of the second, third, etc., degrees, are respectively of the second, third, etc., orders. In natural science, the designation given to the division immediately below a class or sub-class and next above a tribe or a family. In rhetoric, the placing of words and members in a sentence in such a manner as to contribute to force and beauty of expression, or to the clear illustration of the subject.

Ordericus Vitalis, an Anglo-Norman historian, born in the neighborhood of Shrewsbury, England, in 1075, his mother being English, his father Norman. He received his education in the Abbeys of St. Evroul (Normandy), where the name Vitalis was conferred on him, and in due time became a priest. He wrote in Latin an ecclesiastical history in 13 books, from the birth of Christ down to his own time. The later books are valuable to the historical student, as they offer a good description of the life and times of William II., and of the first of the Crusades. He died after 1143.

Order of the Day, in legislative language, a bill or other matter which has been ordered to be discussed on a particular day. The term is also used in the same sense in the proceedings of municipal bodies.

Orders, Military, fraternities or societies of men banded together in former times for military and partly for patriotic or Christian purposes. Free birth and an irreproachable life were the conditions of admission. The chief were the Templars, the Teutonic Knights, and the order of St. John of Jerusalem.

Orders, Religious, associations, the members of which band themselves to lead strict and devotional lives, and to live separate from the world. Prior to their formation there were only the hermits or anchorites (see MONASTERY). The entry into religious orders from their foundation to the present time, is preceded by the taking of the monastic vow, which enjoins residence in a monastery, celibacy, renunciation of worldly pleasures, the duty of prayer, fasting, and other austerities, and unconditional obedience to superiors. These conditions form the basis of the majority of orders, some being more austere in their

observances than others. The first properly constituted religious order was founded in the 4th century by St. Basil. The Basilians are now chiefly confined to the Greek Church in the East. In the time of Justinian (530), St. Benedict established a new order, the Benedictines, under a set of rules based principally on those of St. Basil, and for some 600 years after the greatest number of European monks followed his statutes. According to some authorities as many as 23 orders sprang from this one. About 1220 the Dominicans and Franciscans originated by taking amended rules from their leaders. These rules, especially those of the Dominicans, were more austere, including perpetual silence, total abstinence from flesh, and the wearing of woolen only, and they were not allowed to receive money, and had to subsist on alms, being thus "mendicant" orders. The orders mentioned are the fountain heads of numerous others which arose to accommodate the changing times, the altered conditions of countries, and the particular policies of the Church. Modified orders of the Benedictines are, for instance, the Camaldulians or Camaldolites, the Carthusians, the Celestines, the Cistercians, the Bernardines, Feuillants, Recollets, the nuns of Port Royal, and the Trappists. The reputed rules of St. Augustine were accepted by a large number of religious orders, but the monks who were reckoned among the laity in the 7th century, could not adopt them, as they were designed for the clergy only. In the 8th century the monks began to be viewed as members of the clerical order, and in the 10th, by receiving permission to assume the tonsure, they were formally declared clergymen. Indeed, public opinion and several papal bulls placed them as superior in sanctity, above the secular clergy, who for this reason often became monks. The Præmonstratenses, Augustines, Servites, Hieronymites or Jeronymites, Jesuits, and Carmelites are regular orders, according to the rules of St. Augustine. Suborders of the Franciscans are the Minorites, Conventuals, Observatines, Fraticelli, Cordeliers, Capuchins, Minims, etc. As the secluded life of the monks, soon after the origin of monasteries, had given rise to similar associations of pious females, so nuns commonly banded together as new orders of monks arose, and formed societies under similar names and regulations. Thus there were Benedictine, Camaldulian, Carthusian, Cistercian, Augustine, Præmonstratensian, Carmelite, Trinitarian, Dominican, Franciscan nuns, and many other orders of regular canonesses. There were also congregations of nuns who united with certain orders of monks without adopting their names. The Ursuline and Hospitaller nuns, or Sisters of Mercy, are female orders existing independently of any male orders, and living according to the rules of St. Augustine. Almost all the important religious orders received new accessions in the lay brethren and lay sisters, who were taken to perform the necessary labors of the monasteries, and to manage their intercourse with the world. The orders first established governed themselves in an aristocratico-republican manner. The Benedictine monasteries were long independent of one another. The Cistercians obeyed a high council made up of the superior, and other abbots and counsellors, and these were again responsible to the general chapters. The four mendicant orders, the Dominicans, Franciscans, Augustines, and Carmelites, at their very commencement placed themselves in a much more intimate connection with the Popes. Dependent solely and immediately on Rome, they preserved the strictness of their organization with a success which could be maintained only by the unity of the ruling power and the blind obedience of the subjects. Most of the other orders soon adopted the same constitution. Accordingly at the head of every religious order stands a general or governor, who is chosen every three years from the officers of the institution, resides at Rome, and is responsible only to the Pope. The counsellors of the general are the officers to whom the supervision and government of monasteries is committed.

Orders in Council, orders by the ruling sovereign with the advice of the privy council. See PRIVY COUNCIL.

Ordinal, the prescribed form of service used at the ordination of clergy, as in the English, Roman Catholic, and Eastern Churches. The ordinal of the English Church was originally drawn up in the time of Edward VI. It was altered to some extent in the reign of Queen Elizabeth, and again revised in 1661.

Ordinance of 1784. At the close of the American Revolutionary War, it was regarded as unjust that the States having unsettled Western possessions should hold the same solely for their own benefit, and it was agreed that these should be ceded to the general government. In 1784 Jefferson presented to the Continental Congress, at Philadelphia, Virginia's cession of all her territory N. W. of the Ohio, and submitted a plan for the government of that tract and of any other that might be ceded within certain geographical limits. This is known as the Ordinance of 1784. Among other regulations it provided for the abolishment of slavery in the territory after the year 1800, but this section was not adopted.

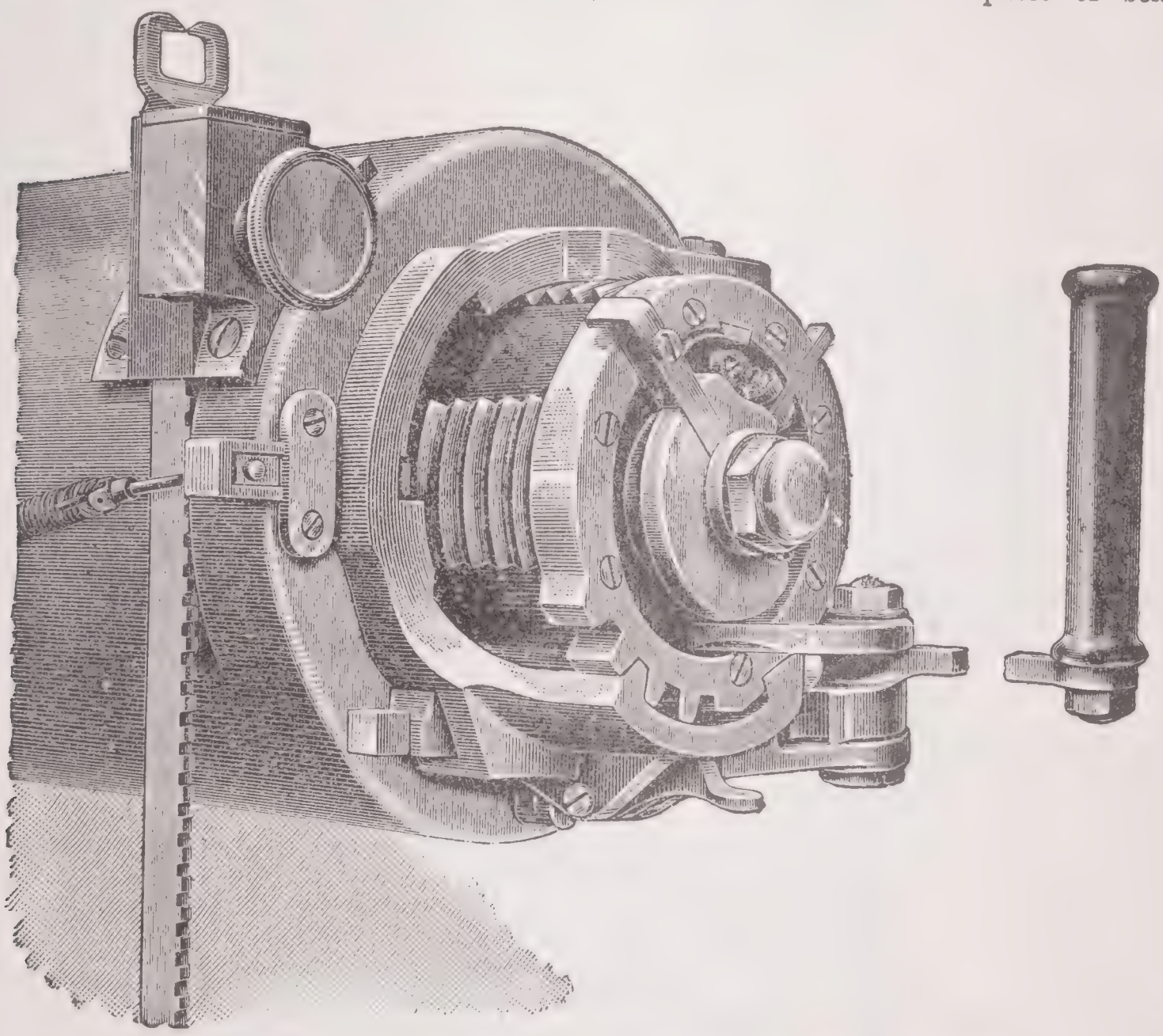
Ordinance of 1787. An ordinance for the government of the territory of the

United States N. W. of the Ohio river; passed by the last Continental Congress in New York, in 1787. It provided among other things for the immediate abolition of slavery in the territory and for the return of fugitive slaves to their masters.

Ordinary, or **Ordinarie,** in heraldry, a term indicating an addition to a coat of arms. The ordinaries proper are nine in number, viz., the chief, pale, bend, bend sinister, fess, bar, chevron, cross, and saltier. The name is also applied to the lesser ordinaries or subordinates, such as the gyron, pile, orle, tressure, etc. In civil law, a judge who has authority to take cognizance of causes in his own right, and not by deputation. In common and canon law, an ecclesiastical judge; one who has ordinary and immediate jurisdiction in ecclesiastical matters. In the Church of England the Bishop is the ordinary of his own diocese and the two archbishops are the ordinaries of their respective provinces.

Ordinate, in analytical geometry, the ordinate of a point is one of the elements of reference, by means of which the position of a point is determined with respect to fixed straight lines, taken as coördinate axes. The ordinate of a point to a diameter of a conic section is the distance of the point from that diameter, measured on a line parallel to a tangent drawn at the vertex of the diameter. The ordinate to a diameter is equal to half the chord through the point which is bisected by the diameter.

Ordination, the act of conferring the sacrament of order in the Roman Catholic Church. Women are incapable of being validly ordained (I Cor. xiv: 34; I Tim. ii: 11, 12). Ordination is, in the normal course of things, conferred by bishops, but abbots may confer minor orders on their subjects. Dismissory letters are necessary if a man is to be ordained for a diocese other than that in which he was born, and he must have legitimate and sufficient title. Ordination to sacred orders, according to the general law of the Church, can only take place on the Saturdays in the four Ember weeks, on the fifth Saturday in Lent, or on Holy Saturday, and always during mass. Minor orders can be conferred at general ordinations, and also on any Sunday or

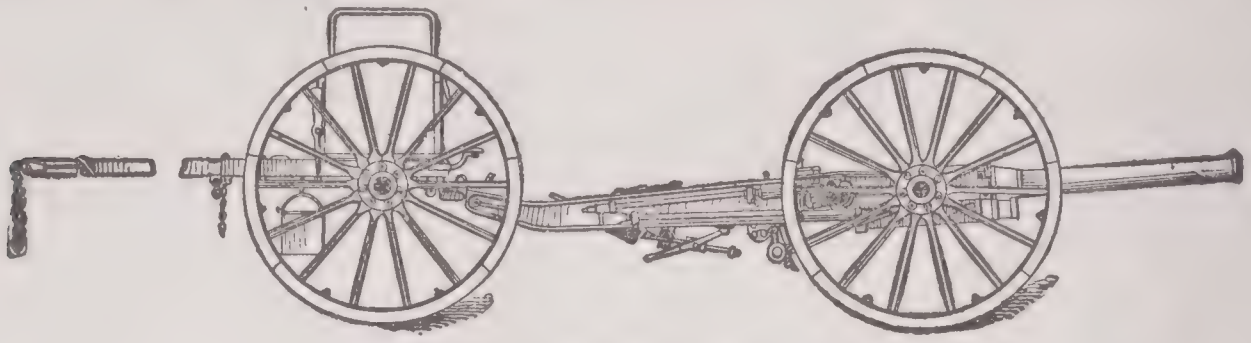


ORDNANCE—BREECH-LOADING RIFLE, BREECH PARTLY CLOSED.

holiday, not necessarily during mass. The Council of Trent enjoins that sacred orders should be publicly conferred in the cathedral or in one of the principal churches of the diocese, in the presence of the canons, but custom has sanctioned a departure from the practice when a reasonable cause exists. Regulars are usually ordained in their monasteries.

In the United States Protestant churches have each their own method of ordination, which is rather a service of consecration than a sacrament imparting special power. The ordination in the Episcopal Church is patterned largely after that of the English Episcopal Church.

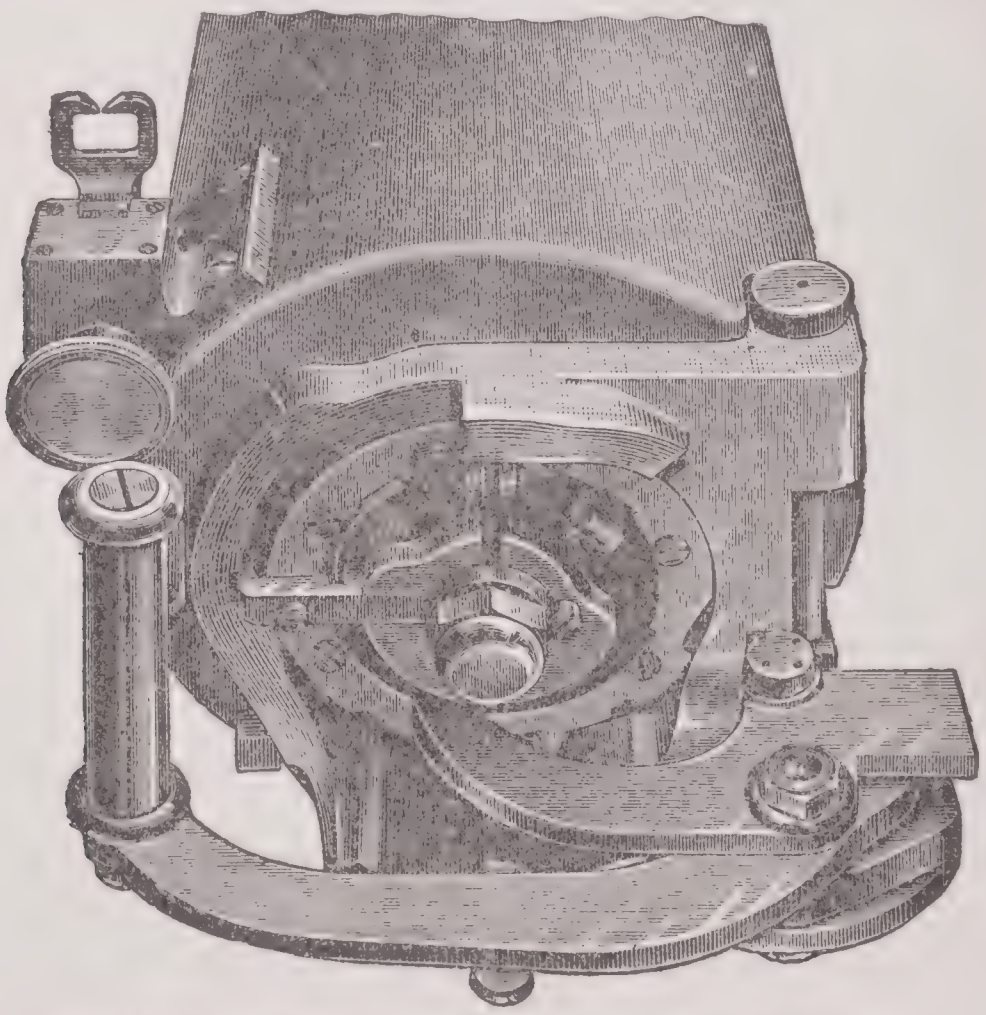
Ordnance, military guns of the larger class; artillery; also called rifles, guns, cannon. There are a great many varieties, among which may be named the "field piece," a light rifled cannon mounted on wheels and arranged to be drawn by horses. They are rarely larger than three inches in the bore, and are intended for rapid movements. The "howitzer," a short gun of comparatively large bore, also the "mortar," are employed mainly in siege work.



ORDNANCE—CREUSOT FIELD GUN.

The "siege" gun is a heavy rifled cannon mounted on wheels to admit of its being transported across the country by horses.

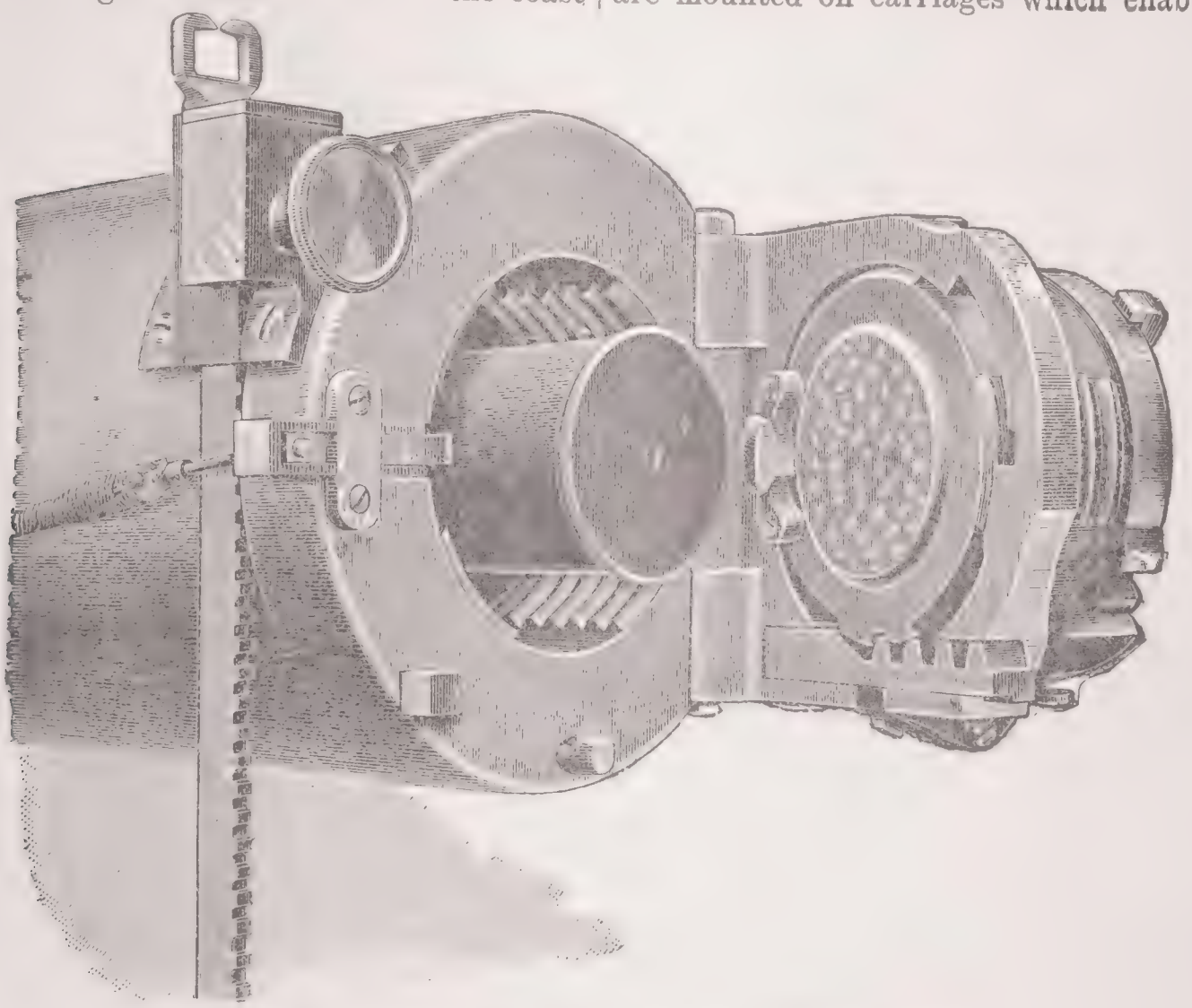
The carronade was a short cast-iron, smooth-bore gun, made at Carron, Scotland, having thinner metal than guns of similar caliber. Carronades had powder chambers, but no swell to the muzzle and no trunnions, being attached to a carriage by a bolt passing through a loop on the under side of the piece. They were formerly used to throw large shot up to 600 yards.



ORDNANCE—BREECH-LOADING RIFLE, BREECH CLOSED.

The United States Navy Department has adopted the 13-inch as its largest gun for mounting in the turrets of the heaviest battleships. This gun weighs 60½ tons; length 40 feet, greatest diameter 4 feet 11

inches, total length of bore 37 feet 10½ inches, twist of rifling 0 to 1 turn on 25 calibers, number of grooves 52, weight of charge 550 pounds of brown prismatic powder, or about half as much smokeless powder, weight of projectile 1,100 pounds, chamber pressure 15 tons, muzzle velocity 2,300 feet per second, muzzle energy 40,338 foot tons, thickness of steel which shell will perforate at 1,500 yards, 23.42 inches, range at 40° elevation, 10 miles. The cost of the 13-inch gun is less than half that of the 16-inch, and it can be fired at least four times oftener. The largest caliber in use in the coast defenses of the United States is 12-inch, though an experimental 16-inch gun has recently been completed, as has also an 18-inch torpedo gun. This 16-inch gun is 49½ feet long, weighs 130 long tons and throws a shell of 2,400 pounds with a velocity of 2,300 feet, giving a muzzle energy of 87,344 foot tons. The other guns of this type are the 12-inch, 10-inch, and 8-inch. The next class embraces the "rapid fire" and "machine guns." The former are made in sizes from 6-inch down to 1-inch. They are much longer in proportion to bore than the heavy guns above mentioned. All of the above guns are made in sections of steel, and consist of a central tube, over which are shrunk bands or hoops of steel, till the desired strength is attained. The machine-gun has developed of late years to a remarkable degree of perfection, some types having been handled in "service" up to 800 shots per minute, and on test to even greater speed. All of these modern guns are loaded at the breech, the ball or shell going in first, followed by the powder. The breech is then closed by a plug, which is screwed in by proper machinery. The Creusot gun, which caused the British so much trouble at the opening of the Boer war in October, 1899, was constructed at the Creusot works and was purchased by the Boers in 1896. "Disappearing" guns are mounted on carriages which enable the gun to be elevated from a fort to discharge its contents, and then to descend into its pit out of sight of the enemy, there to be reloaded for repeating the fire, thus reducing the chances of dismounting and of injury to the gunners. Many of these guns are now mounted in various sea-coast fortifications of the United States. See also GUN; GUN BATTERY; GUNNERY; MACHINE GUN; MORTAR.



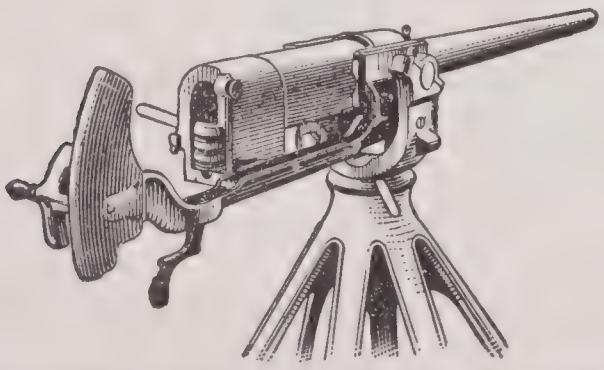
ORDNANCE—BREECH-LOADING RIFLE, BREECH OPEN.

E. L. ZALINSKI.

Ordnance, Department of, in the United States, a department attached to the War Department, and controlled by a Chief of Ordnance (who, while thus acting, has the rank of brigadier-general), with a large force of officers and clerks. By the army bill of 1901, line officers are detailed to the department for a period of four

years. It is the duty of the department to provide, preserve, and distribute all arms and munitions for the army and militia. The department, therefore, directs the establishment and maintenance of armories, arsenals, and depots for the storage and manufacture of large and small arms and all necessary stores. In Great Britain the ordnance department, which for over 400 years provided the army and navy with all arms and ammunition, administered the affairs of the artillery and engineer regiments, executed fortifications and other works at home and abroad, and supplied all troops at home with forage, was abolished during the Crimean War (May 25, 1855), and its functions were divided between the War Office and the Horse Guards. See ORDNANCE.

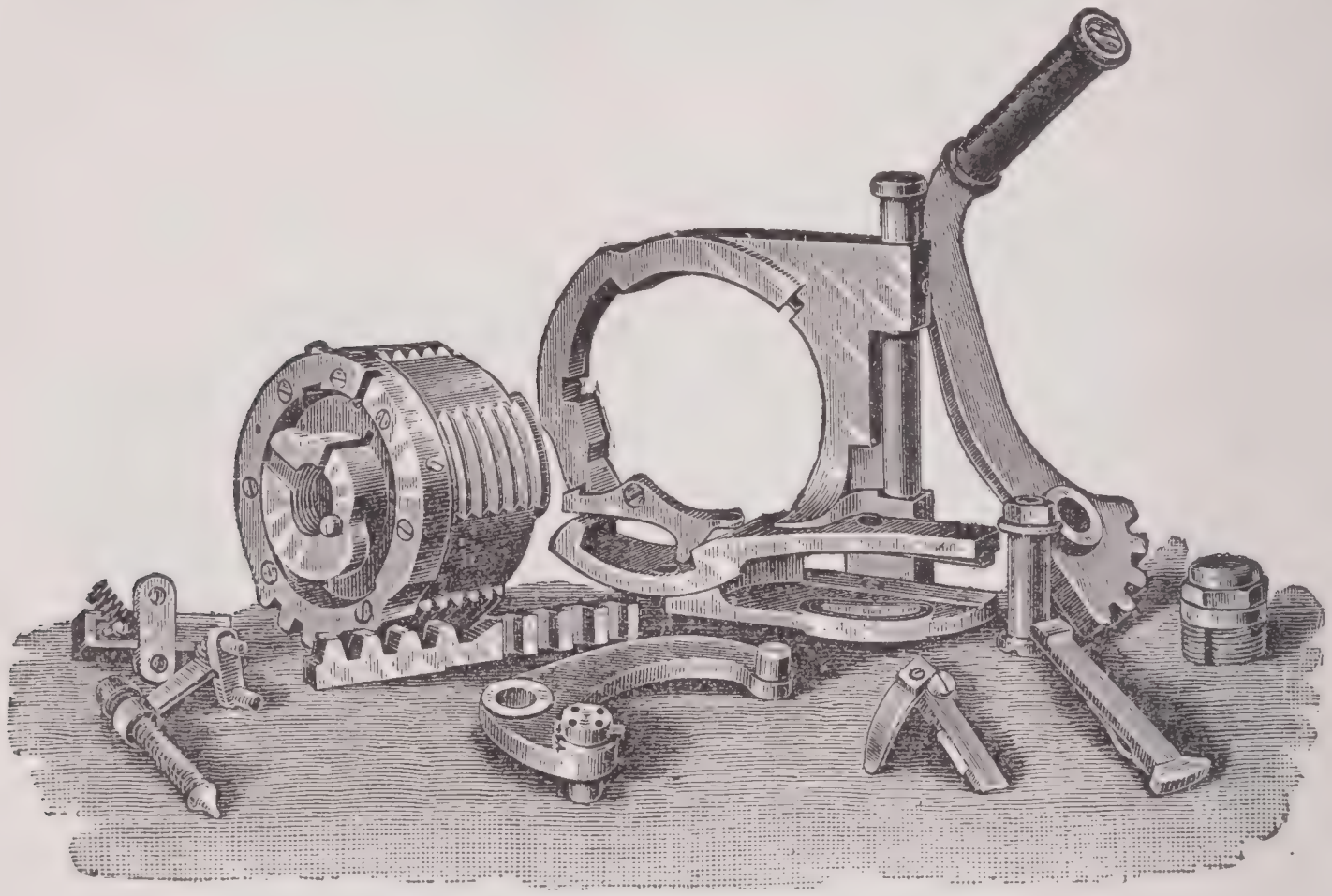
E. L. ZALINSKI.



ORDNANCE—DRIGGS-SCHROEDER 6-POUNDER.

Ordovician, a name sometimes given to a geological formation intermediate between Cambrian and Silurian; otherwise accounted the Lower Silurian strata. It is so called from the Ordovices, an ancient British tribe.

Ore, substances found in the earth from which metals are obtained by various processes, but chiefly by roasting and smelting. Ore consists of metals mineralized by chemical combination with one or more of the non-metallic elements. The principal ores are combinations of metal with sulphur, forming sulphides; with chlorine, forming chlorides; with oxygen, forming oxides; and



ORDNANCE—BREECH PARTS OF BREECH-LOADING RIFLE.

with carbonic, silicic, sulphuric, arsenic, and phosphoric acids, forming carbonates, silicates, sulphates, arsenates, and phosphates. Generally speaking, however, all mineral substances containing metals, combined or free, are called ores. They are found in veins or lodes, in bedded masses, and also disseminated in rocks of all ages, both igneous and stratified sedimentary. In the latter, the ores of iron and manganese are the most abundant, and often found in beds of large extent. Some ores, as well as native metals, are also found in alluvial deposits; gold, platinum, etc., in those known as placers. Placer products, sometimes called placer ores, have been derived from the degradation and wearing away of older rocks, the minerals having been washed out and redeposited by the agency of water. Were it not for the fact that much of the gold and silver bearing ores found in the Rocky Mountains is of too low a grade to work profitably, the product of those metals would have been much

OREGON

SCALE OF MILES

0 10 20 30 40 50 60

State Capital ⊛ County Seats

Railroads ——— Stage Lines ——— Automobile

Size of type indicates relative importance of places

A 124 B 123 C 122 D 121 Longitude

1 2 3 4 5 6 Latitude 46 45 44 43 42

PACIFIC OCEAN

Astoria Clatsop Gearhart Seaside Melville Olney Westport Clifton Svensen Marshland Clatskanie Inglis Goble Rainier Carrollton Mayger Quinn Cathlamet Brookfield Knappton Pt.Adams Ft.Stevens Hammond Warrenton Columbia R. Bay

CLATSOP COLUMBIA

Jewell Push Keasey Pittsburg Carico St Helens Houlton Deer Island Columbia City Apiary Mist Reuben Kalama Ridgefield Warren Scappoose Kist Vernonia Elsie Nehalem Timber Buxton Glenwood Felida Vancouver Lyle Stevenson Cascades Wyeth Viento Cascade Locks Bonneville Warrenda Dee The Dalles Bridal Veil Latourell Falls Mt. Hood Orient Alms Sandy Boring Barton Salmon Endersly Dufur Boyd Erskine Friend Kingsley Tygh Valley Wamic Smock Victor Wapinitia Bakeoven

C.Falcon C.Meares C.Lookout C.Foulweather Yaquina Hd. Cascade Hd. Heceta Hd. C.Arago Coos Hd. C.Blanco C.Ferrelo C.Sebastian

Tillamook B. Barnegat Sandlake Nestucca B. Siletz B. Yaquina B. Alsea B. Winchester B. Coos B. Coquille R. Bullards Bandon Prosper Parkersburg Port Orford Illinois R. Rogue River Smith River

TILLAMOOK YAMHILL CLACKAMAS MULTNOMAH HOOD RIVER WASCO

Foley Wilson Hobsonville Bay City Tillamook Barnegat Trask Spruce Blaine Beaver Woods Oretown Neskowin Pittner Butler Buell Grandronde Ind. Res. Ronde Dolph Grande Ronde Hebo Sheridan Willamina McMinnville Whiteson Amity Lafayette Sher. Jo. Carlton St Joseph Newberg Yamhill N. Yamhill Middleton Rex Springbrook Dundee Champoeg Hubbard Needy Macksburg Clarkes Molalla Woodburn McKee Mt. Angel Silverton Butte Cr. Wilhoit Oregon City New Era Canby Aurora Currinsville Estacada Cazadero Clackamas R. Salmon R. Mt. Hood 11,225 ft. Kingsley Wamic Smock White R. Victor Wapinitia Bakeoven

SILETZ IND. RES. Kernville Roots Falls City Black Rock Siletz R. Kings Valley Roseca Siletz Airlie Parker Silver Wells Granger Corvallis Elk City Eddyville Norton Summit Wren Glen Harlan Tidewater Philomath Bayview Waldport Angora Bruce Alsea Ocean View Fisher Monroe Dallas Independence Monmouth Falls City Perrydale Ballston Pedee Polk Salem Macleay Aumsville Hullt Turner Stayton Mehama Gates Elkhorn Niagara Mill City Lyons Rox Valley Detroit Idanha Shitike Cr. Warmsprings INDIAN RES. Simnasho Mutton Mts. Warm Spr. WARM SPRINGS Ollallie Butte R. Ridge Deschutes R.

Albany Tallman Lacomb Lebanon Tangent Waterloo Sweet Home Cascadia Brownsville Foster Santian Crawfordsville Halsey Harrisburg Mabel Shedds Sodaville Thomas Crabtree Shelburn Scio Kingston Buenavista Marion Jefferson Granger Wells Silver Airlie Parker Mt. Jefferson 10,206 Metolius R. Haystack Culver Lamonta Madras Sicsequa Cr. Three Fingered Jack Mt. Washington McKenzie Bridge Wendling Luckyboy North Sister Middle Sister South Sister Blue River Vida Walterville Camp Creek Foley Springs Tumalo Bend Laidlaw Redmond Cline Falls Sisters Crooked R. Deschutes R. Lava

LINN BENTON

Yaquina Toledo Newport Chitwood Siletz Roseca Kings Valley Airlie Parker Silver Wells Granger Corvallis Elk City Eddyville Norton Summit Wren Glen Harlan Tidewater Philomath Bayview Waldport Angora Bruce Alsea Ocean View Fisher Monroe Albany Tallman Lacomb Lebanon Tangent Waterloo Sweet Home Cascadia Brownsville Foster Santian Crawfordsville Halsey Harrisburg Mabel Shedds Sodaville Thomas Crabtree Shelburn Scio Kingston Buenavista Marion Jefferson Granger Wells Silver Airlie Parker Mt. Jefferson 10,206 Metolius R. Haystack Culver Lamonta Madras Sicsequa Cr. Three Fingered Jack Mt. Washington McKenzie Bridge Wendling Luckyboy North Sister Middle Sister South Sister Blue River Vida Walterville Camp Creek Foley Springs Tumalo Bend Laidlaw Redmond Cline Falls Sisters Crooked R. Deschutes R. Lava

LINCOLN

Yaquina Toledo Newport Chitwood Elk City Eddyville Norton Summit Wren Glen Harlan Tidewater Philomath Bayview Waldport Angora Bruce Alsea Ocean View Fisher Monroe Minnie Samaria Reed Blachly Junction City Goldson Irving Deadwood Alpha Elmira Swisshome Minerva Mapleton Walton Hale Eugene Heceta Pt. Terrace Florence Glenada Meadow Ivison Crow Madison Goshen Acme Ord Mohawk Jc. Natron Jasper Fallcreek Lowell Dexter June Walker Saginaw Creswell Panther Alma Mound Siuslaw Gardiner Sulphur Springs Cottagegrove Smiths R. Comstock Scottsburg Divide Dorena Star Leona Anlauf Drain Boswell Wildwood Disston Bonita Hazeldell Kelsey Waldo L. West Fk. East L. Pauline L. Rosland Davis L. Maiden Pk. Odell L. Crescent L. Odell Summit L. Cowhorn Sawtooth North Fk. Diamond L. Mt. Thielsen Peel Dixonville Winchester Glide Hoaglin Wilbur Oakland Millwood Coles Valley Cleveland Melrose Rosenburg Dora Sikkum Fairview Beaver Hill Jc. Beaver Hill Sumner Coos R. Marshfield Allegaby Empire North Bend Coos B. Coquille Arago Gravelford Reston Tenmile Dillard Olalla Myrtlepoint Remote Bridge Canas Valley Myrtlecreek Ruckles Whiterock Mt. Riddles Azalea Days Creek Nugget Umpqua R. Perdue Tiller Drew Canyonville Galesville Hobbsford Starvout Dothan Glendale Marial Wolf Creek Asbestos Grave Trail Onion Sprs. Mt. Leland Gallice Hugo Winona Wimer Merlin Beagle Bigbutte Rustler Pk. Peyton Leads Ulvstad Prospect Union Pk. Crater L. Huckleberry Mt. Klamath Marsh Summer Lake Silver Cr. Bear Cr. Bridge Cr. Silverlake Rimrock Mts. Sycon River Marsh Sycon R. Fuego Mt. Ft. Klamath Klamath Agency Pelican Saddle Mt. Big or Upper Klamath Lake Sprague R. Yainax Bly Royston Dairy Klamath Falls Olene Bonanza Vistillas Lorella Bedfield Tule Lake Merrill Langells Valley Lost R. Rhett or Tule L. Lower Klamath Lake Snow a Pokegama Pk. Hot Springs Hilts Colestin Siskiyou Soda Spring Shake Barron Ashland Talent Buncom Ruch Applegate Dryden Kerby Williams Davidson Jacksonville Medford Agate Eaglepoint Centralpoint Lakecreek Mt. Pitt Woodville Rockpoint Sams Valley Grants Pass Wilderville Wonder Murphy Goldhill Toloa Draper Selma Siskiyou Illinois R. Illinois Rogue R. Rogue Agness Illahe Corbin Ophir Wedderburn Goldbeach Harbor Mt. Emery Chetco R. Chetco Pistol R. Deering Takilma Waldo Browntown Steamboat Watkins Monumental Alma Mound Panther Creswell Walker Saginaw Dexter June Lowell Wimble Cr. Middle Fk. Kelsey Waldo L. West Fk. East L. Pauline L. Rosland Davis L. Maiden Pk. Odell L. Crescent L. Odell Summit L. Cowhorn Sawtooth North Fk. Diamond L. Mt. Thielsen Peel Dixonville Winchester Glide Hoaglin Wilbur Oakland Millwood Coles Valley Cleveland Melrose Rosenburg Dora Sikkum Fairview Beaver Hill Jc. Beaver Hill Sumner Coos R. Marshfield Allegaby Empire North Bend Coos B. Coquille Arago Gravelford Reston Tenmile Dillard Olalla Myrtlepoint Remote Bridge Canas Valley Myrtlecreek Ruckles Whiterock Mt. Riddles Azalea Days Creek Nugget Umpqua R. Perdue Tiller Drew Canyonville Galesville Hobbsford Starvout Dothan Glendale Marial Wolf Creek Asbestos Grave Trail Onion Sprs. Mt. Leland Gallice Hugo Winona Wimer Merlin Beagle Bigbutte Rustler Pk. Peyton Leads Ulvstad Prospect Union Pk. Crater L. Huckleberry Mt. Klamath Marsh Summer Lake Silver Cr. Bear Cr. Bridge Cr. Silverlake Rimrock Mts. Sycon River Marsh Sycon R. Fuego Mt. Ft. Klamath Klamath Agency Pelican Saddle Mt. Big or Upper Klamath Lake Sprague R. Yainax Bly Royston Dairy Klamath Falls Olene Bonanza Vistillas Lorella Bedfield Tule Lake Merrill Langells Valley Lost R. Rhett or Tule L. Lower Klamath Lake Snow a Pokegama Pk. Hot Springs Hilts Colestin Siskiyou Soda Spring Shake Barron Ashland Talent Buncom Ruch Applegate Dryden Kerby Williams Davidson Jacksonville Medford Agate Eaglepoint Centralpoint Lakecreek Mt. Pitt Woodville Rockpoint Sams Valley Grants Pass Wilderville Wonder Murphy Goldhill Toloa Draper Selma Siskiyou Illinois R. Illinois Rogue R. Rogue Agness Illahe Corbin Ophir Wedderburn Goldbeach Harbor Mt. Emery Chetco R. Chetco Pistol R. Deering Takilma Waldo Browntown Steamboat Watkins Monumental

DOUGLAS JACKSON JOSEPHINE CURRY KLAMATH LAKE

CASCADE RANGE

Deschutes Crook Lake Klamath Jackson Josephine Douglas Coos Curry

Willamette R. Santiam R. Calapooia Mts. Coast Fk. Middle Fk. North Fk. Siuslaw R. Umpqua R. Rogue River Mts. Applegate Mts. Siskiyou Mts. Klamath R. Williamson R. Sycon R. Deschutes R. Crooked R. Metolius R. Willow Cr. Shitike Cr. Sicsequa Cr. Squaw Cr. Middle Sister Three Fingered Jack Mt. Washington North Sister Mt. Jefferson Haystack Culver Lamonta Madras Redmond Cline Falls Sisters Tumalo Bend Laidlaw Deschutes Lava Kelsey Waldo L. West Fk. East L. Pauline L. Rosland Davis L. Maiden Pk. Odell L. Crescent L. Odell Summit L. Cowhorn Sawtooth North Fk. Diamond L. Mt. Thielsen Peel Dixonville Winchester Glide Hoaglin Wilbur Oakland Millwood Coles Valley Cleveland Melrose Rosenburg Dora Sikkum Fairview Beaver Hill Jc. Beaver Hill Sumner Coos R. Marshfield Allegaby Empire North Bend Coos B. Coquille Arago Gravelford Reston Tenmile Dillard Olalla Myrtlepoint Remote Bridge Canas Valley Myrtlecreek Ruckles Whiterock Mt. Riddles Azalea Days Creek Nugget Umpqua R. Perdue Tiller Drew Canyonville Galesville Hobbsford Starvout Dothan Glendale Marial Wolf Creek Asbestos Grave Trail Onion Sprs. Mt. Leland Gallice Hugo Winona Wimer Merlin Beagle Bigbutte Rustler Pk. Peyton Leads Ulvstad Prospect Union Pk. Crater L. Huckleberry Mt. Klamath Marsh Summer Lake Silver Cr. Bear Cr. Bridge Cr. Silverlake Rimrock Mts. Sycon River Marsh Sycon R. Fuego Mt. Ft. Klamath Klamath Agency Pelican Saddle Mt. Big or Upper Klamath Lake Sprague R. Yainax Bly Royston Dairy Klamath Falls Olene Bonanza Vistillas Lorella Bedfield Tule Lake Merrill Langells Valley Lost R. Rhett or Tule L. Lower Klamath Lake Snow a Pokegama Pk. Hot Springs Hilts Colestin Siskiyou Soda Spring Shake Barron Ashland Talent Buncom Ruch Applegate Dryden Kerby Williams Davidson Jacksonville Medford Agate Eaglepoint Centralpoint Lakecreek Mt. Pitt Woodville Rockpoint Sams Valley Grants Pass Wilderville Wonder Murphy Goldhill Toloa Draper Selma Siskiyou Illinois R. Illinois Rogue R. Rogue Agness Illahe Corbin Ophir Wedderburn Goldbeach Harbor Mt. Emery Chetco R. Chetco Pistol R. Deering Takilma Waldo Browntown Steamboat Watkins Monumental

CALIFORNIA

WASHINGTON
OREGON
IDAHO
NEVADA
GILLIAM
MORROW
UMATILLA
UNION
WALLOWA
WHEELER
GRANT
BAKER
MALHEUR
HARNEY
120
F
119
G
118
H
117
J
1
2
3
4
5
6
46
45
44
43
42
from 120 Greenwich
Kennewick
Pasco
Hunts Jc.
Wallula
O.R.R.& N. CO.
Walla Walla
Walla Walla R.
S. P. & Expansion
RIVER
Irrigon
Roosevelt
Castle Rock
Willows
Arlington
Blalock
Quinton
Rock Creek
Olex
Mikkalo
Ajax
Gwendolen
Clem
Alville
Condon
Mayville
Trailfork
Lonerock
John Day
Cecil
Ella
Galloway
Morgan
Strawberry
Ione
Lexington
Willow Cr.
Heppner
Eightmile
Gooseberry
Rays Fk.
Hardman
Gurdane
Umatilla
Hermiston
Holdman
Juniper
Killian Jc.
Freewater
Hilldale
Milton
Weston
Helix
Myrick
Athena
Adams
Briggson
Tanks
Pendleton
Echo
Butter Cr.
Umatilla R.
Cayuse
Gibbon
Pilot Rock Jc.
Indian Res.
Duncan
Pilotrock
McKay
Meacham
Nye
Vinson
Ridge
Alba
Ukiah
Comas Cr.
Lehman
Kamela
Hilgard
Starkey
La Grande
Grande Ronde
Summerville
Imbler
Alice
Elgin
Island City
Cove
Tule L.
Union
Hotlake Sta.
Telocaset
Medical Springs
North Powder
Course Cr.
Grouse
Bartlett
Troy
Paradise
Flora
Appleton
Promise
Grossman
Eustis
Lovely
Chico
Eureka
Copper
Zumwalt
Imnaha
Imnaha R.
Wallowa
Wallowa R.
Lostine
Enterprise
Joseph
Wallowa L.
Fruita
Minam R.
Powder River Mts.
Solomon R.
River
Homestead
Cornucopia
Sanger
Anthony
Burkemont
Carson
Miles
Sparta
Erwin
Pine
Pine Cr.
Keating
Powder R.
Newbridge
Richland
Haines
Bourne
Sumpter
Sumpter Jc.
McEwen
Baker City
Pleasant Valley
Connor Creek
Durkee
Weatherby
Burnt R.
Blue Mts.
Geiser
Whitney
Tipton
Audrey
Bridgeport
Rye Valley
Lime
Unity
Hereford
Mts.
Burnt River
Malheur
Huntington
Ironside
Willow Cr.
Dell
Snake
Oregon Short Line
Weiser
Weiser R.
P. & I. NO.
Mosquito
Payette
Payette R.
Ontario
Vale
Westfall
Bully Cr.
Beulah
Nyssa
Owyhee
Parma
Notus
Boise R.
Caldwell
Homedale
Snake R.
Rockville
Cedar Mts.
Juntura
Malheur R.
Riverside
Skullspring
Watson
Mahogany Mt.
Sheaville
Cow Cr. Lakes
Delamar
Silver City
Jordan Valley
Boulder R.
Mt. Winthrop
Dairy
Owyhee R.
North Fk.
Middle Fk.
South Fk.
Crooked Cr.
Rattlesnake Cr.
Antelope Cr.
Lit. Owyhee
McDermitt
Washburn Cr.
Venator
Cord
Mule
Fossil
Lost Valley
Burnt Ranch
Twickenham
Spray
Richmond
Monument
Waterman
Mitchell
Antone
Barite
Howard
Dale
North Fk.
Desolation Cr.
Ritter
Middle Fk.
Granite
Lawton
Alamo
Hamilton
Kilbride
Susanville
Greenhorn
Longcreek
Fox
Austin
Comer
Beech Creek
Dayville
John Day R.
Prairie City
Mt Vernon
Canyon City
Strawberry Mts.
Canyon Cr.
South Fk.
Seneca
Izee
Suplee
Post
Beaver Cr.
Paulina
Maurys Mts.
Van
Silvies
Drewsey
Silvies R.
Harney
Riley
Burns
Silver Cr.
Sage Hen Cr.
Lawen
Egli
Silver L.
Narrows
Malheur Lake
Harney L.
Christmas L.
Blitzen R.
Smith
Diamond
Riddle R.
Juniper L.
Donner & Blitzen R.
Boca L.
Mc.Coys Cr.
Steins Mts.
Manns L.
Andrews
Alvord L.
Trout Cr.
Tumtum L.
Denio
Alkali L.
Lake
Paisley
Chewaucan Marsh
Lake Albert
Warner Lake
Honey Cr.
Mt. Warner
Plush
Guano Cr.
Shirk
Guano L.
Thomas Cr.
Lakeview
Adel
Warner Lake
Goose Lake
New Pinecreek
Hammond's 8 X 11 Map of Oregon
Copyright 1908, by C.S.Hammond & Co., N.Y.

greater from many of the Western States, as millions of tons of low grade ores now encumber the dumps of the mines. Improved methods of treating the ore or some cheaper plan of transportation to the smelters from the mines is certain to transform much of this now valueless product into one of great value. Edison in 1896 perfected an electrical machine for treating low grade "magnetic" ore.

Oreads, in Greek mythology, nymphs of the mountains.

Orebro. See OEREBRO.

Oregon, a State in the Pacific Division of the North American Union; bounded by Washington, Idaho, Nevada, California, and the Pacific Ocean; admitted to the Union, Feb. 14, 1859; capital, Salem; number of counties, 33; area, 94,560 square miles; pop. (1900) 413,536; (1910) 672,765.

Topography.—The surface of the State is mountainous, three ranges dividing it from N. to S.; the Coast Range from 10 to 30 miles from the ocean; the Cascade Mountains, from 110 to 150 miles inland; and the Blue Mountains in the E. The Coast Range has an extreme altitude of 4,000 feet, and is covered with dense forests. The Cascade Mountains, a continuation of the Sierra Nevadas, have an extreme height of 7,000 feet, with several peaks rising 2,000 to 5,000 feet higher. Mount Hood reaches an altitude of 11,500 feet, McLoughlin, 11,000 feet; and Jefferson, 10,500 feet. The Cascades are heavily timbered to the snow line. Four transverse ranges connect the Coast Range with the Cascades; the Calpooia, Umpqua, Rouge river and Siskigon Mountains. The Willamette river valley, lying between the Coast Range and Cascade Mountains, and the Columbia river and California spur, is 150 miles long, from 30 to 70 miles wide, and is extremely fertile. Eastern Oregon, embracing two-thirds of the State, is a high table-land, with little rainfall, and sparsely populated. There are fertile valleys along the rivers and lakes in the S., and in the Blue Mountains. The rivers flowing into the ocean are the Roque, Coquille, Umpqua, Sinslaw, Alsace, Yaquina, Nestuca, and Nehalem; those emptying into the Columbia, Lewis and Clarke, Clatskaine, Youngs, Sandy, Willamette, Des Chutes, Hood, Umatilla, and John Day; and those feeding the Snake river, the Owybee, Malbeur, Burnt, Powder, and Grande Ronde. The principal lakes are, Klamath, Goose, Warner, Salt, Christmas, Albery, Summer, Silver, Henry, and Malbeur. Crater Lake in the Cascades, 8,000 feet above sea-level, is the crater of an extinct volcano, 10 miles in circumference, and surrounded by bluffs 2,000 feet high. It is the deepest body of fresh water in America. The coast line of Oregon is very abrupt and rocky and but little indented, the mouth of the Columbia river being the best harbor. There are other harbors at Port Orchard, Roque river, Coos Bay, Tillamook Bay, and Yaquina Bay.

Geology.—The geological structure of the State is quite varied. The Coast Range and Blue Mountains are of Eozoic formation; the Cascade ranges and the E. part of the State, of volcanic, with its ridges and hills of obsidian; and the Pacific Coast, Willamette valley, and part of the Umpqua valley, are of Tertiary formation. The Cretaceous fossil deposits are found in the upper valleys of Des Chutes, Crooked and John Day rivers, and the Grande Ronde valley. The Glacial, Champlain, and Terrace periods are well represented. In 1900 the principal mineral productions included gold, 81,980 fine ounces, valued at $1,694,700; silver, 115,400 fine ounces, valued at $71,548; and coal, 58,864 short tons, valued at $220,001. The building stones were granite, valued at $5,313; sandstone, $5,450; and limestone, $10,900. The production of mineral waters was 49,300 gallons, valued at $11,960; and the clay products had a value of $327,374.

Soil and Agriculture.—The soil is of volcanic origin, with alluvial deposits in the valleys, and is extremely fertile. In the central and S. E. portions of the State the rainfall is very light and the farming depends largely upon irrigation. Grapes, prunes and other fruits thrive abundantly, and the wool growing industry is very large. In 1900 the principal farm crops were corn, 317,147 bushels, valued at $180,774; wheat, 16,198,012 bushels, valued at $8,908,907; oats, 3,282,770 bushels, valued at $1,345,936; hay, 1,677,085 tons, valued at $11,404,178; potatoes, 1,692,020 bushels, valued at $761,409; and barley, 905,928 bushels, valued at $380,490.

Manufactures.—In 1900 there were reported by the United States census, 3,088 manufacturing establishments, employing $33,422,393 in capital, and 17,236 persons; and paying $26,099,855 for raw materials, and $8,333,433 in wages; and having an annual output, valued at $46,000,587. The natural advantages of the State are extensive, furnishing material for its various manufacturing enterprises, and its streams furnish abundant power at the Dalles, the Cascades, and Oregon City. The principal industries include railroad cars and shop construction, fish canning, flouring mills, lumber and timber, printing and publishing, shipbuilding, slaughtering, meat packing, and the manufacture of woolen goods.

Banking.—On Oct. 31, 1901, there were reported 29 National banks in operation, having $2,395,000 in capital, $1,194,734 in outstanding circulation, and $1,154,800 in United States bonds. There were also 21 State banks, with $812,920 capital, and 114,350 surplus; and 2 private banks, with

$64,000 capital, and $1,850 surplus. The exchanges at the United States Clearing House at Portland, during the year ending June 30, 1901, amounted to $113,728,149, an increase over those of the preceding year of $11,686,829.

Commerce.—The imports of merchandise at the ports of Oregon and Willamette, during 1900 aggregated in value, $1,519,517; and the exports, $9,094,168.

Education.—At the end of the school year 1899–1900 the children of school census age numbered 111,490; the enrollment in public schools, 89,405; and the average daily attendance, 64,411. There were 2,070 public school buildings, public school property valued at $2,984,443, and 3,742 teachers. The receipts for the year amounted to $1,636,695, and the expenditures, $1,594,420. For higher education there were 14 public high schools, 19 private secondary schools, 4 private normal schools and 9 universities and colleges for men and for both sexes. The colleges include the University of Oregon, at Eugene; Pacific University at Forest Grove; Willamette University, at Salem; and Portland University at University Park.

Churches.—The strongest denominations in the State are the Roman Catholic; Methodist Episcopal; Regular Baptist; Disciples of Christ; Presbyterian; Congregational; Methodist Episcopal, South; Protestant Episcopal; and United Brethren. In 1899 there were 1,223 Evangelical Sunday-schools, with 11,863 officers and teachers and 80,017 scholars.

Postoffices and Periodicals.—In 1901 there were 890 postoffices of all grades; and 193 periodicals, of which 17 were daily, 7 semi-weekly, 144 weekly, 1 bi-weekly, 2 semi-monthly, and 22 monthly.

Railroads.—The total length of railroads within the State, Jan. 1, 1901, was 1,695 miles; of which 58 miles were constructed during the previous year.

Finances.—With the exception of $1,239 in unclaimed bonds, the State has no public debt. In 1901 the amount held in irreducible trust funds was as follows: School fund, $3,637,591; agricultural college fund, $157,302; and university fund, $103,046. The gross property valuation in 1900 was $125,738,761; exemptions, $7,933,887; net taxable valuation, $117,804,874; tax rate, $5.70 per $1,000.

State Government.—The governor is elected for a term of four years and receives a salary of $1,500 per annum. Legislative sessions are held biennially, and are limited to 40 days each. The Legislature has 30 members in the Senate, and 60 in the House, each of whom receives $3.00 per day, and mileage. There are 2 Representatives in Congress. The State government in 1901 was Republican.

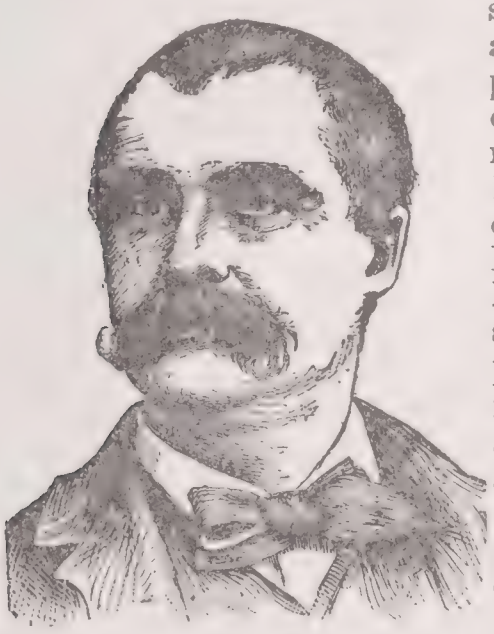
History.—The name Oregon was long applied to all the territory claimed by the United States on the Pacific coast, extending from lat. 42° to 54° 40′ N. By the treaty of 1846, a boundary line was fixed between Great Britain and the United States at lat. 49°. The discovery of the Columbia river, in 1792, was succeeded by an exploration under Captains Lewis and Clarke, 1804–1805. In 1808 the Missouri Fur Company established trading-posts in the country; and, in 1811, the American Fur Company founded a settlement at the mouth of the Columbia, and named it Astoria. In 1839, the emigration of Americans commenced overland by way of the South Pass, and the territory continued to receive settlers yearly till 1848, when the California "gold-fever" attracted a large quota of her citizens away. In 1850, however, the land-donation law, passed by Congress, had the effect of registering 8,000 citizens in Oregon, which was formally organized as a Territory, March 3, 1849. On March 2, 1853, Washington Territory was formed out of the N. half of Oregon; Nov. 5, 1857, a State constitution was adopted; and Feb. 14, 1859, the State was admitted into the Union by Act of Congress under the constitution previously ratified. From 1845 till 1855, a desultory warfare was kept up with the Indian aborigines, and a resumption of the same occurred in 1858, and again in 1872–1873.

Oregon, The, a first-class, twin-screw, steel battleship of the United States navy. She was built at the Union Iron Works, San Francisco, by Irving M. Scott, a native of Maryland, after designs by Lewis Nixon. Her dimensions, the same as those of the "Massachusetts" and the "Indiana," are: Length 348 feet; breadth 69 feet, 3 inches; displacement 10,288 tons; mean draft 24 feet. Her armor is 18 inches on the sides, from 6 to 15 inches on the turrets and from 6 to 17 inches on the barbettes; main battery, four 13-inch, eight 8-inch, and four 6-inch rifles; secondary battery, 30 rapid-fire guns of small caliber; speed 16.79 knots; crew, 32 officers and 440 men; cost, $3,222,810. In the early part of 1898 the "Oregon" made a memorable journey. She was stationed at San Francisco, on the Pacific Coast, and was ordered to Key West, Florida, to join the North Atlantic Squadron in the West Indies. The distance covered was 13,587 miles and the time consumed, including stoppages to coal, etc., was 66 days. The "Oregon" left San Francisco March 19, before the war with Spain began, and reached Key West on the morning of May 26, fully prepared to join the squadron of Admiral Sampson and take part, as she did later on, in the destruction of Admiral Cervera's ships at Santiago de Cuba. During the voyage the "Oregon" was commanded by Capt. Charles E. Clark. On

June 23, 1900, the "Oregon," on her trip from Hong Kong to Taku, ran ashore on the Pinnacle Rock, 50 miles N. W. of Che-Foo. She was floated off, dry docked, and returned to active service some months later.

Oregon, University of, a coeducational non-sectarian institution in Eugene, Ore.; founded in 1876; has grounds and buildings valued at over $400,000; endowment, $175,000; scientific apparatus, etc., $60,000; ordinary income, about $140,000; volumes in the library, 30,000; average number of faculty, 105; average student attendance, 1,000; number of graduates since opening, over 1,500.

O'Reilly, John Boyle, an Irish American poet; born at Dowth Castle, County Meath, Ireland, June 28, 1844; became a reporter for several English and Irish papers, and soon embraced Fenianism. In 1863 he enlisted in the 10th Hussars, in Ireland, for the avowed purpose of spreading revolutionary doctrines among the soldiers. For this he was arrested, tried for treason and sent for 20 years penal servitude in Australia. The following year (1869) he escaped to America, going first to New York and afterward to Boston. In the latter city he found work on "The Pilot" (of which he subsequently became editor and principal owner). In 1870 he went to Canada as reporter for "The Pilot" during the second Fenian raid, and for a time commanded the Irish forces. His published works include: "Songs of the Southern Seas" (1873); "Songs, Legends and Ballads" (1878); "Moondyne, a Novel" (1879); "Statues in the Block" (1881); "In Bohemia" (1886); and "Stories and Sketches" (1888). He died in Hull, Mass., Aug. 10, 1890.



JOHN BOYLE O'REILLY.

O'Rell, Max. See BLOUET, PAUL.

Orellana, Francisco de, a Spanish explorer; born in Truxillo, Spain, about 1490, accompanied Pizarro to Peru in 1531. Ambitious of adventure, he set out to explore the continent of South America, E. from Peru; passed down a branch of the Amazon into that vast river, and thence to the sea; thus being the first European navigator of the Amazon. His accounts of the marvelous country he had crossed induced Charles V. to authorize him to settle colonies there, and he returned for that purpose in 1549, but died soon after his arrival.

Orelli, Kaspar von, a Swiss scholar; born in Zurich, Switzerland, Feb. 13, 1787. Ordained in 1806, he next year became a Reformed preacher at Bergamo; in 1813 a teacher in the cantonal school at Coire; in 1819 professor at Zurich, and in 1833 Professor of Classical Philology in the newly-founded university. Orelli edited many classical authors with great learning, taste, and acute discrimination, in particular "Horace" (1837–1838), "Tacitus" (1846–1847), and "Cicero" (1826–1831); and also compiled a "Collection of Latin Inscriptions" (1828). He died in Zurich, Jan. 6, 1849.

Orelli, Konrad von, a German theologian; born in Zurich, Switzerland, Jan. 25, 1846; studied at Lausanne, Zurich, Erlangen, and especially theology at Tübingen, and Oriental languages at Leipsic. In 1869 he became orphan-house preacher at Zurich, privat-docent in 1871, Professor extraordinary of Theology at Basel in 1873, and ordinary professor there in 1881. Among his writings are: "The Old Testament Prophecy of the Fulfillment of the Kingdom of God" (1882; Eng. trans. 1885) and admirable "Commentaries on Isaiah" (1887; trans. 1889); "Jeremiah" (1887); "Ezekiel and the Twelve Minor Prophets" (1888).

Ore Mountains. See ERZEBIRGE.

Orenburg, a town of European Russia; on the Ural river; 727 miles E. S. E. of Moscow. Founded (1743) as a frontier fortress, it is now of importance for its commerce only; it imports cotton, silk stuffs, cattle, hides, etc., from Bokhara, Khiva, and Tashkend. Corn, metals, sugar, woven goods are the principal exports. The town possesses an arsenal and two military schools. Pop. (1908) 72,425.

Oreodaphne, in botany, a genus of *Lauraceæ*, chiefly from tropical America. It consists of large trees with alternate leaves and panicles or racemes of umbel-like heads of flowers, with nine stamens. *O. opifera* is a large tree found in the forests between the Orinoco and Parana. When incision is made in the bark, there gushes out a volatile oil, which is a discutient. The fruit, when distilled, yields a yellow wine colored and scented volatile oil, used in Brazil in contractions of the joints, pains in the limbs, etc. *O. fœtens* furnishes the til of the Canaries, a kind of wood with a bad odor; *O. exaltata*, the sweet wood of Jamaica; and *O. cupularis*, the cinnamon of the Isle of France. In palæobotany, *O. heerri* is found in the Older Pliocene of Italy.

Oreodonts, an extinct family of ungulates, the remains of which occur in the Tertiary deposits of North America.

Orestes, in Greek mythology, the son of Agamemnon and of Clytemnestra, the avenger of his father, by becoming the murderer of his mother. For this murder he is relentlessly pursued by the Eumenides or Furies, and only succeeds in appeasing these terrible goddesses by carrying out the instructions of the Delphian oracle to bring back the statue of Diana from Tauris to Argos. Married to Hermione, daughter of Menelaus, Orestes ruled over his paternal kingdom of Mycenæ, and over Argos, upon

ORESTES' EXPIRATION.

the death of its king. Orestes is an important figure in the "Choephori" and the "Eumenides" of Æschylus, the "Electra" of Sophocles, and the "Orestes" and "Iphigenia in Tauris" of Euripides.

Orfa. See EDESSA.

Orfah, Oorfa, or **Urfa,** a fortified town of Asiatic Turkey, 78 miles S. W. of Diarbekr. It is well built, and has a considerable trade with North Syria and Mesopotamia. It is supposed to be the site of the "Ur of the Chaldees," mentioned in Scripture. Pop. 30,000.

Orfila, Mateo José Bonaventura, a French physician of Spanish parentage, and the founder of the science of toxicology; born in Mahon, Minorca, 1787. In 1813 he published his "Treatise on Poisons," which placed him among the best French chemists, and led to his election as member of the Academy of Medicine, and correspondent of the Institute. In 1819 he became Professor of Medical Jurisprudence; in 1831 he was elected dean of the faculty of medicine. His most important works were: "Elements of Chemistry, applied to Medicine and the Arts"; "Treatise on Legal Medicine," in four volumes, which is the greatest work on medical jurisprudence extant; and "Lectures upon Legal Medicine." He died in 1853.

Organ, in anatomy, a member of an organized being through which its functions are executed. Thus the root, stem, and leaves of a plant are organs.

In music, the most comprehensive and important of all wind instruments. Its history can be traced back to the earliest antiquity. Starting from a small collection of pipes, perhaps even from a syrinx, it has gradually grown in size and complexity till, at the present day, one performer has complete control over many thousands of pipes. The *ugab*, translated "organ," in Genesis (iv: 21) and Job (xxi: 12), was probably one of the earliest and simplest forms of a collection of pipes placed over a windbox or soundboard. In its rudimentary state, the wind was admitted to each pipe at the will of the player by means of a sliding strip of wood, which could be pulled in and out; this mechanism was the ancestor of our modern keyboard. The next step was to have more than one series of pipes; strips of wood passing lengthwise under the mouths of each set enabled the player, by pulling a stop, to exercise a choice as to which he used. Afterward, as larger organs were constructed, the smaller were called "portative," because they could be carried about in processions, etc., and the large ones were called "positive," because they were fixtures. The essential principles of the construction of an organ were thus discovered, and it only remained to expand the instruments (1) by the placing of several organs under the control of one player, with a separate manual or clavier for each; (2) by the use of keys to be played by the feet, or pedals; (3) by the increase of the compass; (4) by the introduction of great variety of tone; (5) by perfecting the bellows and wind supply, and placing the registers under the organist's control by means of mechanical appliances. It is probable that the use of water in ancient organs (hence called hydraulic organs) was merely for the purpose of graduating the exit of air from a chamber into the pipes. In modern instruments, four, or sometimes even five, rows of keys are found, each representing a distinct instrument; these are named after their use or characteristics; as, great organ, that used for grand effects, the principal manual; choir organ, that used for the accompaniment of voices; solo organ, that containing stops for solo use; swell organ, pipes placed in a distant box, with shutters opening and closing like Venetian blinds, by means of which a *crescendo* can be made; pedal organ, the pipes controlled

by the pedals. Pipes range from 32 feet to ¾ of an inch in length; they are divided into two great classes, flue and reed, names which need no explanation. The title of stops generally intimates their quality of tone, *e. g.*, flute, violin, oboe, clarinet, trumpet, etc. The touch of a large organ is made "light" by levers filled with highly compressed air, hence called pneumatic levers; the long array of stops is controlled by composition pedals, combination pistons, or by ventils; and, lastly, mechanical means have superseded manual labor for blowing.

In comparative anatomy and physiology, organ of Bojanus, a double organ with two bilaterally symmetrical halves, one on each side of the body, just below the pericardium, communicating with it and with the mantle cavity, in the Lamellibranchiata. This organ performs the function of a kidney, is in some cases connected with reproduction, and probably corresponds to the pseudohearts of the Brachiopoda.

Organic Chemistry, the chemistry of the carbon compounds in which the hydrogen or nitrogen of the substance is directly united with carbon. No distinction is drawn between compounds which are the products of animal and vegetable life and those obtained by direct combination of the elements. It is owing to the number and great complexity of the carbon compounds that they are dealt with under a separate division.

Organic Radical, a group of atoms containing one or more atoms of carbon, of which one or more bonds are unsatisfied. It may be a monad, dyad, or triad radical, according to the number of monad atoms required to complete its active atomicity.

Organometallic Bodies, compounds of hydrocarbon radicals with monad, dyad, and tetrad metals, *e. g.*, sodium ethide, NaC_2H_5; zinc methide, $Zn''(CH_3)_2$; stannic dimethyl di-iodide, $Sn^{iv}(CH_3)_2I_2$, etc.

Organzine, a silk thread of several singles twisted together; thrown silk.

Orgaz, Francisco, a Cuban poet; born in Havana in 1815; published a volume of poems, "Preludes for the Harp" (1841), which placed him among the best lyric poets of Spanish America. A collection of poems, "Poems of the Tropics" (1850), preserved the uses and customs of the Cuban aborigines. He also wrote several dramas. He died in Madrid, Spain, in 1873.

Orgeat, a liquor or syrup extracted from barley and sweet almonds, and used as a flavor for beverages and edibles, or medicinally as a mild demulcent.

Orgies, secret rites or ceremonies connected with the worship of some of the pagan deities, especially applied to the revels at the Dionysia, or feasts in honor of Dionysos or Bacchus, which were characterized by wild and frantic revelry.

Oriel, or **Oriol,** a projecting window, mostly of a triagonal or pentagonal form, and divided by mullions and transoms into different bays and other proportions. Sometimes it is of two stories, and when it does not reach to the ground it is supported on brackets or corbels.

Oriental, the term is often applied to certain gems or precious stones as a mark of excellence, or to distinguish them from an inferior variety, in opposition to occidental.

Oriental Languages, the general designation at the present day for the languages of the nations of Asia, as also of the Mohammedan countries of Europe and Africa.

Oriental Venice, Bangkok, in Siam; so named because a large number of its population dwell in floating houses.

Orientation, in anthropology, practices concerning the posture of the dead in their graves, and the living in their temples. In architecture, the placing or building of a church so that its chancel is toward the E., or that part of the E. in which the sun rises on the day of the patron saint. In biology, a term applied to the means by which animals, when taken from home, are able to trace their way back. In surveying, the act of determining the direction of the side of a triangle, or the direction of a chain of triangles.

Oriflamme, or **Oriflamb,** the ancient royal banner of France; originally the banner of the abbey of St. Denis, near Paris, which received many important grants from the early French kings. Its color was purple with a tinge of azure, and gold. It became the banner of the monarchy in the reign of Philip I. The oriflamme borne at Agincourt was, according to Sir H. Nicolas, an oblong red flag, split into five points. It sometimes bore upon it a saltire wavy, from the center of which golden rays diverged.

Origen, a father of the Church, and one of the most learned ecclesiastical writers; was born in Alexandria, 185 A. D., of Christian parents, who early instructed him in religious knowledge and in the sciences. At the age of 17 he lost his father, who was beheaded for his profession of Christianity. Origen had now recourse to the teaching of grammar for the support of himself, his mother, and brothers; but this occupation he relinquished on being appointed catechist, or head of the Christian school of Alexandria. In this situation, he distinguished himself by the austerity of his life. From Alexandria he went to Rome, where he began his famous "Hexapla," an edition of the Hebrew Bible with five Greek versions of it. At the command of his bishop he

returned to Alexandria, and was ordained. Soon after this, he began his "Commentaries on the Scriptures." His great talents and popularity exposed him to the jealousy of the bishop, whose persecutions at length drove him from his native country, and for a long period made him a wanderer. Origen is supposed to have died in Tyre about the year 254.

Original Sin, in Protestant theology, sin for which each individual is held to be responsible before he has committed any actual transgression. It arises from the first sin of Adam in Paradise, opinions, however, differing as to the precise connection between the two. In Roman theology, in the Small Catechism, published by authority, original sin is defined to be "that guilt and stain of sin which we inherit from Adam, who was the origin and head of all mankind." The Council of Trent defines that Adam lost original justice not only for himself but for his descendants, and that he poured sin — the death of the soul — into the whole human race. This is supported by a reference to Romans v: 12. The Council declared that nothing in the decree as to original sin was to apply to the Virgin Mary.

Orinoco, one of the great rivers of South America, has its origin on the slopes of the Sierra Parima, in the extreme S. E. of Venezuela; its exact sources were only discovered in 1886 by Chaffanjon. It flows at first W. by N., a mountain-stream, as far as lon. 67° W. A little below Esmeralda (lon. 65° 50′ W.) it divides and sends off to the S. an arm, the Cassiquiare, which, after a course of 180 miles, enters the Rio Negro, a tributary of the Amazon. The other branch on reaching San Fernando (lon. 68° 10′ and lat. 4° 2′ N.) is met by the strong current of the Guaviare; the united stream then turns due N., and, after passing over the magnificent cataracts of Maypures and Atures (glowingly described by Humboldt), and picking up the Meta on the left, meets the Apure, which likewise strikes it from the left. Below the confluence with the Apure the Orinoco turns E. and traverses the llanos of Venezuela, its waters, with an average breadth of 4 miles, being augmented from the right by the Caura and the Caroni. About 120 miles from the Atlantic, into which it rolls its milk-white flood, its delta (8,500 square miles) begins. Of the numerous mouths which reach the ocean over 165 miles of coast line only seven are navigable. The waterway principally used by ocean-going vessels, which penetrate up to Ciudad Bolivar (Angostura), a distance of 245 miles, is the Boca de Navios, varying in width from 3¾ to 23 miles. The total length of the river is some 1,550 miles, of which 900, up to the cataracts of Atures, are navigable, besides a farther stretch of 500 miles above the cataracts of Maypures; area of drainage basin, 368,600 square miles. Most of the larger affluents are also navigable for considerable distances, the Meta, for instance, to within 60 miles of Bogotá, the capital of Colombia. As a rule the river floods the districts adjoining its banks from May to January, the country under water sometimes measuring 100 miles across.

Orillon, a curved projection formed by the face of a bastion overlapping the end of the flank, intended to protect it from oblique fire. Also an earthen mound faced with brick.

Oriole, *Oriolus galbula,* the type-species of the family *Oriolidæ.* Its conspicuous plumage, bright yellow contrasted with

EUROPEAN ORIOLE.

black, chiefly on wings and tail, often brings about its death. The nest is suspended under the horizontal fork of a bough, to both branches of which it is firmly attached; the eggs are of a shining white, sometimes tinged with pink, and sparsely dotted with purple. It is well known in Europe. Its range in summer is as far E. as Irkutsk, in winter it is found in Natal and Damaraland. In India it is replaced by *Oriolus kundoo,* and in Asia and Africa there are numerous species resembling it. Orioles, the genus *Oriolus,* or the family *Oriolidæ;* the genus *Icterus,* or the family *Icteridæ,* of America.

Orion, in mythology, a celebrated Greek giant and hero, and the reputed son of Hyrieus of Hyria, in Bœotia. So immense was his size, that when he waded through the deepest seas he was still a head and shoulders above the water; and when he walked on dry land, his stature reached the clouds. Once on a time he came to Chios, in the Ægean Sea, where he fell in love with Æro or Merope, daughter of Œnopion. He cleared the isle of wild beasts, and brought their skins as presents to his sweetheart; but her father always put off their marriage; whereupon Orion, one day giving way to passion (while under the influence of

wine), sought to take the maiden by force. Œnopion now called upon Dionysus (Bacchus) for help, who put out the eyes of the inebriate lover. Orion, however, recovered his sight in Lemnos, by following the advice of an oracle, and returned to Chios to take vengeance on Œnopion. Not finding him, he went to Crete, where he spent the rest of his life hunting in company with Artemis (Diana). The cause and manner of his death are differently related. After his death he was placed with his hound in heaven, where, to this day, the following constellation bears his name.

In astronomy, one of the ancient constellations found by Ptolemy. The equinoctial passes nearly through its center, and it is situated in the Southern Hemisphere with respect to the ecliptic. Four of the seven stars constituting the constellation are situated in the middle of it, in a straight line. Two of these are of the first magnitude, namely, Betelguese or Beltegeux, in the right shoulder, and Rigel in the left foot. In the middle of the square are three stars of the second magnitude, which form what is called the belt of Orion. The constellations which surround Orion are Eridanus, Canis Major, Gemini, Auriga, and Taurus. Near the sword-scabbard is a remarkable nebula, and within the constellation are thousands of small stars, which are only visible by powerful telescopes.

Orissa, a maritime province of Hindustan; on the Bay of Bengal; between Bardwan and the Madras presidency, forming a division or commissionership under the jurisdiction of the lieutenant-governor of Bengal. It has an area of 9,853 square miles, and includes the districts of Balasore, Cattack, and Puri, and a number of tributary States. The surface along the shore is in general low and sandy, and in the interior wild and rugged. The inhabitants are composed chiefly of Oorias, the conquerors of the country, and of wild hill tribes. The largest river is the Mahánadi. The chief towns are Cattack, Puri or Juggernauth, and Balasore. Pop. (1901) 4,982,142.

Orizaba, capital of the Mexican state of Vera Cruz; 82 miles W. S. W. of Vera Cruz city, and 181 E. S. E. of Mexico; in a fertile garden country, 4,030 feet above the sea; contains an extensive cotton factory, paper and corn mills, and railway shops. Pop. (1900) 32,894. The volcano of Orizaba, 25 miles N., is a noble pyramid rising to an elevation of 17,876 feet, or, according to Heilprin's measurements, 18,205 feet. Its last severe eruption was in 1566.

Orkney Islands, a group of 90 Scotch islands, islets, and skerries, of which only 28 are inhabited, and which have an aggregate area of 376 square miles, the largest being Pomona or Mainland (207 square miles), Hoy (53), Sanday (26), Westray, South Ronaldshay, Rousay, Stronsay, Eday, Shapinshay, Burray, Flotta, etc. They extend 50 miles N. E., and are separated from Cáithness by the Pentland Firth, 6½ miles wide at the narrowest. With the exception of Hoy, which has fine cliffs, and in the Ward Hill attains 1,564 feet, the scenery is generally tame, the surface low and treeless, with many fresh water lochs. The prevailing formation is the Old Red Sandstone, with a small granitic district near Stromness; and the soil is mostly shallow, incumbent on peat or moss. The mean annual temperature is 45°, the rainfall 34.3 inches. The area under cultivation has more than doubled since 1850, but is still less than one-half of the total area. The live stock during the same period has trebled. The holdings are small — 16½ acres on an average; and agriculture and fishing are the principal industries. The Orkneys (Ptolemy's Orcades) were gradually wrested by Norse rovers from their Pictish inhabitants; and in 875 Harold Haarfager conquered both them and the Hebrides. They continued subject to the Scandanavian crown — under Norse jarls till 1231, and afterward under the Earls of Angus and Stratherne and the Sinclairs — till in 1468 they were given to James III. of Scotland as a security for the dowry of his wife, Margaret of Denmark. They were never redeemed from this pledge; and in 1590, on James VI.'s marriage with the Danish Princess Anne, Denmark formally resigned all claims to the sovereignty of the Orkneys. The present landed proprietors are chiefly of Scotch descent, the islanders generally of mixed Scandinavian and Scotch origin. Pop. 30,453.

Orlando, a town and county-seat of Orange co., Fla.; on the Plant System and the Florida Central and Peninsula railroad; 18 miles N. by N. E. of Kissimmee. It is chiefly known as a center of the orange industry. Pineapples, and various vegetables are also grown. The assessed property valuation exceeds $1,000,000. Pop. (1890) 2,856; (1900) 2,481.

Orléans (or-lā-an'), a city of France, formerly capital of Orléanais, now of the department of the Loiret; on the Loire; 68 miles S. W. of Paris. It has some handsome public squares, a Gothic cathedral, two city halls, a court house and other notable buildings. Confectionery, pottery, and woolen goods are the staple articles of manufacture. Philip of Valois erected Orléans into a duchy and peerage in favor of his son, and Orléans has since continued to give the title of duke to a prince of the blood royal. In 1426 the city sustained a siege against the English, and was relieved by the Maid of Orléans (Joan of Arc), whose statue in bronze stands in one of the public squares. It was taken and retaken more

than once in the Franco-German War in the latter part of 1870. Pop. (1906) 68,614.

Orléans, a French royal family, two houses of which have occupied the throne of France. On the death of Charles VIII. without issue in 1498, Louis, Duke of Orléans, great-grandson of their common ancestor Charles V., and grandson of the first Duke of Orléans, being the nearest heir, ascended the throne under the title of Louis XII. Henry III. (died 1589) was the last sovereign of this house, the Valois-Orléans branch. The house of Bourbon-Orléans is descended from Philip, Duke of Orléans, son of Louis XIII. and younger brother of Louis XIV. His son Philip, Duke of Orléans, was regent of France during the minority of Louis XV. His grandson, Louis Philippe Joseph, who assumed the surname of Egalité, was beheaded in 1793. Louis Philippe, Duke of Chartres, afterward King of the French, was the son of Egalité. The grandson of Louis Philippe, the Comte de Paris, born 1838, and educated in England, next became the head of the royal house and royalist party of France. He died in England, Sept. 8, 1894; and the title passed to his son, Louis Philippe Robert, born in Twickenham, England, Feb. 6, 1869, who is now the legitimate pretender.

Orléans, Bastard of. See DUNOIS, JEAM.

Orléans, Jean Baptiste Gaston, Duke of, third son of Henry IV. of France, and Mary Medici; born April 25, 1608. His early education was miserable, and the cause of the feebleness of character which he displayed through life, though he had received from nature much more of his father's spirit than his brother Louis XIII. The latter was jealous of the duke, and opposed him in many ways, while the duke retaliated by intriguing against the king; and but for Richelieu, who was a greater power in the state than the royal family itself, might have succeeded. By his first marriage, with Mary of Bourbon, heiress of the house of Montpensier, he had a daughter, author of some interesting memoirs. During the disturbances of the Fronde he joined De Retz, the soul of the Fronde, who, however, soon saw through the character of his fickle and feeble confederate. After the termination of the troubles (1648) the duke was banished to Blois. He died Feb. 2, 1660.

Orléans, Louis Albert Philippe, Count of Paris; born in the Tuileries, Paris, France, Aug. 24, 1838; son of the Duke of Orleans; was educated at Claremont, England. In 1861 he and his brother, the Duke of Chartres, came to the United States and served with distinction on General McClellan's staff till June, 1862. After the establishment of the republic in France he lived in Paris, till the expulsion bill of 1886 drove him into exile to England. Among his publications, his "History of the Civil War in America" (1874–1889), is highly esteemed by historians and military critics. He died in London, England, Sept. 8, 1894.

Orléans, Louis Philippe Joseph, Duke of (Egalité), a great-grandson of the regent Philippe, Duke of Orléans; born in St. Cloud, France, April 13, 1747; married in 1769 the daughter of the Duke of Penthièvre. He was notorious for his dissoluteness of manners, and the extreme, though vacillating political conduct by which he courted popularity. His opposition to the court began in 1771, and he became the rallying point of its enemies. In 1787 he was exiled for the part he took in the Assembly of Notables; in 1789 he was one of the nobles who joined the Tiers Etat (Third Estate); in 1792 he went over to the revolutionary party without reserve, took the name of Philippe Egalité ("Philip Equality"), and voted for the death of Louis XVI. It did not save him from being arrested as a Bourbon, condemned and beheaded, in Paris, Nov. 6, 1793.

Orléans, Louis Philippe Robert, Duke of; born in Twickenham, England, Feb. 6, 1869; son of the Count of Paris, and heir to the French throne; was educated in France, but banished with the other princes in 1886. In 1890 he returned and demanded the right of enlisting in the army, but was again imprisoned and banished. On the death of his father, in 1894, he became the head of the royal house.

Orléans, Philippe, Duke of, only brother of Louis XIV., of France, and founder of the house of Bourbon-Orléans, which for a short time held the throne of France; born Sept. 21, 1640. In his 21st year he married Henrietta of England, sister of Charles II. The great esteem which the king showed for this princess excited the jealousy of his brother, and her sudden death was attributed to poison, to the administration of which the duke was suspected of being accessory. His jealousy seems not to have been unfounded. The second marriage of the duke, with the princess Elizabeth of the Palatinate (1671), was arranged by Louis to secure the neutrality of the Elector Palatine in the approaching war against Holland. In this war the duke distinguished himself in spite of his effeminacy. He died June 9, 1701.

Orléans, Philippe, Duke of, Regent of France, son of Philippe, Duke of Orléans, and the Princess Palatine Elizabeth; born in St. Cloud, France, in August, 1674. He fell early under the influence of the clever and unscrupulous Abbé (afterward Cardinal) Dubois, who continued his confidant and adviser through life. He made his

military début at the siege of Mons (1691), and in 1693 distinguished himself at Neerwinden, but only to arouse the jealousy of Louis XIV., his uncle, who compelled him to retire from the army. In 1692 he married Mlle. de Blois, the legitimated daughter of Louis. In 1707 he was appointed to succeed the Duke of Berwick in Spain, and completed the subjugation of that country. He was recalled, however, being suspected of intriguing for the crown of Spain, and again forced into retirement. On the death of the king (Sept. 1, 1715), he was appointed regent. On acceding to power the regent found the finances in extreme disorder, and endeavored to improve matters by retrenchment and peace; but his reckless introduction of a vast paper currency brought the nation to the verge of bankruptcy. He resigned the government to Louis XV. on Feb. 13, 1723, and died in Paris, in December of the same year.

Orloff, a celebrated Russian family, founded under Peter the Great by Ivan Orel, one of the archers or *strelitzes,* who, when that body was destroyed, saved his life by his cool courage, and became an officer and a noble. The most celebrated of his descendants were: GREGORY, a Russian general and political intriguer, who greatly promoted the elevation of his mistress, Catherine II., to the throne. Being disappointed in his hope of sharing the crown with her, and declining a private marriage, he was supplanted by a new favorite, and died insane in 1783. He had one son by the empress, named Bobrinski. ALEXIS, his brother, and fellow conspirator, was a man of gigantic stature and strength, and is said to have strangled the Emperor Peter with his own hands. He was a favorite of Catherine, and was married to the Princess Tarakanoff, daughter of the Empress Elizabeth; died in 1808. GREGORY VLADIMIROWITZ, a nobleman of the same family, born in 1778, and bearing the title of Count Orloff, was distinguished for his patronage and culture of letters. He was author of "Historical, Political, and Literary Memoirs of Naples"; and "History of the Arts in Italy"; died in 1826. MICHAEL, son of the above Alexis; born in 1785, served in the Russian army against Napoleon I., and went to Paris with the allies in 1814. ALEXIS, brother of the preceding; born in 1787, distinguished himself as a diplomatist and statesman under Nicholas, and died in 1861.

Orloff Diamond, The, a magnificent gem which decorates the imperial scepter of the Russian czar, and on this account sometimes called the scepter diamond. It was purchased in Amsterdam by Count Orloff, who presented it to Catharine II. It weighs 193 carats. See DIAMOND.

Orlop, the lowest deck of a vessel having three decks; also a temporary deck. The deck is below the waterline, and may be occupied by the magazine, cock-pit, and for stores.

Ormer, the ear-shell, a large marine univalve shellfish belonging to the genus *Haliotis,* common on the shores of the Channel Islands, where it is cooked after being well beaten to make it tender. The shell is common as a mantel-piece ornament on account of its pearly interior.

Ormerod, Eleanor A., an English entomologist; born in Sidburg, England. She commenced her contributions to the science of entomology in 1868 in connection with the Bethnal Green Museum. In 1880 she edited the "Cobham Journals," being the meteorological and other observations made during 40 years by Miss C. Molesworth, and involving enormous labor in the consultation of 75,000 observations. In 1882 Miss Ormerod was appointed consulting entomologist of the Royal Agricultural Society, and shortly afterward became special lecturer on economic entomology at the Royal Agricultural College, Cirencester. Her "Manual of Injurious Insects" (1881) and her "Guide to Methods of Insect Life" (1884) are the most generally interesting of her works, which consist principally of papers on different injurious insects of South Africa and Australia, as well as of England. She died July 19, 1901.

Orme's Head, Great, a bold projecting headland, in North Wales, at the mouth of the river Conway, surrounded nearly on all sides by the sea.

Ormolu, a brass used for cheap jewelry, and composed of zinc and copper, in various proportions, to imitate gold. Gold lacquer is used to heighten the color. It is also called mosaic gold. Bronze and copper-gilt also go by this name.

Ormonde, James Butler, Duke of, an English statesman; born in London, England, Oct. 19, 1610. He was the first of the ancient Anglo-Irish family of Butler on whom the ducal title was conferred. The family was of illustrious antiquity. In the beginning of the 13th century Theobald Butler, from whom the Duke of Ormonde was descended, held the hereditary office of royal cupbearer or "butler" of Ireland. The duke's father, the son of the celebrated Walter, Earl of Ormonde, was drowned in crossing the channel; and the old earl having incurred the displeasure of the king, James I., and being thrown into prison, James, who on his father's death became, as Viscount Thurles, the heir of the title, was taken possession of as a royal ward, and placed under the guardianship of the Archbishop of Canterbury. On the restoration of his grandfather to liberty, he also was released; and in his 20th year he married

his cousin, Lady Elizabeth Preston, and in 1632 succeeded, upon his grandfather's death, to the earldom and estates of Ormonde. During the Strafford administration in Ireland Ormonde distinguished himself so much that on Strafford's recall he recommended him to the king; and in the rebellion of 1640 Ormonde was appointed to the chief command of the army. During the troubled times which followed he conducted himself with undoubted ability, though, as a necessary consequence of the numberless divisions and subdivisions of party which then prevailed in Ireland, he failed to satisfy any one of the conflicting sections; and when, in 1643, he concluded an armistice, his policy was loudly condemned as well by the friends as by the enemies of the royalist party in England. During the long contest of Charles with the Parliament, Ormonde continued to uphold the royal interest in his Irish government; and when the last crisis of the king's fortunes came, he resigned his Irish command, and retired to France, from which country he again returned to Ireland with the all but desperate design of restoring the royal authority. After a gallant but unequal struggle, he was, however, compelled, in 1650, to return to France. His services to the royal cause continued unremitting during his exile; and at the Restoration he accompanied Charles II. on his return, and was rewarded for his fidelity by the ducal title of Ormonde. His after life was less eventful, though he twice again returned to the government of Ireland. It was in 1679 that the well-known attempt was made by the notorious Colonel Blood on the life of Ormonde. As he was returning from a civic festival, he was attacked by Blood and a party of ruffians, and was dragged from his coach with the intention of being hanged at Tyburn. The attempt drew additional interest from its being commonly supposed to have been instigated by the profligate Duke of Buckingham, Ormonde's inveterate foe. He escaped uninjured, and lived till the year 1688. As a soldier he exhibited both skill and bravery in command; and as a politician he was singularly upright in a period when there were many opportunities for the trimmer and the charlatan. His letters and other papers are full of deep historical interest. He died in Dorsetshire, England, July 21, 1688.

Ormonde, James Butler, 2d Duke of, an English military officer; born in Dublin in 1665, and when 10 years of age was sent to France for his education, whence he returned after a few years, and was entered at Christ Church, Oxford. In 1682 he married Anne, daughter of Lord Hyde, afterward Earl of Rochester. As Earl of Ossory he served in the army against Monmouth, and also held an office in the palace under James II. After his accession to the dukedom by the death of his grandfather in 1688, he took his share in the Revolution conflict, at first being for moderate measures; but he must have seen the futility of these, for afterward, at the coronation of William and Mary, he acted as lord high-constable. He was present at the battle of the Boyne, at the head of William's life guards. He soon became popular. In 1702 he was placed in command in the expedition against Cadiz; in 1703 he was appointed lord-lieutenant of Ireland, and in 1711 Commander-in-Chief of the land forces sent against France and Spain. After the accession of George I. Ormonde somehow fell into disgrace with the king, and was impeached in 1715 of high treason, and with the result that his estates were attainted, and he was deprived of all his honors. He retired into France, where he attached himself to the Jacobite court, and spent many years in the secret intrigues of the Pretender and his followers. A collection of letters written by him in the organization of the abortive attempt by Spain to invade England and Scotland in 1719, and which led to the affair of Glenshiel, were in 1890 brought to light, in the following years prepared for publication, and in 1896 issued by the Scottish History Society. He died abroad in 1746.

Ormulum, a Transition English metrical translation of the Gospel history.

Ormuz, or **Hormuz,** a small town on the island of Jerun, in the Strait of Ormuz, at the entrance of the Persian Gulf, 4 miles S. of the Persian coast. Three centuries before the Christian era there existed on the mainland, 12 miles E. of the island, a city Ormuz; this in the 13th century was the headquarters of the Persian trade with India. But about the end of the century its ruler transferred his people to the site of the present town, to escape the Mongols. The new city maintained its commercial supremacy even after it passed into the hands of the Portuguese, through Albuquerque's capture of it in 1507. It was taken from the Portuguese in 1622 by an English fleet (Baffin, the Arctic navigator, being killed in the action), and given to Shah Abbas of Persia, who transferred the trade to his port of Bandar Abbas, 12 miles N. W. on the mainland. The Portuguese fort still stands, but the town of Ormuz is a ruin. The island yields salt and sulphur.

Ormuzd, in Persian mythology, the beneficent deity of the Zoroastrian religion as it is set forth in the Zendavesta. According to this system (dualism), Ormuzd, the principle of light and purity, created six immortal spirits, then 28 subordinate spirits, and lastly the souls of men, while Ahriman, the opposing evil principle, produced six evil angels with sundry subordinate

demons. These are all engaged in a ceaseless conflict, which is to end with the triumph of Ormuzd, when Ahriman will acknowledge his supremacy, and all creatures shall be delivered from the dominion of evil.

Orne, a department of France formed out of the old provinces of Normandy, Alençon, and Perche; separated from the English Channel on the W. by La Manche and on the N. by Calvados; area, 2,353 square miles; pop. (1906) 315,993. A range of wooded hills, nowhere rising above 1,370 feet, extends across the S. of the department from E. to W., separating the streams that flow N. to the English Channel from those that go S. to the Seine and Loire. Though the soil is fertile, agriculture is not in an advanced state. Apple and pear trees abound, and more than 22,000,000 gallons of cider are made every year. Cattle and horses of the purest Norman breed are reared. There are cotton and hemp spinning, and cotton and linen weaving, dyeing, bleaching, and manufactures of gloves, iron, glass, etc. Fishing and bee keeping are carried on. Capital, Alençon.

Ornithology, in natural science, the methodical study, and consequent knowledge of birds, with all that relates to them. It embraces caliology (which treats of nests), oölogy, pterylology, and ornithotomy. Its earliest literature dates from Aristotle (385–322 B. C.), and every succeeding age has added its quota. That part of the science which deals with the classification of birds is in an unsettled state; but the fact that old classifications based on external characteristics are of little or no scientific value is now recognized. In the early part of the 19th century Nitzsch made an attempt to introduce a better method. Sundevall followed, in the memoir he presented to the Academy of Sciences, Stockholm, in 1835; and Professor Huxley, in a paper read before the Zoölogical Society, in which he made his celebrated announcement that "Birds are greatly modified reptiles," proposed a morphological classification.

Ornithorhynchus, commonly called duckbill or watermole, in zoölogy, the sole genus of the family *Ornithorhynchidæ*, founded by Blumenbach (1800), the name Platypus, given by Shaw (1799), being previously taken for a genus of Coleoptera. Premaxillæ and mandible expanded anteriorly, and supporting a horny beak; teeth supplied functionally by horny structures; legs short, fitted for swimming; feet webbed, each with five well developed toes, armed with large claws, and beyond which, in the forefeet, the interdigital membrane is extended. Tongue not extensile; tail rather short, broad, and depressed; eyes very small; fur close and soft. A single species, *O. paradoxus*. *O. anatinus* inhabits Australia and Tasmania. It is aquatic, and feeds on water insects, small mollusca, and worms. The ornithorhynchus, though mammalian in its general structure, is

DUCKBILL.

oviparous, laying two eggs at a time. These are about ¾ inches in the longer, and ½ inches in the shorter diameter. The shell is white, strong, and flexible.

Orobanchaceæ, or **Orobancheæ,** in botany, broomrapes; an order of perigynous exogens, alliance Gentianales. It consists of herbaceous, leafless plants growing parasitically on the roots of others. Stems covered with brown or colorless scales; calyx divided, persistent, inferior; corolla monopetalous, irregular, persistent; stamens four, didynamous; ovary superior, one-celled, seated in a fleshy disk, with two or more parietal polyspermous placentæ; fruit capsular; seeds very minute, indefinite. Found in the four great continents. Known genera 14, species 125.

Orobus, in botany, a genus of plants, order *Fabaceæ*. They are perennial herbs, chiefly native of Europe. *O. tuberosa*, the bittervetch, with other species, afford good food for cattle. The tubers have a sweet taste, resembling that of licorice, and are sought after by children; they are also bruised and steeped in water in some parts of the Highlands of Scotland, to make a fermented liquor. They are well flavored and nutritious when boiled or roasted.

Orography, in natural science, that branch of science which treats of mountains and mountain systems of the world; orology, oreography.

Orontes, the ancient name of a river in Syria, now called NAHR-EL-ASI. It rises in the highest part of Cœle-Syria, near Baalbek, flows N. between the mountains of Libanus, as far as the city of Antioch, and then W. to the Mediterranean Sea, through a total course of 147 miles. Its lower course is remarkably beautiful; its rocky banks are 300 feet high, and the windings of the river show them off to the greatest advantage. Myrtles, laurels, figs, wild vines, arbutus, dwarf oaks, and sycamores

grow up the cliffs in picturesque irregularity. The country through which the river flows is in many parts richly cultivated.

Oropus, an ancient seaport in Attica, Greece; situated on the border of Bœotia. It was long an object of strife between the Athenians and Thebans, who alternately possessed it, the Athenians obtaining it permanently before the second century A. D. Many archæological discoveries have been made on the site since 1884.

Oroshaza, a town of Hungary, about 30 miles N. E. of Szegedin. The chief industries are wine-growing and cattle-raising. Pop. (1890) 20,000; (1900) 21,385.

Orosius, Paulus, a Spanish theologian and historian; born in Tarragona toward the end of the fourth century. For a time he resided with Augustine at Hippo, in Africa, and at his suggestion Orosius wrote a general history of the world ("Historiarum Libri vii. adversus Paganos"), to prove that the Christians were not to blame for the downfall of the Roman empire as the pagans alleged. The work is a compilation of no historical value; yet in the Middle Ages it was a popular text-book, and was translated into Anglo-Saxon by Alfred the Great. Several other works are attributed to Orosius, among them one on the errors of Priscillian and Origen.

Orozco y Berra, Fernando (ō-roth'kō ē bär'ä), a Mexican poet; born in San Felipe del Obraje, Mexico, June 3, 1822. His novel "The Thirty Years' War" appeared in 1850. He wrote: "The Coming Fashion," "Three Patriots," "Three Aspirants," three act comedies in verse; and "Friendship," a five act comedy in prose. After his death a collection of his works was published in 1886. He died in Mexico in 1851.

Orozco y Berra, Manuel, a Mexican historian; born in the City of Mexico, June 8, 1816. Among his published works are: "History of Geography in Mexico" (1876 and 1880); and "Ancient History of Mexico," his most famous work (1880–1881), in four parts, — "Civilization," "Primitive Man," "Ancient History," and "The Conquest." He died in the City of Mexico, Jan. 27, 1881.

Orphan, in Church history, a party of Hussites who refused to follow Procopius or to elect any special leader after the death of Ziska, and called themselves Orphans because they had lost their spiritual father.

Orphan Asylum, or **Orphanage,** an establishment in which orphans are provided for and educated. In all well regulated states the duty of taking care of destitute orphans was recognized at an early age, and it appears that the cities of Thebes, Athens, and Rome had establishments in which orphaned, deserted, and illegitimate children were supported and educated at the public expense. In the laws of Emperor Justinian there is frequent mention of such institutions. In the Middle Ages such asylums were numerous and generally under the direction of the clergy. In recent times public orphanages have been substituted or supplemented by the farming out system, that is, the children are brought up in private families willing to undertake their charge. This system, with due care in the selection of guardians and judicious supervision, has proved satisfactory wherever it has been tried. It is more economical, and the example of respectable family life cannot fail to have a beneficial moral influence. Orphan asylums, as conducted in the United States, are supported as private institutions, assisted by legislative appropriation. They are fostered also by the religious denominations.

Orpheus, in Greek mythology, a celebrated mythic bard, said to have been a son of Apollo or Œagrus, King of Thrace

ORPHEUS, EURYDIÇE, AND HERMES.

and the Muse Calliope. Together with his brother Linus he was regarded as having introduced the arts of civilized life among wild and untutored hordes, and by the power of song to have charmed savage beasts, and to have awakened even inanimate nature into life and rapture.

Orpheus C. Kerr, the pseudonym of Robert Henry Newell (*q. v.*).

Orphism, in comparative religion, the doctrines of a Greek school or sect, said to have been founded by the mythic Orpheus. It first comes into notice in the 6th century, B. C. It contained two elements: (1) The religion of Bacchus, and (2) speculation on the nature and relations of the gods. The literature formed a corpus, "The Orphica," now lost, except fragments of uncertain age.

SEP 13 1912

LIBRARY OF CONGRESS
0 038 701 628 4